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JOURNAL OF THE TRANSACTIONS
OF
THE VICTORIA INSTITUTE.

VOL. XXX.

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

EDITED BY THE HONORARY SECRETARY,
CAPTAIN F. W. H. PETRIE, F.G.S., &c.

VOL. XXX.



LONDON :

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1898.

LONDON

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

PREFACE.

THE Thirtieth Volume of the *Journal of the Transactions* of the VICTORIA INSTITUTE is now issued. It is a record of the various important questions which are occupying the thinkers of the present day, taken up in papers by competent authors, carefully investigated, and impartially discussed at meetings by those who have studied the subjects considered; to whose opinions have been added the statements of others whom distance has prevented attending the Institute's gatherings in person.*

The papers and discussions in this volume are upon the following subjects:—"The Röntgen Rays," by Sir G. G. STOKES, Bart., F.R.S.; remarks by the Right Honourable EARL HALSBURY, F.R.S. (Lord High Chancellor) Vice-President, the Right Honourable LORD KELVIN, G.C.V.O., F.R.S., Sir H. BARKLY, G.G.M.G., K.C.B., F.R.S., Sir JOSEPH FAYRER, Bart., F.R.S., and Professor E. HULL, LL.D., F.R.S. "On Biblical Lands, their Topography, Races, Religions,

* The careful correction of the papers, discussions, and MS. communications, by their respective authors and their arrangement, is at times a cause of delay in their publication in the *Journal*, but the result is to give the Volume of Transactions the character of a finished work; and from time to time Members of the Institute and others have expressed their high sense of the value of the Transactions of the Institute, inasmuch as they contain not the views of any one person only, but the well-considered opinions of many, resident in various and even distant parts of the world. This system, carried on by a competent body, gives a value to the treatment of the several subjects beyond that which any individual author could give.

Languages and Customs," by HORMUZD RĀSSAM, Esq., a subject which he, being a Chaldean, is well acquainted with. "The History of Māṇikka Vāçagar," by the Rev. G. U. POPE, D.D. (of the Indian Institute, Oxford), in which he treats so fully on the early history of that Religion which supplanted Buddhism in Southern India and Ceylon, as to make his work specially useful both to the student and to the missionary.* "On some Relations of Mind and Body," by Dr. A. T. SCHOFIELD; with important communications from Professors J. CLELAND, H. CALDERWOOD, LL.D., and others. "On the Classification of the Vertebrata," by Professor J. CLELAND, M.D., LL.D., F.R.S., Professor of Anatomy in the University of Glasgow; to the discussion on which Inspector-General of Hospitals, J. D. MACDONALD, F.R.S., Dr. J. HUTCHINSON, F.R.S., Professor PARKER of the United States, and others contribute. "On the Proposed Scheme for Embanking the Waters of the Nile at Assouan," by Professor E. HULL, LL.D., F.R.S.,—a subject of special interest, the safety of ancient records being in question. "On problems of Aboriginal Art in Australia," a description of the relics of some early inhabitants of that continent, by the Right Rev. S. THORNTON, D.D., Bishop of Ballarat (a Foundation Member). "On Primitive Man," two papers by the Rev. J. MAGENS MELLO, M.A., F.G.S., to the discussions on which Sir J. W. DAWSON, C.M.G., F.R.S., Professors SEELEY, F.R.S., RUPERT JONES, F.R.S., and many others devoted much time and care, before the author's final replies were added. "Investigations regarding the submerged terraces and river-valleys bordering the British Isles," by Professor E. HULL, LL.D., F.R.S.; remarks by Professors ETHERIDGE, F.R.S., RUPERT JONES, F.R.S., and others, who welcome the paper as illustrating stupendous physical changes and as "a valuable contribution to geological knowledge."

* It is also held to be of value nearer home, where some who have *The True Light* seek that darkness which even Māṇikka so desired to dispel.

To all who have taken part in the work done the best thanks of the Members and Associates are due ; they have contributed to make the Journal, not a mere record of the formal proceedings of meetings, but of the well-considered opinions of the many both at home and abroad who have studied the subjects taken up.

FRANCIS W. H. PETRJE, *Capt.*,

Hon. Sec. and Editor.

September, 1898.

JOURNAL OF THE TRANSACTIONS
OF THE
VICTORIA INSTITUTE,
OR
PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.

—♦—
THIRTIETH ANNUAL MEETING,
HELD AT THE HOUSE OF THE SOCIETY OF ARTS.*

The President,
SIR GEORGE GABRIEL STOKES, Bart., LL.D., Sc.D., F.R.S.,
IN THE CHAIR.

Captain FRANCIS PETRIE, F.G.S., &c., Hon. Sec., read the following Report :—

Progress of the Institute.

In presenting the THIRTIETH ANNUAL REPORT, the Council desires to state that the progress of the Institute during the past year has been encouraging, aided as it has been by the steady support accorded by the members at home and abroad. Without this steady support, not only would all progress have been arrested, but much ground already gained would have been lost; with it, the President and Council have been enabled to build up more firmly a society combining the voluntary labours of a still increasing membership at home and abroad in defence of the truth.

But, the last Report showed that the work of the Victoria Institute has so increased as to render a still larger membership

* The President's Address on this occasion, July 15th, 1896, was delivered mainly extempore, being afterwards arranged and printed.

specially desirable; and in order that every advantage may be derived from the labours of those now furthering its objects, and that the efficiency of the Institute may not only be maintained but augmented, the Council is anxious that the importance of adding to the number of its supporters should be a subject present to the minds of all Members and Associates, both at home and abroad.

Many leading home and foreign societies exchange Transactions with the Institute, and an increasing number of Universities, Colleges, Royal and Public Libraries in various countries subscribe (as Associates) for its Transactions.

The Library of Reference is in need of larger funds in order that it may be maintained in that efficient condition which is necessary, considering the important uses it now serves.

The following is the new list of the President and Council:—

President.

Sir George Gabriel Stokes, Bart., LL.D., Sc.D., F.R.S.

Vice-Presidents.

The Rt. Hon. Lord Halsbury, P.C., F.R.S.
 Sir H. Barkly, G.C.M.G., K.C.B., F.R.S.
 Sir Joseph Fayrer, K.C.S.I., F.R.S.
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 The Venerable Archdeacon Robinson Thornton, D.D.
 W. H. Hudleston, Esq., M.A., F.R.S., *Past President of the Geological Society*

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

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 Professor H. A. Nicholson, M.D., F.R.S.E.
 The Bishop of Wakefield.
 Rev. F. W. Tremlett, D.C.L.
 Surg.-Gen. Gordon, M.D., C.B. Q.H.P.
 His Excellency Dr. R. H. Gunning, F.R.S.E.

*Rev. Preb. H. Wace, D.D.
 Rev. Chancellor Lias, M.A.
 *Gen. G. S. Hallowes (*Cor. Sec.*).
 Rev. A. I. McCaul, M.A.
 Capt. Creak, R.N., F.R.S., &c.
 Rev. F. A. Walker, D.D., F.L.S.
 T. Chaplin, Esq., M.D.
 Admiral H. D. Grant, C.B.
 Rev. Canon Girdleston, M.A.
 Professor E. Hull, LL.D., F.R.S.
 T. G. Pinches, Esq. (*Brit. Mus.*).
 The Ven. Archdeacon Sinclair, D.D.
 Gerard Smith, Esq., M.R.C.S.

The Council regret to announce the decease of the following supporters of the Institute:—

The Hon. M. Brimmer, *M.*; Rev. A. Brooks, D.D., *A.*; J. Du Boulay, Esq., D.L., *A.*; Rev. C. V. A. Van Dyck, D.D., *H.C.M.*; Col. F. Fairbanks, *A.*; C. S. Farthing, Esq., *A.*; The Rt. Rev. Bishop G. Hills, D.D., *M.*; H. Edgell Hunt, Esq., *L.M.*; J. C. Jackson, Esq., M.D., *A.*; Rev. R. Lloyd, M.A., *A.*; Professor Louis Pasteur, *H.C.M.* (a firm supporter of the Institute's objects); J. L. Phillips, Esq., M.D., *A.*; Rev. G. Scratton, *A.*; F. W. Upham, Esq., LL.D., *A.*; Rev. Prof. R. Watts, D.D., *A.*; J. Bracebridge Wilson, Esq., F.L.S., *A.*; Mrs. H. Woodrow, *A.*

L. Life. *M.* Member. *A.* Associate. *H.C.M.* Hon. Corresp. Mem.

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

	Life		Annual	
	Members.	Associates.	Members.	Associates.
Numbers on June 30, 1895	62	48	368	882
Deduct Deaths	1	—	3	13
„ Retirements, changes, &c.	—	—	8	15
			— 11	— 28
			357	854
Joined to July 10, 1896	1	1	9	33
	62	49	366	887
	111		1253	
Total			1364	
Hon. Correspondents number 145.			Total	1509.

Finance.

The Treasurer's Balance-sheet for the year ending December 31, 1895, duly audited, shows a balance creditor of £52 12s. 8d., after the payment of all liabilities, with the exception of a small bill due to the printer. The amount invested in 2½ per Cent. Consols is £1,365 18s. 9d.

The Council desires to urge the very great importance of all subscriptions being remitted during the first half of the year (Bye-law III, 3). Adherence to the rule on this point would remove a difficulty in the management which now affects prejudicially the welfare of the Institute. Forms for the payment of the subscriptions through a banker are used by a large number, and may be had at the office.

The arrears of subscriptions are as follows:—

	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Members	1	2	1	0	1	2	2	4	5
Associates	6	1	3	2	8	8	5	5	3

MEETINGS.

It will be remembered that representations having been made by many members living in London and in the home counties, that in consequence of the late hour at which the Institute's meetings were held they were unable to be present thereat; and experience having shown that this late hour often deprived the Institute of the presence not only of leading authorities upon the subjects taken up, but also of many desirous of being listeners, the Council took steps in 1894 to gather the opinions of the members upon the question of adopting an earlier hour for the meetings, with the result that it was found an overwhelming majority were in favour of the earlier hour of half-past four. The meetings were therefore fixed at this hour and with the most successful results.

Since then the popularity of this hour has so increased that in no session have the meetings been so fully attended as during that now closing. Not only so, but several other societies have adopted the earlier hour of meeting.

HALF-PAST 4 O'CLOCK MEETINGS.

MONDAY, DECEMBER 2, 1895.—“Scientific Research and the Sacred Record,” by the Rev. Canon GIRDLESTONE, M.A.

The present position of Science in regard to Revelation was reviewed, the salient points on either side in which the two had been to any extent held to be antagonistic being dealt with; and it was held that careful investigation had proved the error of those who assert the existence of real antagonism.

MONDAY, JANUARY 6, 1896.—“The Ethics of Buddhism,” by E. A. REED.

An enquiry was begun (which specially admits of being more fully taken up hereafter) into the origin of those moral and religious precepts, similar to those in Holy writ, which were now often quoted as being found in Buddhist writings. It was urged—that in some cases it was a question whether these were to be found in the earlier Buddhist writings, and that in some cases they might be accounted for by that “considerable inter-communication” among nations, which recent research tends to show, existed in ancient times.

MONDAY, JANUARY 20.—“On certain Inscriptions and Records referring to Babylonia and Elam and their Rulers, and other matters,” by THEOPHILUS G. PINCHES, Esq., M.R.A.S., Dep. Egyptian and Assyrian Antiq., Brit. Museum.

Among those referred to was Tablet W.A.I. v. 15, in which the author of the paper had deciphered two further lines, giving an important indication of the spot where the Babylonians located

their Paradise or Good City (the Hebrew Eden), and showing that it had *two* not *four* rivers, not one God, but "a picturesque polytheistic system." The Author further referred to the important bearing of some recently deciphered Babylonian inscriptions referring to the Kings who took part in the battles in the valley of Siddim.

(A promised addition to this evidence is now daily expected from Professor FRITZ HOMMEL.)

MONDAY, FEBRUARY 3.—"Where is Mount Sinai?" The results of a Scientific Exploration of the Mountain, by Professor E. HULL, LL.D., F.R.S., late Director-General of the Geological Survey of Ireland.

This was an investigation into the tenability of certain views recently advanced, as to the locality of Mount Sinai. Sir Charles Wilson, K.C.B., K.C.M.G., F.R.S., and others took part in the investigation.

MONDAY, FEBRUARY 17.—"China's Place in Ancient History," by Surgeon-General Sir C. A. GORDON, K.C.B., Q.H.P., &c.

The discussion of this subject was introduced in a valuable paper, practically a synchronous history of the leading events in every country in the world.

MONDAY, MARCH 2.—"Plants and Plant Names of the Polynesians," by H. B. GUPPY, Esq., M.D.

An investigation in which it was shown that the study of such names told not so much the history of the plant as the history of the people, and showed that the Polynesians had their home in the Indian Archipelago and Further India; a view supporting the results of arguments—from entirely different data—of the Rev. S. J. Whitmee and others, vol. xiv, and Dr. Fraser and others, vol. xxii, and, more recently, the Rev. Dr. Woolls.

MONDAY, MARCH 16.—"On some Relations of Mind and Body," by A. T. SCHOFIELD, Esq., M.D.

An important and most timely investigation, considering the tendency of modern life and thought. Professor Calderwood (Edin.) and others took part.

MONDAY, APRIL 13 (6th being Easter Monday).—"The Australian Mammals in connection with the Theory of Evolution," by Rev. THEODORE WOOD, M.A.

MONDAY, APRIL 20.—"The Classification of the Vertebrate Animals," by J. CLELAND, LL.D., F.R.S., Professor of Anatomy in Glasgow University.

An investigation based on the views of Cuvier and the late Sir R. Owen, and tending to prove the manifest existence of Design in Nature, and illustrating the insufficiency of the theory of *Natural Selection*. Professor Calderwood and others took part.

MONDAY, MAY 4.—"The Difficulties of Evolution," by W. KIDD, Esq., M.D.

A paper including a review of the successes and discouragements of leading investigators of the subject and showing the strength of the evidence for Design in Nature. Professor Hull, F.R.S., Dr. Hutchinson, F.R.S., Dr. Macdonald, R.N., F.R.S., and others took part in the discussion.

MONDAY, MAY 18.—On "Climate in Egypt in Geological, Prehistoric and Ancient Historic Times," by His Excellency GRANT BEY, &c.

MONDAY, JUNE 15.—“The Geology of Herodotus, to what extent is it shown to be reliable by recent Egyptian Research,” by the Rev. F. A. WALKER, D.D., F.L.S., followed by important remarks by Sir J. WILLIAM DAWSON, C.M.G., LL.D., F.R.S.

WEDNESDAY, JULY 15.—The Annual Meeting (“Address referring to the Röntgen Rays,” by the President, Sir G. Gabriel Stokes, Bart., F.R.S.)

Publications.

The twenty-eighth volume of the Transactions has now been issued, and the variety and importance of the subjects considered has already attracted special notice. A delay in the issue of the volume was taken advantage of to ensure that the contents should be reconsidered by authors up to the time of publication, important matters in both papers and discussions being added.

We last year noted that from time to time members of the Institute and others have expressed their high sense of the value of the Transactions of the Institute, inasmuch as they *contained, not the opinions of any one person only, but of many*, resident in various and even distant parts of the world, whose studies had lain in the direction of the subjects taken up. That a system like this carried on by a competent body or Society gives a value to the treatment of the several subjects beyond that which any individual author could give is evident.

Extension of the Usefulness of the Institute.

Not many years ago the issue of the Annual Volume was considered to complete the work of the Institute, but of late the wish to make further use of the valuable matter it contains has resulted in the following operations which the Council has sought to encourage, and hopes to see more generally adopted:—

First—Members and Associates, at home, in India, North and South America, Australasia, and elsewhere, make use of the papers in the Journal as lectures, or as the basis of such, in their localities; (often corresponding with the Institute in regard to information and special help in the preparation of such lectures): excellent results have followed the adoption of this system.

Secondly—Many Members and Associates secure the translation and circulation of portions of the Journal in the various countries in which they are resident. Such translations have been made in many countries of Europe, South

America, and India; and now from China the importance of securing translations has been strongly urged.

Thirdly—Several home, foreign, and colonial public libraries and institutions are regular purchasers of (or subscribers—as Associates—for) the Journal; and Members and Associates have sought to encourage this practice in their respective localities. The need of so doing has been pointed out by many, since it is by no means unusual, especially in the Colonies, to find in public libraries books arguing that Science and Revelation are contradictory. The Journal of the Institute has been spoken of as specially suited to correct such erroneous views.

The efforts which the Council have made to render the Institute useful, both at home and abroad, has led (as was noted last year) an increasing number of members to realise that their connection with the Institute has proved more than a mere personal advantage to themselves. They have realised that the Institute meets a need felt both at home and abroad, especially in our Colonies and India, where imperfect appreciation of the actual results of philosophic and scientific inquiry has led many of the less informed to credit such statements as that "Science and Philosophy are alike opposed to Revelation," or that "the progress of Science has given a death blow to all belief in the truth of the Bible"—misapprehensions which in some cases have led even to systems of Education divorced from Religion.

A PEOPLE'S EDITION FUND.

Some years ago a "People's Edition Fund" was established, and proved of much service. It was used in furthering the publication and circulation of the "People's Edition"* all over the world.

* The People's Edition consists of twelve papers—written by men of eminence in such a style that they may be comprehended by all—reprinted from the *Journal of Transactions*. The Edition was started by some members in the year 1873, and first attracted attention in other quarters to the importance and need of works of the kind. The papers in this edition are often accompanied by the objections and criticisms urged in discussing the subjects, many home and foreign correspondents having urged the value of including these. The papers are published in neat covers, and are sold at a nominal price (sixpence). Single copies are supplied *gratuitously* or at cost price to all individual lecturers against infidelity applying, including those of the London City Mission, the Christian Evidence Society, and similar bodies at home and abroad.

Of late the very useful purpose this fund served has scarce been realised; and it has as a consequence depended on the interest of the Benefaction (£20 a year) of His Excellency R. H. Gunning, M.D., and the donations of one or two other members. The fund is one of such importance that it is more than ever desirable that it should be widely supported.*

Conclusion.

All must feel thankful for the Victoria Institute's progress in the past. Its high objects and the manner in which these are sought to be carried out have earned it supporters in most countries, but with so wide-spread a constituency it has become necessary that it should be stronger in numbers, especially at home. The Rules suggest that this matter lies in the hands of the members themselves, for they require that only those persons shall be eligible for election who have been proposed by existing Members or Associates.

Signed on behalf of the Council,

G. G. STOKES, *President.*

* Contributions for the "*People's Edition Fund*" will always be received by the Honorary Treasurer.

ANNUAL BALANCE SHEET, from 1st January to 31st December, 1895.

RECEIPTS.				EXPENDITURE.					
	£	s.	d.	£	s.	d.	£	s.	d.
Balance from 1894..				57	19	4			
Subscriptions:—									
2 Life Associates	21	0	0	21	0	0			
1 Member, 1893	2	2	0						
7 „ 1894	14	14	0						
183 „ 1895	384	6	0						
4 „ 1896	8	8	0						
1 „ arrears	20	0	0						
10 Entrance Fees	10	10	0						
1 Associate, 1887	1	1	0						
1 „ 1888	1	1	0						
1 „ 1890	1	1	0						
3 „ 1891	3	3	0						
4 „ 1892	4	4	0						
10 „ 1893	10	10	0						
32 „ 1894	33	12	0						
400 „ 1895	420	0	0						
19 „ 1896	19	19	0						
1 „ 1897	1	1	0						
				935	12	0			
Div. on £1,363 18s. 9d. 2½ p.c. Consols ..				36	6	0			
The Gunning Fund				30	0	0			
Special Fund*				1	1	0			
Sale of Journals, &c.				21	18	5			
				£1,103	16	9			
							£1,103	16	9

We have examined the Balance Sheet with the Books and Vouchers, and find a Balance in hand of £55 12s. 8d.

JOHN ALLEN,
T. A. LE MESURIER, } *Auditors.*

• H. C. Dent, Esq., £1 1s. 0d.

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

APPENDIX.

The Gunning Fund.

This fund was founded by His Excellency Robert Halliday Gunning, M.D., LL.D., F.R.S.E., etc., created in 1888 a Grand Dignitary of the Empire of Brazil, and permitted by Her Majesty the Queen to use the title of "Excellency" so conferred in the United Kingdom. It consists of a capital sum of five hundred pounds, the interest now paid on which (4 per cent.) is used in furthering the work of the Institute.

The Special Fund.

This fund was initiated several years ago by some Home and Colonial members, who, impressed with the value and usefulness of the papers and discussions of the Victoria Institute, desired that they might be more widely circulated not only at home but in the Colonies and India, where the want of such literature was, and is still, very greatly felt. It was supported by many members, and the Council decided that it might be contributed to by the general public. The fund is still open, as the need for it has now, 1898, increased.

"The People's Edition" of twelve papers—those being chosen which were written in such a style that they might be comprehended by the general public—reprinted from the Journal of Transactions, is now widely circulated and sold. (This effort on the part of the Institute first attracted public attention to the need and importance of publications of this nature.)

The People's Edition is still maintained.

FORM OF BEQUEST.

I give and bequeath to the Trustees or Trustee for the time being of THE VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN, to be applied by them or him for the purposes of the said Society, the sum of £
such sum to be wholly paid out of such part of my personal estate as may be lawfully applied to the purposes of charity, and in priority to all other legacies. And I declare that the receipt of the Trustees or Trustee for the time being of the said Society shall be a good discharge to my Executors for the said legacy.

The HONORARY SECRETARY (Captain FRANCIS PETRIE, F.G.S.), in briefly referring to the Report, in the hands of all present, pointed out the increasing and world-wide importance of the organisation and work of the Victoria Institute, which was recognised as a body founded to associate men of cultured mind and calm judgment, in the investigation of important questions of philosophy and science, more especially those questions which are alleged to bear on the great truths of Holy Writ—so that hasty conclusions may no longer afford ground for unseemly attack, to the injury both of religion and science. The efficiency of the work depended upon the support, as members or associates, of not only the workers, but of those who profited or even approved the Institute's labours. Every new member strengthened and increased the efficiency of the Institute, which, in the words of its motto, was founded *Ad majorem Dei gloriam*.

The Right Hon. EARL HALSBURY (Lord High Chancellor), Vice-President: It has been entrusted to me 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 past year.”

I have no doubt that, like myself, all present are most anxious to hear our President's Address; I will therefore not detain you by any observations of my own.

Sir H. BARKLY, G.C.M.G., K.C.B., F.R.S.: Mr. President, my lords, ladies, and gentlemen, I have very great pleasure in seconding this resolution, in which I most heartily concur.

[The resolution was passed unanimously.]

Professor EDWARD HULL, F.R.S., replying on behalf of the Council, said:—Although we are all waiting to hear our President's Address, yet on this, the occasion of our Annual Meeting, when many who are not members or associates are present, I may be permitted to say something “about the Institute and its work.”

Happily the work of the Victoria Institute is much more widely known, not only at home, but abroad, than it was some years ago. The Honorary Secretary tells me that when he first undertook the duties of that office, only *one* volume of the Transactions, beyond some 168 copies of the Quarterly Journals, was required to be bound. Now 500 copies have to be bound in order to supply the wants of the members, associates, and Institutions which

take in the Transactions,—in addition to many hundred copies of the Quarterly Journal.

Our name is a bond of union amongst all English-speaking peoples, for it is that of our Most Gracious Queen, whose principles we believe we represent in dealing with the topics treated in the Transactions.

And what are the topics? In answering that question I might almost use the phrase “*quidquid agunt homines.*” Whatever deals with the laws of physical science, objects of natural history, subjects bearing on Oriental history, geography ancient and modern—subjects throwing light on Biblical history and research. All these are admissible into our curriculum, and is it therefore surprising that we are becoming an increasingly popular Society; and that the Institute finds members to join it or support it? The Transactions have a world-wide circulation, at least wherever the English language is spoken, and are often translated into other languages. This Society, I maintain, supplies a want referred to in our first object; it popularises scientific subjects; and it treats them in a reverential spirit, recognising the hand of the Creator both in bringing this wonderful system of physical nature into being and also in guiding and directing its operations.

Let any one take up the Transactions for the past few years and read even the titles of the papers published, and he will find how diversified and interesting are the subjects treated.

The Council, for which I am replying, have a responsible, and sometimes a difficult, task to perform—in determining what papers shall be accepted, what rejected, in conformity with the principles of the Institute. Our great endeavour is to do what is right. Meanwhile, we invite those who sympathise with our objects to join our ranks, either as members or associates, and thus help to extend the usefulness of this Institute. I thank you in the name of the Council for the manner in which you have received this resolution.

Sir GEORGE GABRIEL STOKES, Bart., M.A., LL.D., D.Sc., F.R.S., the President, then delivered the following “Address” :—

*AN ANNUAL ADDRESS (CHIEFLY ON THE
SUBJECT OF THE RÖNTGEN RAYS).*

MY LORDS, LADIES AND GENTLEMEN,

I had intended, in opening my address, to say a few words as to the objects of the Victoria Institute; but I think what you have heard from Professor Hull in great measure relieves me of that duty, and it will therefore leave me more time to speak on a particular scientific subject, which is one that excites a great deal of interest at the present day. The objects of the Institute are contained, shortly, in the Report which the Hon. Secretary has just read. In furtherance of those objects it has struck me that it would be a useful thing, from time to time, to "take stock," if I may so express myself, as to what is known in this or that branch of science; because sometimes the general public take for granted the accuracy of what has been asserted in the name of science, although it may be by persons who themselves have no very strong claim to be regarded as scientific men. The public accordingly are liable to be misled as to what it is that is well established in science and what it is that is mere conjecture.

Now although truth is but one and cannot contradict itself, yet what is supposed to be truth may be in contradiction to something else which, on totally different grounds, is supposed to be true. In such a case, it behoves us to examine the evidence of that which is supposed to be true on the one hand or the other.

One of the chief objects of the Victoria Institute is to examine, from the point of view of science, such questions as may have arisen from an apparent conflict between scientific results and religious truths; to enquire whether the scientific results are or are not well founded. The utility of the Institute depends, in my opinion, in a very great measure, on the perfect impartiality with which that endeavour is carried out.

It may be that the result of the enquiry is to show that what was supposed to be established on scientific grounds is really nothing more than a more or less plausible conjecture which this or that scientific man may have thrown out. It

may be, on the other hand, that the point which has been supposed to be in conflict with religion is really something which is well established on scientific grounds. In such a case it behoves us to re-examine, from the theological or religious side, the arguments on the strength of which the opposition was supposed to have arisen. That latter task the Victoria Institute has not itself undertaken, but leaves it to each individual, avoiding as a society to engage in theological discussions.

In furtherance of the general objects of the Society, I have, as I said, thought it might be useful to "take stock" of what is known in the various departments of science.

On two former occasions I have delivered addresses before the Institute with such an end in view, having relation to certain branches of science, to which I have myself paid more particular attention. In one case I brought before you some of the conclusions to which we have been led regarding the nature of light, and of that mysterious medium for its propagation which we call the luminiferous ether. Those conclusions, so far as I have brought them before you, I think we may regard as thoroughly well established on scientific grounds.

In another address I brought the same subject before you in connection with the perception of light, and the vast utility of the sense of vision to us; and there we have to deal with a very mysterious subject, that of connecting external nature with our own sensations. Here I had to enter on ground which was, more or less, uncertain, and which gives rise to considerable liberty of holding different opinions. To-day, I have chosen as a subject to bring before you one of remarkable interest, which has excited the scientific world, and, I may say, mankind in general, more especially as regards its practical applications to the medical and surgical professions.

Who would have dreamt at the last annual meeting of the Victoria Institute, that before a year was out, we should be able to see on a screen, to receive on a photographic plate, which is afterwards developed, the skeleton, or a portion of the skeleton of a living man, or at least a living child? And as the modes of exciting these rays improve, we shall probably go on, step by step—indeed already, I believe, the whole body of a full grown man has been penetrated by these rays, the discovery of which we owe to Dr. Röntgen. [Applause.]

I feel some diffidence in bringing this subject before you,

because I have never, myself, made experiments with the Röntgen rays. Nevertheless I have read a good deal about them, following what others have done, more especially where it connected itself with the subject of light, to which I have paid a good deal of attention. So I cannot but have a tolerably definite idea in my own mind as to the nature of these Röntgen rays which has been a matter in dispute and, I may say, is still in dispute, although I think opinions are generally coming round to that which I will bring before you in the end.

Now before I go to the Röntgen rays direct, I must touch on previous work which gradually led up to them.

For a very long time it has been known that an electric discharge passes more readily through tolerably rarefied air, than through air of greater density, and so with other gases. If we have a longish closed tube, provided with electrodes at the ends by means of platinum wires passing through the glass, if the air be tolerably exhausted from it, an electric discharge passes, comparatively speaking, freely through it forming a beautiful skein of light, if I may so speak, and under certain circumstances that skein of light is divided into strata in a very remarkable manner. These strata fill the greater part of the tube from the positive electrode, or anode, as it is called, till we get nearly, but not quite, to the negative electrode, or cathode. There is a dark space separating the end of the positive discharge which, as I said under suitable conditions and sufficiently high exhaustion, shows stratification, from a blue glow enveloping the negative electrode or part of it. The luminosity about the cathode is somewhat indefinitely bounded on the side of the stratification.

When, however, the exhaustion is carried still further, at the same time the strata become wider apart, and the luminosity recedes from the cathode and expands, forming a sort of glowing halo much more sharply defined on the inside than the outside; in that respect resembling the ordinary luminous halo—not the corona—occasionally seen round the moon. We have here then, these two dark spaces, one outside the halo, where the luminosity gradually fades off, and another dark space on the inside, where the luminosity is more sharply defined, and which reaches to the negative electrode.

Now it is the phenomena in connection with this second dark space that I have more particularly to bring before you. As

the exhaustion is rendered higher and higher, the inner dark space gets wider and wider, until at a sufficiently high exhaustion it fills the whole tube or bulb. Mr. Crookes has worked more especially at this subject, and, indeed, the tubes which are now used for the production of the Röntgen rays are generally called "Crookes tubes." I have seen in some of the foreign periodicals the word "Crookes" used to signify one of these tubes. Mr. Crookes's researches in very high vacua led him up to that most remarkable instrument, the Radiometer, the nature of which led us to form clearer conceptions, than we had hitherto done, of the nature of the motion of molecules in gas, or rather, when the theory of the Radiometer was made out, presented us as I may say with a visible exhibition of the thing in actual working.

Now these researches, which led Mr. Crookes to improve his vacuum, naturally led him to examine the electrical phenomena produced by excessively high vacua.

I have said that it was with the second or inner dark space that I had chiefly to do. When the exhaustion is sufficient, that fills the whole tube.

Now what takes place in this dark space? Suppose we interpose a screen, such as a plate of mica with a hole in it. A portion of the discharge from the negative electrode goes through that hole and continues onwards in a straight course until it reaches the wall of the tube. When it reaches the wall of the tube (I will suppose the tube, as it is called, to be made of German glass) it produces a greenish-yellow fluorescence, or phosphorescence, of very brief duration. I need hardly say that if you do not limit what comes from the negative electrode by the screen with a hole in it, you get a broader beam which affects the glass wall over a larger space.

Now what is it that proceeds from the negative electrode towards the glass, and, when it gets there, produces this phosphorescence? Is it light, or is it matter?

One remarkable circumstance connected with this *something* is, that you can deflect it in its course by a magnet. If you present a magnet to a ray of light it does not deflect it at all; but this *something* is easily deflected by a magnet, even by a tolerably weak magnet. Mr. Crookes found, that in addition to that property, if this discharge of a *something* fell upon one side of a very light fan, formed of thin, split mica, and delicately mounted so as to enable it to spin readily, it sent it spinning round; and he believed that the

nature of that which we have here to do with is, that it is a stream of molecules. Nobody, I suppose, denies that there is matter propelled; but there has been a considerable difference of opinion as to whether the matter propelled is of the essence of the phenomenon, or whether it is something merely accidental. Mr. Crookes held that it was of the essence of the phenomenon, and that we had here, really, a stream of molecules, and I must say, for my own part, I believe he was right. But some foreign men of science hold that the projection of matter is altogether a secondary phenomenon, and that what comes through this small hole is really only a process which goes on in the ether—something so far of the nature of light, but yet differing from ordinary light most markedly in the property of being deflected by a magnet. To illustrate what I mean by saying something secondary, Professor Wiedemann, who holds the opinion that it is of the nature of light, or a process going on in the ether, imagines that the projection of matter has no more to do with the phenomenon than the path of a cannon ball has to do with your hearing the sound of the cannon. I think, myself, that it has a great deal more to do with it than that. However, I will leave that matter for the present, to pass on to some researches which led up to the remarkable discovery by Dr. Röntgen.

In Germany, Professor Lenard made a very remarkable series of experiments in what the Germans call, and what we may call, the cathodic rays, and which he believed to be actual rays, and not streams of molecules sent from the cathode. In order to produce these rays, as I will call them, you want a very high vacuum. If, however, you make your vacuum too high and too nearly perfect, you cannot get the electric discharge to pass through it. A perfect vacuum appears to be a non-conductor, and if you attempted to make the electric discharge pass through it, it would go, by preference, on the outside from one electrode to the other, so that you cannot work directly with anything too nearly approaching to a perfect vacuum. But it is a very remarkable thing, though Lenard, I believe, was not the first to discover it, but Hittorff, that these cathodic rays pass or appear to pass through a plate of aluminium which is perfectly impervious to light, or even to the ultra-violet rays, which we know by their effects, though we do not see them directly; so that you may have these cathodic rays at one side and something of the same kind at the other.

Lenard constructed an apparatus commencing with a Crookes tube, in which there was very high, though not too high, exhaustion, with a cathode which was either flat or cup-shaped at one end, and opposite to that, in the part where the cathodic rays would strike the glass if it were there, instead of glass it was closed by a thin plate of aluminium foil, so thin that it would not support the atmospheric pressure although it was impervious to air. But as a continuation of that tube he had another tube, which was also capable of exhaustion. The two tubes had glass tubes leading from them to the same air-pump. There was communication with the air-pump and communication between the two tubes, and you could exhaust them together, and the pressure would be so far reduced that the aluminium plate was strong enough to sustain the reduced pressure. They were both exhausted together until a suitable exhaustion was produced for the production of the cathodic rays in the first tube, and then the connection between the two tubes was intercepted, and the exhaustion of the second tube, which was kept connected with the air-pump, was continued for several days, until, as near as he could get it, there was nothing at all, in the way of gas, left in it. What was the result? In the first tube the cathodic rays were produced by the electric discharge. They fell on the aluminium foil at the end, and then there was a continuation of cathodic rays in the highly exhausted tube—the vacuum tube I will call it—and these went on as if they had been rays of light. They were deflected by the magnet just like the original cathodic rays.

Now at first sight that looks very much as if you had to deal with actual rays, which passed through the aluminium foil, just as rays of light would pass through a plate of glass. But I think the real explanation of it is altogether different. I believe it to be of this nature. First I will use rather a gross illustration, in order that you may the better apprehend the nature of the other explanation that I am about to bring before you. Suppose that I have a row of ivory balls in contact, such as billiard balls, and that another similar ball strikes the first of these. The result is that the last of the balls is sent off, and the striking ball and the intermediate balls remain approximately at rest. Now it is conceivable that something analogous to that may take place as regards these so-called cathodic rays, supposing they are not rays at all, but streams of molecules. It is conceivable that the molecules proceeding from the cathode or negative electrode

of the first tube, be they of residual gas, or aluminium, or platinum, might fall upon the thin aluminium plate which forms a wall between the two tubes, separating the one from the other, and that that would give rise to molecular discharge in the second space, although the actual moving molecules never passed through the wall. As I say, that is a rough illustration—rather a gross and material illustration—to enable you to understand more clearly the view I have to bring before you.

I have said that the so-called cathodic rays are easily deflected by a magnet. Now we know from other experiments that if a body sufficiently charged with electricity is in rapid motion, and that motion takes place in a magnetic field, the body tends to be deflected. This looks, therefore, very much as if these cathodic rays are actually streams of molecules, which being highly charged electrically, and of almost inconceivable minuteness, would be deflected by a slight magnetic force. Now, if these highly-charged molecules come to strike on the aluminium wall which separates the two tubes (which are end to end) from one another, it may be that an electrical action goes on which resembles very much what electrolysis is supposed to be according to the views of Grotthuss. I shall not have time to enter into an explanation of that now, for it would lead me too far from the subject; but several present will no doubt understand what I mean when I refer to the views of Grotthuss. The molecules then impinge on the wall, and give rise to a projection of molecules from the second side of the wall, but the latter are not the same molecules which impinged on the first side of it. Whether the molecules projected in the second tube come from a very minute quantity of residual gas, or whether they are derived from the aluminium wall itself, from which they are torn, as it were, does not signify for my purpose. We have here, you see, a conceivable mode of emitting these so-called rays in this way, simulating the transmission of a ray of light through a plate of glass, though it is no ray at all that we are dealing with. I confess I think that that is the true view of the action which takes place. But Lenard himself believed that the cathodic rays were, as he said, processes in the ether. By means of the first tube used alone, as was done in the first instance, but closed with a "window" of somewhat thicker aluminium foil, so as to sustain the atmospheric pressure, he was able to receive the cathodic rays which came from the second surface

of the aluminium foil in air, where he could examine them at pleasure, using for their detection sometimes a phosphorescent or fluorescent screen, sometimes a photographic plate. He found that under these conditions they were quickly deflected from their original direction and dispersed, so that they could not be traced far, just like rays of light in a turbid medium, such as water to which a little milk has been added; whereas in a subsequent series of experiments, to which reference has already been made, in which the cathodic rays were received into a second tube, the dispersion became less and less as the exhaustion proceeded, until at the highest attainable approach to a perfect vacuum the dispersion almost disappeared, and the rays were traced straight onwards for a metre and more, and that, without being enlarged by diffraction, as would be the case with rays of light.

Lenard mentioned incidentally that these cathodic rays, as he supposed they were, were able to pass through the hand even. He missed the discovery of the "X" rays because he had, I may say, the cathodic rays too much in his head, and attributed the whole effect on either side of the wall to the cathodic rays. Really the effect is due in part to the cathodic rays, and in part to the Röntgen rays, the existence of which he was not aware of. They cannot be distinguished merely by their effect on a fluorescent screen or on a photographic plate, since both these recipients are affected by the rays of both kinds.

Such was the state of things when Röntgen made his remarkable discovery. According to an account which I saw in one of the newspapers (we cannot vouch for the truth of everything we see in the newspapers), the discovery was made in the first instance accidentally. I cannot give you more authentic information than that, but he had been working with a Crookes tube and he observed that a photographic plate, enclosed in the usual case in which these plates are enclosed when you want to protect them from light, showed on development certain markings on it; so he put the whole apparatus as it had been, with a photographic plate in its case in the same position as before, and the thing was repeated. That is according to the account in the newspapers. A very remarkable discovery was the result. He found that rays were capable of coming out of some part of a Crookes tube which had the remarkable property of passing through substances that are opaque to

ordinary light, and opaque even to the ultra violet with which we were previously acquainted. They pass freely through black paper, through cork, wood, or even through the flesh of the hand, though less freely through the bones, so that by simply laying his hand upon the case containing the photographic plate, he actually got a photograph of the bones of his hand.

Well, what is the nature of these rays, and from whence do they come? As Röntgen said in his original paper, a slight examination shows that they have their origin in the part of the Crookes tube opposite to the cathode, and which is rendered phosphorescent by the discharge from the cathode.

The rays, however, which come from this part of the tube, and which appear to have their origin there, differ utterly in some respects from the so-called cathodic rays. If you isolate a portion of them, you find that a magnet has no action upon them; unlike the cathodic rays, they proceed onwards without deflection, just as if the magnet were not there. Like light they proceed in a straight course, but these rays are able to pass through a variety of substances that are opaque to ordinary light, while on the other hand they are stopped by other substances which let light freely through. That, however, does not prove that they are not of the nature of light. You may have, suppose, a red glass which is opaque to green rays, but lets red rays through very freely, so that as regards merely the fact of the "X" rays being stopped by substances transparent to light, while they pass more or less freely through other substances which are quite opaque to ordinary light, that establishes no greater distinction than exists between green and red light. Are they then of the same nature as light?

The "X" rays have some very remarkable properties by which they appear at first sight to differ *in toto* from ordinary light. They pass with either no refraction, or excessively small refraction, through prism-shaped bodies, which we know rays of light do not. They suffer hardly any, if any, regular reflection, unless perhaps at a grazing incidence.

Röntgen himself, in his original paper, dwelt on these peculiarities of the new rays. He formed a prism of aluminium, with which he attempted to obtain deviation of the new rays, but the experiment showed that if there were any deviation at all, at any rate the refractive index could not exceed 1.05. He speaks of the rays not being apparently

capable of regular reflection, but he brought forward experiments which show that in a certain sense they appear to be capable of reflection.

A photographic plate with the sensitive surface downwards was placed in its case under a Crookes tube, and immediately under the plate, and inside the case, were placed portions of different kinds of metal, which would be capable of reflecting back the rays on to the sensitive surface, if they admitted of reflection; and it was found that the plate was much more darkened over certain of those metals than where the metal did not exist. There was very little darkening over aluminium and a great deal of darkening comparatively over platinum. This indicated that some effect was produced, though the greater part of it is not one of regular reflection. He conceived the effect to be one of reflection such as you might have from a turbid medium.

There is, however, another mode of explanation which seems worth considering, viz.: that the Röntgen rays, falling upon the metal throw the molecules into a state of vibration, which they communicate to the ether, by a sort of phosphorescence or fluorescence of X light; so that the rays which come from the molecules, though perhaps not of exactly the same nature as the X rays that fell upon them, still have enough of the "X" quality about them, whatever that is, to enable them to get through objects which are opaque to ordinary light.

Lord Blythswood, who has worked a great deal with the Röntgen rays, has written a paper, which was communicated to the Royal Society by Lord Kelvin, in which he establishes a minute regular reflection of those rays from speculum metal at an angle of about 45° . Two plane specula were placed side by side so as to receive at that angle the X rays coming from a Crookes tube, and a duly protected photographic plate was placed in such a position as to receive the regularly reflected rays if there should be any. The developed plate appeared to show a slight indication of the junction between the mirrors; and that the appearance was not illusory was shown by Lord Kelvin, who made measurements on the image and compared the results with what they ought to be on the supposition of a regular reflection. The indication was so faint that I could not myself perceive it (I have not seen the negative, but only positive copies), but Lord Blythswood has given me some positive copies of a negative which he subsequently obtained by reflection from

a concave speculum at a small angle of incidence, and which show for certain a minute regular reflection of X rays, while at the same time they prove that the quantity of X light returned by regular reflection is extremely small compared with that which comes from the mirror by some different process.

Now there is another remarkable property of these rays, or absence of property if you like so to call it. Rays of light, as we know, admit of diffraction. If you pass light from a luminous point through a very small slit, or a small hole, the riband, or the beam of light at the other side does not follow merely the geometrical projection of the slit or hole as seen from the source of light, but is more or less widened, and certain alternations of illumination are visible, a phenomenon referable to interferences which I have not time to go into. How do these "X" rays behave under such conditions? It is a very remarkable thing that they do not show these enlargements or exhibit any sign of interference.

The last number of the *Comptes Rendus* contains a paper by M. Gouy in continuation of a former paper, but describing experiments carried out in a still more elaborate manner, which proves the truth of this to a very high degree of strictness. He makes out that if these X rays are periodical, the wave length cannot well be more than the one-hundredth part of the wave length of green light, indicating an enormously high degree of frequency.

Now if we assume that the X rays, like rays of light, and unlike the cathodic rays, are a disturbance propagated in the ether, ponderable matter being concerned only in their origination, not in their propagation, the question arises, what is the relation between the direction of vibration and the direction of propagation? Are the vibrations normal or transversal? We know that the vibrations of the air which constitute sound take place in a to and fro direction, or are what is called normal, that is, perpendicular to the waves of sound. We have the fullest evidence that the vibrations of the ether which constitute light take place in directions perpendicular to that of propagation, or are what is called transversal. To which category do the vibrations belong which constitute the X rays?

If we could obtain polarisation or even partial polarisation of the X rays, that would settle the question, and prove that they are due to transversal vibrations. But most of those who have attempted to obtain indications of their polarisation

have failed. This, however, does not prove that the vibrations are normal, for the peculiar properties of the X rays shut us out, or at least almost completely shut us out, from the ordinary means of obtaining polarisation. There is, however, one paper in the *Comptes Rendus*, by Prince Galitzine and M. de Karnojitsky, in which the authors profess to have obtained by a special method undoubted indications of polarisation. No reasonable doubt can remain as to the abstract capacity of these rays for polarisation after what has been done by another physicist. I wish I had time to go into the experiments that have been made by M. H. Becquerel in the direction of polarisation; but I have already kept you too long. He had more particularly studied a very remarkable phenomenon, viz.: that certain phosphorescent bodies, such as sulphide of calcium for instance, and salts of uranium, on exposure to ordinary sunlight give out rays of some kind which pass through bodies opaque to light and are able to affect a photographic plate beneath them. So far these agree in their properties with the X rays which are obtained from a Crookes tube, which they far more closely resemble than they do rays of ordinary light; but the rays thus obtained were found by Becquerel to admit of polarisation by means of tourmalines in a manner altogether unmistakable. I think therefore that we may take it as established that the Röntgen rays are due to some kind of transversal disturbance propagated in the ether.

The non-exhibition of the ordinary phenomena of diffraction and interference is explicable on the supposition that the vibrations in the X rays are of an excessively high order of frequency. I am not sure that a different sort of explanation might not, perhaps, be possible which I have in my mind, though I have not matured it; but, save the possibility of that, one is led to regard them as consisting of transverse vibrations of excessively high frequency. This opens out some points of considerable interest in the theory of light; but I am afraid it would keep you too long if I were to attempt to go further into this matter. I will merely remark that taking the way in which these rays are most commonly produced, viz.: as coming from a point where the cathodic discharge in the Crookes tube falls on the opposite wall, we may understand how it is that vibrations of excessively unusual frequency may be produced. These highly charged molecules, charged with electricity, coming suddenly against the wall, may produce vibrations of a degree of frequency

which we are not at all prepared for; but I see by the clock that I must not detain you any longer on speculations. [Applause.]

POSTSCRIPT.

This "different sort of explanation" is one between which and the supposition of periodic vibrations of excessively high frequency my mind has for a long time oscillated. In the above lecture I gave the preference to the latter; but subsequent reflection leads me strongly to incline to the former. I hope before long to develop fully these views elsewhere; meanwhile suffice it to say that I am disposed to regard the disturbance as non-periodic, though having certain features in common with a periodic disturbance of excessively high frequency.

The RIGHT HONOURABLE LORD KELVIN, G.C.V.O., F.R.S.—Mr. President, my Lord Chancellor, ladies and gentlemen; I must first express, on my own account, great regret that I was unable to arrive in time to hear the whole of the Annual Address. Judging from what I have heard, I am able to appreciate how great has been my loss in not hearing the whole. I do not, however, feel at all unable to ask you to accord a most hearty vote of thanks, for what I have heard is more than enough to justify all I would say in support of the motion which I have to put before you. Sir George Stokes has given a most interesting and important description of one of the greatest discoveries of this century. The subject upon which he has spoken—in fact all that he has touched upon—is full of contentious matter. The scientific world has been greatly agitated in regard to the Röntgen phenomena since the beginning of January. Almost every sentence that the President has put before us is strongly in opposition to a great deal that has been published by many exceedingly able men, both mathematicians and experimenters. I have listened with great pleasure, satisfaction and comfort to Sir George Stokes's declarations. If I had doubts myself, my doubts

would have been removed. My faith is strongly fortified by all we have heard from him. In physical science my touchstone as to truth is, "What does Sir George Stokes think of it?" (Hear! hear!) When I hear that he declares for transverse vibrations, and when I hear the strong reasons he has put before us for this conclusion, I myself am very strongly fortified indeed in accepting it. I do not, however, forget that it is put before us not as absolutely demonstrated but as his present opinion. There is no one who is so thoroughly secure as a guide in all scientific matters as our President. He will not put forward anything, and say it is certain, unless he has perfect reason for saying so. He has given us strong reason to believe that the Röntgen phenomena consist of transverse vibrations. He does not tell us that this is *certainly* true; he leaves our minds open to the possibility of other explanations—indeed he has tantalised us very much with the idea of the possibility of another explanation to which he has alluded. I wish the hands of the clock could be set back for half-an-hour, and that the President could be persuaded to give us some idea of the explanation he has referred to; he certainly leaves us with the impression that it is exceedingly probable that the Röntgen rays do consist of transverse vibrations. But how are they related to those of ordinary light? There are, perhaps, a hundredfold more of them in a second of time, so that as there are about 700 million million of vibrations per second in green light, we may have 700 hundred, or 70 thousand, million million vibrations of Röntgen rays in a second of time. Perhaps that does not seem much more marvellous to some than when we talk of 700 million million of vibrations in green light. There is so great a margin that our power of being astonished is at an end, and we are not astonished if we are told that the vibrations of the Röntgen rays are a hundred or a thousand times faster, by mathematicians who have studied the question; but we may feel surprised, indeed, that rays proceeding from the cathode and striking against a target should produce, on their impact, vibrations of a hundred times greater frequency than any of the qualities of light known previously.

I am sure you must all feel that a curtain has been drawn from before your eyes, and that we have been allowed to look into some of the mysteries and wonders of nature. It is only half a year since these X rays, produced by the impact of electrified particles

inside a vacuum tube, were known to exist, and it is wonderful how much of the discovery is dealt with in Röntgen's short paper.

We are all deeply indebted to the President for his Address, and I propose a hearty vote of thanks to him for it, and to those who have read papers before the Victoria Institute during this session (Applause).

Sir JOSEPH FAYRER, Bart., F.R.S.—I have much pleasure in seconding the resolution.

[Carried with applause.]

The PRESIDENT (Sir G. G. Stokes, Bart.)—I will only detain you to express the thanks I feel for the very kind manner in which you have received my Address. (Cheers.)

[Dr. GERARD SMITH, M.R.C.S., a Member of Council, very kindly added to the interest of the Meeting by exhibiting some very remarkable specimens of surgical and other subjects taken by means of the Röntgen rays.]

The Meeting was then adjourned.

ORDINARY MEETING.*

PROFESSOR E. HULL, LL.D., F.R.S., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and a paper was read "On the Human Colour Sense and its accordance with that of Sound as bearing on the analogy of sound and colour," by Dr. J. D. MacDonald, Esq., I.H.R.N., F.R.S. (The consideration of this subject has not yet been completed.)

* February 1st, 1897.

INTERMEDIATE MEETING.*

THEOPHILUS G. PINCHES, ESQ., M.R.A.S., &C., IN THE CHAIR.

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

ASSOCIATES :—Rev. J. G. Haworth, Wales ; E. C. Linton, Esq., B.A. Camb., Wales ; H. J. Smith, Esq., India ; Principal W. T. Wright, India ; Mrs. Greer, London.

A LECTURE entitled "Are Acquired Characters Inherited?" was then delivered by the Rev. A. K. Cherrill, M.A. A general discussion followed, in which Dr. Fletcher Beach, Dr. Norman Kerr, Dr. Walter Kidd, Mr. L. Thrupp, and the Rev. Canon R. B. Girdlestone, B.D., and the Author took part ; the Meeting was then adjourned.

February 15th, 1897.

ORDINARY MEETING.*

PROFESSOR E. HULL, LL.D., F.R.S., IN THE CHAIR.

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

LIFE MEMBER :—Rev. W. D. F. Petter, M.A., Middlesex.

MEMBERS :—H. J. Chinnery, Esq., Surrey ; Rev. G. W. Clements, M.A., Middlesex ; Prof. T. J. Malyon, LL.B., Australia ; E. A. Neatby, Esq., M.D., Middlesex ; Rev. L. Ragg, M.A., Oxon, Oxfordshire ; Cecil Reddie, Esq., B.Sc., Ph.D., Derbyshire ; Rev. Prebendary H. B. Southwell, M.A., Staffordshire ; Prof. J. R. Tucker, LL.D., United States ; Rev. R. M. Webb-Peploe, M.A., B.Sc., Canada.

ASSOCIATES :—Rt. Rev. Bishop Evington, D.D., Japan ; Friends Foreign Mission (Rev. S. Baker, Sec.), India ; Prof. E. Du Toit, M.D., Switzerland ; Hon. G. F. Edmunds, United States ; Judge S. J. Hanna, LL.D., United States ; Rev. W. H. Hazard, Ph.D., United States ; Rev. G. Lakeman, M.A., B.D., Lancashire ; J. H. Raper, Esq., Middlesex ; Rev. J. Smith, D.D., Scotland ; Rev. F. R. Tennant, M.A., B.Sc., Staffordshire ; H. T. Wills, Esq., M.A., B.Sc., F.G.S., India ; Rev. G. Wiseley, D.D., Malta ; Miss J. A. Johnstone, Scotland.

CORRESPONDING MEMBERS :—Rt. Rev. Bishop of Rockhampton, Australia ; Rev. Professor Legge, D.D., Oxford.

HON. LOCAL SECRETARY :—Rev. J. C. Walter, B.A., Horncastle.

The following paper was then read by the author :—

BIBLICAL LANDS, THEIR TOPOGRAPHY, RACES, RELIGIONS, LANGUAGES AND CUSTOMS, ANCIENT AND MODERN.† By HORMUZD RASSAM, Esq.

THERE have been so many erroneous theories propagated regarding the origin and languages of the different nationalities which now occupy the lands of the Bible, that I have taken upon myself the critical task of explaining in the best way I can the constitution of the diverse races and how they are divided by creed and blood.

In quoting passages of scripture in support of my arguments, I disclaim all intention of theological discussion, but

* Dec. 7, 1896. Paper finally revised and passed for press, Dec. 1897.

† This paper was prepared by Mr. Rassam in consequence of it having been urged that the work of investigating the records on the monuments and their comprehension by others, would be much advanced by a paper describing those manners and customs, traditions, &c., in the East, which are now fast dying out, and which he, as a Chaldean, is of all others best acquainted with.—Ed.

merely bring them forward as I shall refer to secular historians such as Herodotus, Xenophon, Josephus, and others.

Of all the nationalities mentioned in the Bible, and by classical historians, only the Jews, the Samaritans, the Chaldeans, and the Coords (the Carduchi of Xenophon) have retained their ancient names. Of the former, there is a remnant in Western India on the borders of Beloochistan and Scinde, who style themselves "Bani Israel," *i.e.*, children of Israel, but whether they belong really to the captivity of the ten tribes or that of Judah, it is difficult to tell. Most probably, however, they are of the latter, because, on the destruction of the Babylonian Monarchy, a great number of them must have emigrated eastward as they were not far from Beloochistan, whereas the ten tribes were dispersed amongst the clans of Northern Assyria and Media, about a thousand miles from the Persian Gulf. The Afghans also assert that they are descended from "Bani Israel," and by their tradition claim lineage to the tribe of Benjamin. Formerly the Israelites who are said to have emigrated to India, were a large community, but on account of their adhering to the tenets of their faith they were driven into the Herat Mountains, whence they spread into the Cabool Valley along the right bank of the Indus. Subsequently they fell into idolatry, and on the spread of Mohammedanism in that country they, like other Gentile tribes, embraced the religion of their fierce conquerors. The well-known traveller, Dr. Jos. Wolff, met in his travels some Israelites who told him that they belonged to the tribes of the Reubenites, Gadites, and half tribe of Manasseh. He found them in Balkh and Bokhara in Central Asia, and they informed him that "many of the Napthali tribe wander on the Oral Mountains, and that the Kafir Seecahpoosh on the Hindoo Koosh or the Caucasus are their brethren."

There is also a Jewish community in Abyssinia called "Falasha," who assert that their forefathers had settled in Ethiopia or Cush in the reign of "Maqueda," the Queen of Sheba (who visited King Solomon during his glorious sovereignty). Of this queen (said to have been one of his wives) was born, according to Abyssinian tradition, Menelik, who ruled over Ethiopia and Arabia.* The history of the Falashas according to that related by the late Rev. H. A.

* 1 Kings x, 13.

Stern in his book about them, is that the Queen of Sheba had "heard from merchants and traders of the magnificence and wisdom of the Jewish monarch. Curiosity, not unmixed with a touch of pardonable vanity, prompted her to visit the court of the wise and famous Solomon. Her faultless beauty and intellectual sagacity, won for her the favour and assiduous attentions of the gifted king; and after a lengthened sojourn at Jerusalem, she returned to her own dominions, laden with munificent presents, and, what greatly enhanced her happiness, with a youthful heir and prince, in the person of her son *Menelik*. The bond of friendship and union between the two mighty rulers, initiated by mutual regard and cemented by the tenderest affection, was made still more lasting and secure by religious sympathy. In the train of the illustrious princess, besides a number of distinguished Jews from every tribe, was Azariaah, the son of the High Priest Zadock, to whom the pious parent had specially intrusted the education of *Menelik*, and the guardianship of the *tabot*, or transcript of the law. The impetuous zeal of the emigrants found ample scope for its loftiest inspiration in the new world to which they were transplanted, and in the course of a few years the worship of the God of Israel extensively supplanted the idolatries of Ethiopia.

"From these vague traditions, in which truth and fiction are inextricably jumbled together, the inquirer does not gain much trustworthy information on the history of Ethiopia, and the settlement of the Jews in that country. The most probable conjecture is, that at a very early period—perhaps when Solomon's fleet navigated the Red Sea—some adventurous Jews, impelled by love of gain, settled among the pleasant hills of Arabia Felix; whilst others of a more daring and enterprising spirit were induced to try their fortune in the more remote, though not less salubrious, mountain scenes of Ethiopia. The Queen of Sheba's visit to Solomon, whether she reigned over both or only one of those countries is an incontestable proof that the wise king's fame had spread far beyond his own empire. To subjects of a monarch so renowned for wisdom, wealth, and power, a gracious reception was, no doubt, everywhere accorded, and the new settlers, in their prosperity abroad, probably soon forgot the attractions of their home in Judea. Subsequent troubles in Palestine and the final overthrow of the Jewish monarch by Nebuchadnezzar, increased the number of the emigrants, and in the lapse of a few centuries the Jews

formed a powerful state in Arabia, and a formidable and turbulent people in the Alpine regions between *Tigré* and *Amhara* in Ethiopia.

“The legend of *Menelik*, and the supposed descent of the Abyssinian sovereign from the line of Solomon, unquestionably exercised a salutary influence in favour of the Jews, and contributed more than anything else towards the spread of those Mosaical rites and ceremonies which to this day are still so extensively engrafted on the Christianity of the country. On the promulgation of the Gospel the Jews, who had now become scattered all over the western plains of *Tschelga* and *Dembea*, retired again to their mountain fastnesses of *Semiën* and *Bellea*, where, under their own kings and queens, called Gideon and Judith, they maintained till the beginning of the seventeenth century a chequered and independent existence. With the fall of their last ruler, and the capture of their strongholds, the Falashas were driven from their rocky homes, and forced to seek a refuge in the midst of their enemies, the detested *Amharas*. The provinces where they at present reside are *Dembea*, *Quara*, *Woggera*, *Tschelga*, and *Godjam*, where their settlements are strikingly distinguished from the Christian villages by the red earthen pot on the apex of their *Mesquid*, or place of worship, which towers from the centre of the thatched huts by which it is invariably environed.

“Claiming a lineal descent from Abraham, Isaac, and Jacob, the Falashas pride themselves on the fame of their progenitors, and the purity of the blood that circulates in their own veins. Intermarriages with those of another tribe or creed are strictly interdicted, nay, even the visit to an unbeliever’s house is a sin, and subjects the transgressor to the penance of a thorough lustration and a complete change of dress before he can return to his own home. Their stern uncompromising sectarian spirit has been highly beneficial in excluding from their community that licentious profligacy in which all the other inhabitants of Ethiopia riot; and it is generally admitted that Falasha men and women seldom, if ever, stray from the path of virtue, or transgress the solemn law of the decalogue.”*

It seems from the allusion made in the 8th chapter of Acts, verse 28, that there were believers in the Jews’ revealed religion in Ethiopia, as it is mentioned that the Treasurer of

* Stern’s *Wanderings among the Falashas in Abyssinia*, ch. xiv, p. 184.

Candace, the queen of that country, had gone on a pilgrimage to Jerusalem, and was found on his return journey reading in his chariot the book of Isaiah the Prophet; or it may be that this servant of Candace was one of the Jewish captives who was intrusted with confidential duties, as were Daniel and Nehemiah by Darius and Artaxerxes respectively. Ethiopian tradition gives this eunuch the name of Judich, and represents him as having propagated Christianity in Arabia Felix and Ethiopia, and brought Candace herself to the true faith. Pliny (vi, 35) and Strabo (xvii, 820), two heathen authors, confirm scripture as to Candace being the name of the Ethiopian queens, as the Pharaohs were of the Egyptian kings.

There has been a good deal of speculation amongst the learned as to the country or countries over which the Queen of Sheba ruled. Sheba (Saba or Sabians) is mentioned in the Bible in different localities like the Chaldeans and the Cushites; and there is no doubt their chief centre was in Southern Arabia, but in the time of Solomon the Queen of Sheba's sovereignty embraced that part of Ethiopia now known by the name of the Soudan, Nubia, Abyssinia, Somaliland, and Galla; as one has only to study the features, the religion, and languages of the peoples of those countries, in order to find that the Semitic element is largely diffused in their customs and religious observances, more especially in regard to circumcision, which is practised by both Christians and Mohammedans just as it is among the Jews.

I have always been a believer in traditions; and though I know that fabulous and exaggerated anecdotes are often mixed up with truth, nevertheless I have found in my experience that a good deal of reliability lies at the bottom of unwritten history.

There is one noticeable fact in the history of the Queen of Sheba, which proves more than anything else that her sway extended to Ethiopia (the African Cush of the Bible), and that is the possession of such a quantity of gold and spices (fragrant or aromatic) which could only be got in tropical climates.* In the 12th chapter of St. Matthew our Lord mentions this potentate as the "queen of the south" coming to Solomon "from the uttermost parts of the earth,"

* In Jeremiah vi, 20, it is said "To what purpose cometh to me incense from Sheba, etc."

which proves that she had gone to Jerusalem from Arabia Felix, the extreme limit of the terra firma, from Canaan to the sea, which has always been called in Arabic *Yaman* or *Tayman*, that is to say, "south," or *right* hand side, while the Somaliland on the opposite side on the African coast is named *Shamal*, which means *left* side. The reason those names were given to the Arabian and African coasts is supposed to have been when the ancient Arab mariners got safe to the Gulf of Aden, after the dangerous storms of the Indian Ocean, especially during the south-west monsoon, they styled the position of the coasts as on the *right* and *left*.

The Rev. Mr. Stern and others think that the name of Falasha is derived from the Ethiopic word *falas*, which signifies *exile*, but I believe that it comes most probably from the Hebrew and Aramaic root פלש, *Palash*, which means emigrants, as this is the root of Palestine.

With the exception of the Abyssinians, who are Christians in communion with the Coptic church,—of whose doctrine I shall give a brief account hereafter,—all the nationalities which occupy the south-eastern and north-western African peninsula are Mohammedans of the Soonee persuasion, divided into four petty sects, Hanafee, Shafec, Humballee, and Malkee, so-named after four eminent theological doctors. The difference between them is not in matters of doctrine, but only in rites and ceremonies. The most liberal of these divisions towards the Christians and Jews are the Turks, and the most strict and fanatical are the Shafees.

It is most interesting to notice the remarkable difference in physique and colour of the various Jewish communities all over the world—between the natives of Poland, Palestine, Central Asia, Mesopotamia, Abyssinia and India. While those of the former country are extremely fair, and those of the two latter are very dark, there is a good deal of resemblance between all, though we know that the Jews have intermarried with different Gentile nations, and that they were commanded by God to allow the children of the Egyptians and Edomites to enter the congregation of the Lord in their third generations (Deut. xxiii, 8).

The Samaritans are so called after the name of Samaria, which Josephus says is derived from Semer or Shomer, who sold his inheritance to Omri, King of Israel. The latter built his capital on it, which he named after its former owner

Shemer.* The origin of this community, however, is detailed in the 17th chapter of 2nd Kings, when the King of Assyria carried away captives the bulk of the ten tribes, substituting in their place a mixed Gentile race from Cuthah, Ava, Hamath, and Sepharvaim. These mingled with one another, and with those of the Jews who were left in Palestine, so they formed a united community calling themselves Samaritans from the name of the principal city Shemer, its etymological meaning being "watch mountain." At first they continued to practise their idolatrous worship which they had taken with them from Southern Mesopotamia, but having been visited with manifest tokens of the Divine anger, they were anxiously desirous of being instructed in the knowledge of the true God, and gladly welcomed one of the captive Jewish priests who was sent by the King of Assyria to teach them. Unwilling, however, to renounce idolatry altogether, they endeavoured to combine the true and simple worship of God with heathenism. After the Jewish captivity in Babylon had come to an end, the Samaritans professed wholly to abandon their idolatrous habits and ceremonies and to adhere to the worship of the God of Israel. So far did they seek to identify themselves with the Jews who had returned from their Babylonian captivity that they tried to associate themselves with Nehemiah's people in rebuilding the temple. But this offer having been rejected, the Samaritans were provoked to oppose them by every means in their power, with the help of Sanballat, to thwart the holy work carried on by the Jews; but they could not succeed. They managed, however, to obtain permission from the Persian king to erect on Mount Gerizim a rival temple to that of the Jews. Thus commenced in Samaria a national system of worship identical in all respects with that of the people of God. The enmity which existed between the two nations increased every day, until in the time of our Lord it had risen to such an extent that the Jews would have no dealings with the Samaritans; hence the question which the Samaritan woman addressed to our Saviour, "How is it that thou, being a Jew, askest drink of me, who am a woman of Samaria?"

Josephus in his *Antiquities of the Jews* (B. ix, ch. xiv, c. 3), says thus of them:—

"But now the Cutheans, who removed into Samaria (for that is the name they have been called by to this time,

* 1 Kings xvi, 23, 24.

because they were brought out of the country called Cuthah, which is a country of Persia, and there is a river of the same name in it), each of them according to their nations, which were in number five, brought their own gods into Samaria, and by worshipping them, as was the custom of their own countries, they provoked Almighty God to be angry and displeased at them, for a plague seized upon them by which they were destroyed; and when they found no cure for their miseries, they learned by the oracle that they ought to worship Almighty God, as the method for their deliverance. So they sent ambassadors to the King of Assyria, and desired him to send them some of those priests of the Israelites whom he had taken captive. And when he thereupon sent them, and the people were by them taught the laws, and the holy worship of God, they worshipped him in a respectful manner, and the plague ceased immediately; and indeed they continue to make use of the very same customs to this very time, and are called in the Hebrew tongue Cutheans; but in the Greek Samaritans. And when they see the Jews in prosperity, they pretend that they are changed, and allied to them, and call them kinsmen, as though they were derived from Joseph, and had by that means an original alliance with them, but when they see them falling into a low condition, they say they are no way related to them, and that the Jews have no right to expect any kindness or marks of kindred from them, but they declare that they are sojourners, that come from other countries."

Even after the destruction of the temple the Samaritans still continued to worship on Mount Gerizim and to maintain that no other place was equally sacred as having been the spot on which altars were reared and sacrifices offered by Abraham and Jacob. A small remnant of those interesting people still exist in Shechem, the present Nablous, and its surroundings. Their mode of worship resembles that of the Jews, and they observe the law of Moses and celebrate the Passover by killing the Pascal lamb.

All the ancient nationalities of the Holy Land and its surroundings, also of the Syrian lowland and highland, together with those who inhabit the Arabian desert, have been merged under one nomenclature, which is the "Arab." There are now no distinct peoples existing such as the Hittites, Edomites, Moabites, Ishmaelites, Philistines, and others, because since Christianity was established and Islamism followed it, all the Gentile nations embraced the

creed of one or the other, and instead of retaining the name of their ancient nationalities like the Greeks, Armenians, and Chaldeans, they adopted the religious designations of their conquerors.

The latter, who are doubtless descendants of the ancient Chaldeans, or Assyrians, of whom I shall speak more fully hereafter, are now in communion with the church of Rome, and are to be found in Assyria and Mesopotamia. Part of them who are commonly called "Nestorians," but who really have never had any connexion with that Greek prelate, retain their primitive creed pure and simple. They occupy the highlands of Assyria and that part of Coordistan or ancient Media called Teearee, and also a remnant of them are in Persia. A part of the latter are now Roman Catholics, and the remainder have been taken up for religious and educational culture by the Board of the American Presbyterian Mission and the Archbishop of Canterbury's Mission to the Assyrian Christians. The so-called "Syrians" are of mixed nationality of Assyrians, Cappadocians, and Arameans, commonly known as Syrians. These also are divided into two sects called respectively Syrian Catholics, in communion with Rome, and Syrian Jacobites, that is to say followers of Jacob Baradeus, the promulgator of their faith in the sixth century, when it was nigh extinction. The Patriarchs of both claim their ecclesiastical titles from the *See* of Antioch, but neither of these communities has really any more right to the primitive hierarchy of Antioch than the Maronites; as all now differ in their religious professions from that confessed by St. Chrysostom or those bishops before him.

Of all the nationalities mentioned in the Old Testament, only the Persians hold their own now both in dominion and sway, but the remainder of the other ancient peoples have been brought into subjection under one rule, which is that of the Turk, known in history by the name of Tartar or Scythian. More than nine-tenths of the population of Turkey and Persia are followers of Mohammed, and the remainder are a mixture of Christians, Jews, and nondescript sects, as the latter do not exactly know themselves what they believe in. They are commonly known as the Guebres, the ancient Parsees or Zoroastrians, Sabians, better known as Christians of St. John, Assassins, Ansarees, Droozes, Yezeedees, or devil worshippers, and Shabbacks. From the constant intercourse and intermixing with their Christian and Moslem neighbours, more especially from being con-

stantly harassed and persecuted in their religious rites by their rulers, they deemed it politic to conform to certain ceremonies and usages, and have come to acknowledge the God of revelation as the only true deity. It is remarkable that though constant mention is made in Holy Writ regarding the idolatry of the different Gentile nations who inhabited those countries formerly, there are now no people that have idols, nor are there any worshippers of the heavenly bodies anywhere in Turkey or Persia. It is true that the Yezedees have an image of a bird made of brass they call "Malik Tawoos,"* which the Kawalls or priests carry about periodically for the purpose of collecting alms, and is to a certain degree revered, but they do not really worship it any more than some Christian sects adore the images and pictures of Christ, the Blessed Virgin, and saints. The Guebres† or Parsees, who are called fire worshippers, do not really bend the knee before that element, but merely regard it as a hallowed emblem of the sun. They consider it sacrilegious to spit in the fire, and on this account they do not blow out a candle by the mouth, but put it out by a wave of the hand. About two thousand families of these so-called fire worshippers still exist in Persia, chiefly in Yazd and in other towns in Karman, but nine-tenths of the sect, who are known as Parsees, have established themselves in India,—mostly in the Bombay Presidency. They never allow the sacred fire to be extinguished. The faith of the Parsees and the Guebres is that of Zoroaster, and the reason that the name of Parsee is given to the former, was because they were emigrants from Pars or Persia. The Parsees have a number of peculiar rites and customs which are not to my purpose to relate in this paper, but as they have a very quaint ceremony performed before and after the birth of a child, I think it will not be uninteresting to relate it. When such an event is expected, the mother is conveyed to the ground floor of the house, where she must remain forty days, at the end of which she undergoes purification before again mingling with the family. Five days after the child is born, an astrologer is called in to cast its nativity; and all the relations assemble to hear what is to be the future fortune

* Two Arabic words which mean "King Peacock."

† The common uncomplimentary epithet of Gawir, used by the Turks for a Christian in a contemptible manner, is derived from this word, which means a heathen.

of the babe, and what influence it is to exert upon its parents and family. Till the child is six years old, its dress consists of a single garment called the Jubhla, a kind of loose skirt, which extends from the neck to the ankles, and the head is covered with a skull cap. When it has reached the age of six years and three months, the investiture of the child with the sūdra and kūsta takes place, by which it is solemnly initiated into the religion of Zoroaster. The ceremony commences with certain purifications, and the child being seated before the high priest, after a benediction has been pronounced, the emblematic garments are put on. The sudra is made of linen, and the kusti is a thin woollen cord, consisting of seventy-two threads, representing the seventy-two chapters of the Izashné, a sacred book of the Parsees. This cord is passed round the waist three times, and tied with four knots, while a kind of hymn is sung. At the first knot the person says, "There is only one God, and no other is to be compared with him," at the second, "The religion given by Zurtošht is true," at the third, "Zurtošht is the true Prophet, and he derived his mission from God," and the fourth and last, "Perform good actions, and abstain from evil ones."

The semi-pagan sects existing now in the Holy Land and the so-called Syria are the Ansarees, the Droozes, and Assassins, of whose religious customs I must give a short account. The first of these minor denominations inhabit the range of mountains north of Lebanon, between Tripoli and Antioch. They profess an absurd and strange mass of doctrines, taught by their theological doctors. They allege that God has been incarnate several times, that He has been incarnate, not only in Jesus Christ, but also in Abraham, Moses, and other persons celebrated in the old Testament. They attribute also the same honour to Mohammed. They imagine that they honour Jesus Christ by maintaining that He did not die on the cross as the Christians profess, but that God had substituted another in His place, as the Moslems believe. They likewise say that Mohammed appointed that another body in place of his own should be put into the tomb which had been prepared in his stead. They have borrowed from Christianity the practice of observing the Lord's Supper, but they celebrate it with wine and a morsel of meat. They admit only the male sex to the communion, and observe it in secret. They celebrate some of the festivals observed amongst Christians, such as Christmas, the

Circumcision, Epiphany, Palm Sunday, Easter, and some of the apostles' and saints' days. When they are at their prayers, they turn their face towards the sun, which has led some to suppose that they worship that luminary. The Ansarees also believe in the transmigration of souls, and entertain a quaint notion that the soul ought to quit the body of a dying man by the mouth; they are therefore particular about any accident which they imagine may prevent it from taking that course. In consequence of this belief whenever a sentence of capital punishment is passed upon any criminal of their sect, his relations offer considerable sums of money that he may be impaled, instead of being hanged, in order that the passage of the throat might be kept unimpeded for the soul to pass free.

The Droozes, who inhabit the mountains of Syria, chiefly in Lebanon, are considered a heretical sect of the Mohammedans, though their profession of faith is shrouded in mystery. It is their rule to adopt the religious practices of the country in which they reside, and to profess the creed of the strongest, but there is no truth in the assertion that the Droozes frequent mosques and churches to please the people with whom they live. They all profess Islamism, and whenever they mix with Mohammedans, they perform the rites prescribed by their religion. In private, however, they break the fast of the Ramadhan, indulge in wine, and eat food forbidden by the Koran. In reality they hate all religious professions of all sects. They have a religion of their own, there is no doubt, but what their rites and duties are it is impossible to tell. They have amongst them the sacred rite of baptism, but they do not practise circumcision, nor do they fast or pray. They wear white turbans as an emblem of purity. It is said that the number of the Droozes in Lebanon is not more than about 200,000.

The sect of the Assassins is small, and their chief seat is on the mountains, west of Hama in Syria. They are also called Ismaeleya or Ishmaelites. They came originally from Persia, and their religion is a compound of Zoroastrian, Jewish, Christian, and Mohammedan creeds, but the distinguishing tenets of the sect is the union of the deity with their chief, whose orders were accordingly promptly and unhesitatingly obeyed as coming from heaven. The sect is an offshoot from the Ismailee branch of the Sheea Mohammedans. It was founded about eight hundred years ago by a man called Hasan bin Sabah, in Persia; a section

of them afterwards removed from Persia to Syria, where they came in contact with the Crusaders and obtained atrocious notoriety through their monstrous deeds. They were bound implicitly to carry out the commands of their chief (commonly known at the time as "old man of the mountain"), even to the extent of murdering any man, king or peasant all over the world, whom he might wish to dispose of. Several potentates are said to have paid him blackmail for safety's sake, but the Knights Templars had more of a gallant spirit and defied his power. The Mongols made a general massacre of the Persian branch of the order in 1256, and Sultan Bibaris nearly rooted out the Syrian offshoot in 1270. Traces of them still remain in Persia, but they are now a very insignificant sect in that country or Turkey. Some etymologists derive the name of Assassin from Hasan bin Sabah, but Volney believes it was derived from the Turkish word "hassassin," to kill silently and by surprise, being equivalent to a night robber. From whence Volney obtained this derivation in the Turkish language is more than I can understand, as I do not know of such a word meaning "to kill." I myself believe that it came from *Hashasheen*, that is to say those who indulge in partaking of, or smoking an intoxicating herb or drug called in India "bhang" prepared from the powdered leaves of *Cannabis Sativa* or common hemp. Many Indian and Persian desperadoes, when they wish to do some horrible deeds, deaden what remains of conscience they possess and stimulate their passions by means of this concoction.

The only remaining sect in Syria is that of the Maronites, but this term cannot really be considered a nationality but a religious community, which though it has allied itself to the Church of Rome, still retains most of its original independence and rituals. Their Patriarch styles himself Peter of Antioch, and claims his spiritual descent to the Apostle St. Peter. The name of Maronite they inherited from the Syrian monk named Maro,* who lived on the bank of the Orontes about A.D. 400, but other historians say that this nomenclature was given to them from the name of one of their patriarchs called Marun† or Maro,‡ who was ruling over the see of Antioch in A.D. 700. They are no doubt descended from the ancient Arameans commonly called Syrians, and

* Lord in Syriac, but not in Chaldean.

† Our Lord in Chaldean or Aramean.

‡ Lord in Syriac.

are of the same nationality as the Droozes. Their numbers are reckoned to be about 200,000 souls. They are to be found mostly on the range of mountains called Libanus. They are most fanatical, and have more monastic institutions, in comparison to their numbers, than any Roman Catholic country in the world. Formerly in the district of Kusrewan, where they predominate, a Protestant was not allowed to settle, and very seldom escaped injury or insult when even merely passing through the country as a traveller. It is now of course quite the opposite, because the general friendly intercourse between different nationalities in the east and west has almost nullified the open fanaticism, though doctrinal and sect hatred still exist in the heart of the ignorant classes of the Maronites against those who are opposed to them in matters of faith. The Maronite church is really not unlike that of the so-called *Syrian Catholics*, who are to be found in Mossul, Baghdad, and Syria. They both retain their liturgy in Syriac, and have the same ancient rites and ceremonies.

The native Christians of Egypt are called, as it is supposed, Copts from the Greek word *Argobtos*, used in the Septuagint for Egyptian. They are no doubt descended from the ancient Hamites. Through their intermingling with other nationalities like the Greeks, Syrians, and Arabs, their blood is more or less impregnated with Semitic as well as Grecian connexion. Formerly their language was akin to the old Egyptian, as the Hebrew to the Chaldee or Aramaic. It continued till the tenth century, when it was to a large extent absorbed by Arabic; and by the seventeenth it had ceased to be spoken, and existed only in their rituals as it is at present. They belong to that branch of the Christian Church commonly called "Monophysite," which means that they believe in one nature in Christ, which is the essential doctrine held by the Abyssinians, Armenians, and the Syrian Jacobites;* but as I intend to touch upon the so-called heresies of the fifth century before I conclude, I must go on to give a short account of this interesting community.

At the time when the Eutychian or Monophysite heresy was condemned by the general council of Chalcedon, in A.D. 403, the Coptic nation with the Abyssinians and Nubians adhered to the error, and so keen was the contention between them and the Greek church that they

* Followers of Jacob Barradeus.—Ed.

favoured the invasion of Egypt by the Moslem Arabs, whom they joined in expelling the Greeks. The change of government, however, did not benefit them, but they found to their bitter disappointment that the enemies of the cross were harder task-masters than their Christian enemies. Being tyrannized over by harassing impositions and cruel oppressions, they tried to get rid of them by a general rise, which was put down with a high hand, and brought upon them greater miseries. For many centuries the Copts were treated with the utmost severity and subjected to the greatest cruelties. In the ninth century they were made to wear dark garments and turbans to distinguish them from the Moslems, and as a mockery they were forced to carry a heavy wooden cross of about 5 lbs. weight, suspended from the neck. In the thirteenth century another severe persecution took place, in which all their principal churches were destroyed throughout Egypt. Having been so much worried by constant ill-treatment and diabolical persecution, not a few of them embraced Islamism, and their churches were turned into mosques. Indeed, all Christians were domineered over by every Mohammedan, whether high or low, until the iron rule of Mohammed Ali Pasha in the beginning of this century, when he had the Mamlooks massacred, and accorded liberty to all Christians wherever his power was extended. He being of Albanian origin, tolerated both Christians and Jews, and meted out justice to both Moslem and non-Moslem alike.

It is calculated that the present number of the Copts all over Egypt does not exceed a quarter of a million souls.

The religious system of the Coptic church is the same as that of all other oriental and Papal churches in regard to unscriptural forms and ceremonies, excepting that of the old Chaldean church, erroneously nicknamed "Nestorian," but they practise both circumcision and baptism the same as the Abyssinians. They believe that their church was founded by St. Mark, and their Patriarch is regarded by them as his lineal successor. They administer the Eucharist in the form of small cakes (as all Monophysites do), which are moistened with wine for the laity, but the priests receive it in both kinds separately.

Having touched in the beginning of my paper upon the Chaldean, Syrian, and other nationalities existing in Mesopotamia and Assyria, I must explain at some length their history and present constitution and doctrinal differences.

In the first place I have to remark that, as is the case all over Asiatic Turkey, nine-tenths of the population of those countries are Mohammedan, and the remainder are a mixture of Christians and semi-Gentile sects, as the Yezedees, commonly nicknamed "devil worshippers," Shabbaks, and Sabeans, who are also styled Christians of St. John. The first of these are found in Assyria, Northern Mesopotamia, Coordistan, Russia, and Persia. Doubtless these people are descended from the ancient Assyrians, but having been under the yoke of Islam for the last thirteen centuries, and in close connexion with Mohammedans and Christians, they have adopted some tenets of both. They profess to believe in Christ as well as Mohammed, and they practise baptism, but circumcision is optional with them. Though they believe and adore the God of revelation, they pay great honour and veneration to Satan, who they declare will one day be restored to his original status as the chief of all angels. On this account they think it wrong to abuse him, and say, "woe betide those who utter a word against him, for they would be punished by him at the end of time for their hatred of him!"

The Shabbaks are found both in Assyria and Northern Mesopotamia, and are more like Moslems than any semi-pagan sect. Indeed those who have not mixed with them much would never think that they are not Mohammedans. Though I myself was intimately connected with them for some time during my explorations in Assyria, I did not know that they were not Moslems until I became very intimate with two of their elders. I found that they believed in Christ and in His Divinity, but dare not make such an avowal before a Moslem. They adore the blessed virgin almost as much as the oriental Christians and Roman Catholics, and call her the "Mother of God." None of their children are initiated into the mysteries of their religion until they pass the age of puberty.

The Sabeans, mentioned in Job, Isaiah, Ezekiel, and Joel, as שְׁבָא Sheba, and variably styled in modern time as "Christians of St. John" and "Mendeans," from Mendai Djalie, who was, as it is alleged, a disciple of St. John the Baptist, are found in Southern Babylonia and the districts of ancient Susiana. They are no doubt descendants of the ancient Babylonians, and were originally of the same nationality as the Sabeans who inhabited the province of Orfa, the ancient Edessa and Haran in Northern Mesopo-

tamia. They have, as other semi-pagan sects, borrowed many rites and ceremonies from the Christians and Moslems, but they are supposed to worship the heavenly bodies as their forefathers did. This kind of idolatry prevailed formerly in Mesopotamia, whence it spread all over the East, and found its way ultimately into Greece. The sun, the moon, and the stars were believed to possess divine intelligence, and exercised constant influence for good or evil upon the destiny of man. Even now superstition prevails in different parts of Biblical lands amongst all classes and sects at the appearance of a new moon, and those who see it at its birth are particular as to what face or object they behold immediately afterwards. On this account, therefore, if a person meets with bad luck or is visited with any misfortune during that lunar month he exclaims, "I must have seen the new moon on an ill-omened face." Probably the influence of the moon on the sea tides and persons afflicted with epileptic fits, may have in a great measure contributed to the belief of those who are more or less superstitious as to the heavenly bodies possessing a mysterious power over the fate of the human race.

It is said that there is a small sect in Syria mixed with the Maronites and Droozes called "Galdeans," who, like the Sabeans, claim St. John the Baptist as their prophet and founder of their faith. They hold a middle course belief between Judaism and Christianity and adhere strictly to the sacrament of baptism. They celebrate their Eucharist with honey and locusts alternately, which are distributed as consecrated elements to the worshippers present, and sent to the absent members of their sect as a religious rite. The term "Galdean" may be a corruption of "Chaldean" as applied to a part of those whom the King of Assyria transferred from Babylonia to Samaria.

The present Chaldeans of Mesopotamia and Assyria, of whose nationality I am, are doubtless the offspring of the ancients, as I shall try to prove by what to my mind is incontestable evidence, though some travellers and self-opinionated writers have insisted on irrelevant arguments to the contrary. I will quote what they have adduced in defence of their theories, and will leave to painstaking critics to draw their conclusions therefrom. I myself will base my proofs on three undeniable data, namely,—language, homestead, and history, which I think ought to be infallible tests in demonstrating the nationality of the natives of any country.

With regard to the language, no one can deny that the mother tongue of the present Chaldeans is akin to the Chaldee of the Targum and some parts of the Books of Daniel and Ezra, besides a number of Aramaic words used in the Old and New Testaments like "Yagar-Sahadutha" (heap of witness), "Bar" (son), "Abba" (father), "Talitha-cumi" (damsel arise), "Marantha" (Our Lord's coming), &c.

To show how near the Chaldee of Daniel is to the language used by the present Chaldeans and the so-called Nestorians in the mountains of Assyria and Media, I quote in the appendix a few verses from the orthography of the 5th chapter of Daniel in parallel columns with the Chaldee text called pesheto (but erroneously termed in Europe "Syriac"), which shows how striking is the resemblance between the two versions. I have inserted the words without the vowels, which were only introduced in the seventh century, inasmuch as all the ancient manuscripts were unpointed—like the present Arabic in common use amongst the Arabic speaking peoples all over the world. I have also omitted to punctuate the Hebrew letters—to conform them to the reading of the Chaldee of old; because the vowel points, like those introduced by modern Chaldeans and Syrians, were adopted in the time of the compilation of the Masorah.*

Bar Hebræus, also known as Abulfaragius, who lived in the thirteenth century, in writing about the Aramean language of the *Chaldeans*, remarks thus:—"The Orientals who are descendants of the Chaldeans are a wonderful people, in their tongue there is no difference between the pthaha and zkapa." These two vowels of the five, invented for the Chaldee alphabet by Jacob, Bishop of Edessa in the seventh century, are only used by the present Chaldeans in their writings, and are pronounced now in the same way as they were twelve hundred years ago. Then in another place the same author in writing about the Aramean alphabet remarks thus on the first letter Alep: "There are three dialects of the Syrian tongue: 1st, the Aramean or Syriac, properly so-called, which is the most elegant of all, and used in Mesopotamia and by the inhabitants of Roha, Edessa, Haran, and the outer Syria; 2nd, the dialect of Palestine spoken by the inhabitants of Damascus, Mount Libanus, and the inner Syria; 3rd, the Chaldee or

* See Appendix.

Nabathean dialect, the most unpolished of the three, current in the mountainous parts of Assyria and the villages of Irak and Babylonia.”*

These two historical facts ought, to my mind, to convince any sceptical scholar as to the nationality of the present Chaldeans, whose language is the same now as it was in those remote days, but we Chaldeans do not agree that our pronunciation is unpolished; on the contrary we consider it the prettiest of all the Aramean dialects.

Now we come to the homestead of the Chaldeans of to-day, and examine geographically that part of the globe where they are to be found. First there is Assyria and Mesopotamia, including the Irak known in history as Babylonia, which has always been their native country, through which the two well-known rivers of the Garden of Eden, *Tigris* and *Euphrates*, flow. It cannot but be admitted from historical facts that their Christianity originated in Babylonia in the first century, and the see of their Patriarchate was first established at Ctesiphon, which was then the seat of the Persian monarchy after the destruction of Babylon. They owe their conversion, according to the history of Sleewa-ibn Yohanna, *who lived in the early part of the fourteenth century*, to one of the seventy disciples named Mar Maree, who also was at the same time the proselytizer of the Assyrians of Nineveh and its surroundings. Both nations merged then into one community under that saint's pastorate, and on his death the "company of the faithful" sent to the Holy City to Simon, who succeeded St. James, the brother of our Lord, as head over the church there, requesting him to send them a patriarch. The person selected was Abrees, who was consecrated at Jerusalem and sent to Ctesiphon A.D. 90.† The Chaldeans possess a list of their patriarchs from the time of the Chaldean conversion up to the present time, numbering one hundred and eight, wherein a short history is given of each, but in this catalogue the first patriarch is said to have been St. Thomas, one of the twelve apostles of our Lord, who after six years went to India and converted the Gentiles on the coast of Malabar, who were allied in their ecclesiastical rites with the Chaldeans of Mesopotamia and Assyria. St. Thomas was succeeded in the Babylonian Patriarchate by St. Adi, one of the seventy apostles who

* Abulfaragius, *Hist. Dynt.*

† Badger's *Nestorians and their Rituals*, vol. i, p. 136.

with St. Mari is held as the great saint of the Chaldean church.

Having disposed of the language and homestead of the present Chaldeans, I must notice a few facts in connexion with history which will show that the present highland Chaldeans and the so-called Nestorians are inhabiting the same country now as they did in the time of Xenophon about twenty-three centuries ago. The Chaldeans, Armenians, and Coords whom he met on his march with Cyrus through Assyria and Media are occupying now the same mountainous regions as formerly. As his history is interesting, I do not think it is out of place here to quote it according to its English translation by the Revs. J. S. Watson and Henry Dale. In his *Anabasis* (Book iv, ch. iii, cl. 3) he says:—

“At daybreak, however, they perceived on the other side of the river a body of cavalry, in complete armour, ready to prevent them from crossing, and on the high banks above the cavalry, another of foot prepared to hinder them from entering Armenia. These were Armenians, Mardians, and Chaldeans, mercenary troops of Orontes and Artuchas. The Chaldeans were said to be a free people, and warlike; for arms they had long shields and spears. The high banks on which these forces were drawn up, were three or four hundred feet from the river; and the only road that was visible was one that led upward, apparently a work of art. Here the Greeks endeavoured to cross, but as, on making trial, the water rose above their breasts, and the bed of the river was rough with large and slippery stones, and as it was impossible for them to carry their arms in the water, or if they attempted to do so, the river swept them away (while if any of them took their arms on their heads, they became exposed to the arrows and other missiles of the enemy); they in consequence retreated, and encamped at the side of the river.

“They now perceived the Carduchi assembled in great numbers under arms on the spot where they themselves had been on the previous night. Hence great despondency was felt by the Greeks, as they knew the difficulty of passing the river, and saw the Carduchi ready to attack them if they attempted to cross.”

In his *Cyropædia* (Book iii, ch. ii, cl. i) Xenophon also gives the following account of the races which inhabited, in his time, the highlands of Assyria and Media:—

“The next day Cyrus, taking Tigranes with him, and the

best of the Median horse, together with as many of his own friends as he thought proper, rode round and surveyed the country, examining where he should build a fortress. Going up to a certain eminence, he asked Tigranes what sort of mountains they were from which the Chaldeans came down to plunder the country? Tigranes pointed them out to him. He then inquired again, 'And are these mountains now entirely deserted?' 'No, indeed,' said he, 'but there are always scouts of the Chaldeans there, who give notice to the rest of whatever they observe.' 'And how do they act?' said he, 'when they receive this notice?' 'They hasten with aid to the eminences, just as each can.' Cyrus gave attention to this account; and, looking round, observed a great part of the Armenian territory lying desert and uncultivated, in consequence of the war. They then retired to the camp, and, after taking supper, went to rest."

In the same chapter (clause 7) Xenophon relates thus with reference to the Chaldeans and Armenians:—

"The Chaldeans had each a shield and two javelins; they are said to be the most warlike of all people in that part of the world. They serve as mercenaries, if any one requires their services, being a warlike people and poor; for their country is mountainous, and but little of it yields anything profitable. As Cyrus's men approached the heights, Tigranes, who was riding on with Cyrus, said, 'Cyrus, are you aware that we ourselves must very soon come to action, as the Armenians will not stand the attack of the enemy?' Cyrus, telling him that he knew it, immediately gave orders to the Persians to hold themselves in readiness, as they would have immediately to press forward, as soon as the flying Armenians drew the enemy down* so as to be near them. The Armenians accordingly led on, and such of the Chaldeans as were on the spot when the Armenians approached, raised a shout, and, according to their custom, ran upon them, and the Armenians, according to their custom, did not stand their charge. When the Chaldeans, pursuing, saw swordsmen fronting them, and pressing up the hill, some of them, coming up close to the enemy, were at once killed; some fled, and some were taken; and the heights were immediately gained. As soon as Cyrus's men were in occupation of the summit, they looked down on the habitations of the

* Cyrus disguises from his soldiers the want of courage in the Armenians, by representing that they would flee designedly. [A note in *Cyropædia*, Book iii, ch. ii, cl. 8.--H. R.]

Chaldeans, and perceived them fleeing from the nearest houses."

It will be gathered from the above quotations that the Chaldeans, Armenians, and Coords inhabited in the time of Xenophon the same country which they occupy now, and why the name *Chaldean* is changed into a foreign nomenclature *Syrian*, is more than I can understand. It is quite anomalous to apply such a term to the Nestorians, seeing that the highlands of Assyria and Media are on the border of Persia and far away from the country called "Syria," which lies on the western side of the Euphrates and near the Mediterranean Sea.

The Armenians speak Armenian, the Coords Median or corrupt Persian, and the Chaldeans, Chaldean or Chaldaic; why then are the two former nationalities universally acknowledged to be descendants of the ancient Armenians and Carduchi or Coords, and not the Chaldeans, who are termed in a doctrinal sense "Nestorians"?

There is another fact connected with the nationality of the Chaldeans which goes far to show they are as much entitled to Assyrian descent as any other community which boasts of ancient origin, and that is the annual commemoration of the repentance of the Ninevites at the preaching of Jonah by fasting three days, commencing on the twentieth day before Lent, which always begins on a Monday and lasts till Wednesday inclusive. Formerly a large number of devotees tasted nothing during the three days, as it is traditionally believed that the Ninevites did so when God Almighty forgave them their iniquities. I remember when I was quite a youth I tried to fast the three whole days without partaking of any food or water, but as my sainted mother feared that my health would suffer, she persuaded me to break my fast at the end of the second day. The Chaldeans have an elaborate ritual for devout purposes used in the three days' fast, which is as ancient as any other church services of theirs; it is ascribed to St. Ephraim Syrus, who flourished in the fourth century. How is it then that of all other Christian nationalities all over the world, the Chaldeans alone retain the usage of this tradition, and yet forsooth they are told that they must look to Syria for their origin?

The so-called "Syrians," whether Jacobites or Catholics, are not natives of what is known in Europe as "Syria," nor are there many of them to be found in that country, the majority of the Christians in Syria being either Maronites,

Greek Orthodox and Catholic, Armenian Monophysite and Catholics. The word Syrian as it is used in Arabic is known in Biblical lands to denote only a religious community and not natives of any country in particular; for although some modern geographers have tried to define the limits of "Syria," yet it is a known fact that neither the Hebrews nor the Greeks knew exactly what constituted the boundary of Syria, and what is really meant by the *Syrian* language. Indeed in what in Europe is now termed Syria there were not less than a dozen different nationalities who formerly occupied that land; and if the word be taken to mean what was considered in ancient days *Aram*, there is no such country now to represent it save the Pashalic of Damascus, while the other two Arams of Zaba and Macka are now in the Pashalic of Aleppo. The only people that remain who might be considered lineal descendants of the Aramean race are the Droozes and Maronites. The remainder of the different ancient nationalities have been merged into that of the Arab when those lands were overcome by the Arabian hordes in the seventh century. At the same time all Jews and Christians who existed in the three Arabias, viz., Arabia Felix, Arabia Deserta, and Arabia Petræa, had to embrace Mohammedanism or die martyrs.

Having produced certain proofs to show that the present Chaldeans are the descendants of that primitive race or Assyrian, I must now refer briefly to certain theories that have been started by some travellers to the contrary. I maintain that if the Chaldeans of Assyria, Mesopotamia and the Irak are not the progeny of the archaic inhabitants of the land, they cannot ethnologically be reckoned either Armenians, Coords, Syrians, or of any other nationality,—certainly not "Nestorians," as this is not a name of a race but of dogma, like the Wesleyans, Lutherans, and Calvinists.

The first of the critics who started the quaint idea that the *Chaldeans* were originally *Nestorians*, and that the change of name was bestowed on them by a certain *Pope* when they joined the church of Rome, were Messrs. Smith and Dwight, two American missionaries who in the book they published entitled *Researches in Armenia*, write thus:—

"The present Chaldean Christians are of recent origin. It was in 1681 that the Nestorian Metropolitan of Diarbekir having quarrelled with his Patriarch was first consecrated by the Pope (Innocent XI), Patriarch of the Chaldeans.

The sect was new, as the office was created for it. Converts to Popery from the Nestorians and Jacobite churches were united in one body and dignified by the name of the Chaldean Church. It means no more than Papal Syrians, as we have in other parts Papal Armenians and Papal Greeks." This is certainly a wild idea, seeing that the term Greeks and Armenians mean nationalities, whereas "Nestorian" is neither more nor less than a religious title. Any people joining a sect would be called, as a matter of course, by the denomination they have allied themselves with, like English Lutherans and German Lutherans, and if the Chaldeans were not called by that appellation before, what was their nationality then, unless Messrs. Smith and Dwight meant to prove that the Chaldeans were descendants of Nestorius? If those two writers had taken the trouble to study the Mesopotamian and Assyrian nationalities, and what the word "Nestorian" meant, they would have found the *Nestorians* and *Syrians*, whether Catholic or Monophysites, were separate sects, each having rituals of their own. Moreover, had they gone to head-quarters, they would have found at the Vatican documents extant wherein the *Chaldeans* were called by Paul V heretics more than seventy years before the date they quote, and it is a folly to suppose that the Roman Pontiff could or would create a national name of *Chaldeans* for a people like the natives of Diarbekir, who were not living in either Chaldea or Assyria, to say nothing about the converted Nestorians and Jacobites having no nationalities at all. To show how groundless these assertions are, I produce here what Assemani the Syrian historian says in contradiction. In vol. iv, page 75, he remarks that "Paul V," the seventh Pope before Innocent X, to whom Messrs. Smith and Dwight refer as having given the name of Chaldeans to the Nestorians, "wrote to Elias the Patriarch of the Chaldeans (who was then a Nestorian) thus—'A great part of the East was infected by this heresy of Nestorius, especially the Chaldeans, who for this reason have been called Nestorians.'" In the same volume, page 1, Assemani states "that the Chaldeans, or Assyrians, are called Orientals from that part of the globe which they inhabit, and Nestorians from the heresy they profess."

The late Rev. G. P. Badger also followed the footsteps of Messrs. Smith and Dwight in their capricious idea about the origin of the Chaldeans. He says in his *Nestorians and their Rituals* (vol. i, page 180), "that when the Latin missionaries

had succeeded in forming a schism among the Nestorians of Diarbekir, they wanted a name whereby to designate the proselytes. In other instances the *national* title of the parent body supplied a ready and an unobjectionable appellation. Thus, by prefixing the term 'Catholic,' they adequately, and according to their views, appropriately distinguished the seceders from the Greek, Armenian, and Syrian communities. A difficulty now arose; the new converts styled themselves 'Soorayé' and 'Nestorayé.' The Romanists could not call them 'Catholic Syrians' or 'Syrian Catholics,' for this appellation they had already given to their proselytes from the Jacobites, who also call themselves 'Syrians.' They could not term them 'Catholic Nestorians,' as Mr. Justice Perkins, the Independent American missionary does,* for this would involve a contradiction. What more natural then, than that they should have applied to them the title of Chaldeans, to which they had some claims *nationally* in virtue of their Assyrian descent."

Dr. Badger allowed the *Armenians*, the *Greeks*, and even the so-called *Syrians*, to have a name of nationality, and yet the poor "Nestorians" have no nationality whatever, and the important Chaldean community at Diarbekir could only ascribe their origin to religious nomenclature, namely, "Soorayé" and "Nestorayé," two Chaldean words which mean Syrian and Nestorian. The term "Nestorian" speaks for itself, as every one knows that it is a nickname given to them in the fifth century, when they refused to accept the edict of excommunication of the council of Ephesus against Nestorius.

It has been urged also that the primitive church in Babylonia was under the Patriarch of Antioch (which is a Syrian city), because forsooth at one time the election of their "Catholicos" was left to his choice. This assertion has no more connexion with the nationality of individuals than to say that the British are not English but Latins, because at one time the Anglican church was under the jurisdiction of the popes of Rome, or that the Roman Catholics of Ireland are not Irish, because they are ecclesiastically governed by the Vatican. Even if there had been any connexion between the sees of Antioch and Ctesiphon in Babylonia, it was as merely superficial as the

* *Residence in Persia among the Nestorians*, p. 171.

connexion between the Catholic churches in different parts of the world with that of Rome, but this fact does not surely do away with the nationalities of the different races that are under the pontificate of the Pope!

The same Syrian historian, Assemani, mentions plainly the origin of the Chaldean nationality and doctrine in the following words: "The Chaldeans or Assyrians received Christianity in the time of the twelve apostles—Peter, Thomas (St. Thomas, the incredulous, and the apostle of India), Bartholomew, Matthew, and Judas, the son of James, and Thaddeus, also called Lebæus, also Thaddeus of the seventy, and Mark and Ayhæus, are called the apostles of the Syrians and Chaldeans, Adæus or Adi, one of the seventy disciples, was sent into the East by St. Thomas, one of the twelve, and was martyred at Edessa, under the son of the celebrated Abgarus, on his return from preaching in Persia, Assyria, and Babylonia. Mark, a disciple of Adæus, proclaimed the Gospel in Babylonia and Persia. He fixed his residence at Ctesiphon and Seleucia, and is called the first Bishop of Seleucia; and Seleucia in this manner became the head of the Oriental Church.*

The present Dean of Argyle and the Isles, with whom I have had some correspondence on the subject, when he was in charge of the mission at Urmi in Persia, has drawn his conclusion from the word "Soorayé," by which, as he alleges, the Nestorians call themselves. I have already explained the meaning of this appellative above (previous page), which is nothing more than a religious term, that is to say, a Christian, like the sect of the "Nazarenes."† The word "Soorayé" is a corruption of the word Athurayé or Assyrian, just as Othman is corrupted by the Turks into *Osman*, and rendered in English *Ottoman*. The th as in *three* is turned into s, as it is now pronounced by different Biblical nationalities such as the Yezeedees, Coords, and Persians. The want of the letter A in Soorayé is not uncommon if we examine different cognate languages,

* Rich's *Koordistan*, vol. ii, p. 120. Another peculiar idea has now been stated with regard to the nationality of the Chaldeans, and it is to be hoped that the use by the members of the Archbishop of Canterbury's "Mission to the Assyrian Christians," who invented a new and quaint foreign name for the Nestorians, by calling them in their official reports "East Syrians," and likewise calling the Monophysite Syrians "West Syrians," will not start an erroneous idea with regard to their nationality.

† Acts xxiv, 5.

such as Aramaic, in connexion with Hebrew, Chaldee, and Arabic, and Latin with Italian, Portuguese, and Spanish. For instance, the Chaldean word *Estranghelo* is sometimes spelled Stranghilee, ibn, (a son in Arabic), is bin in Hebrew. Emmanuel in Latin and other European languages is *Manuel* in Portuguese; the sacred words "praise ye the Lord," are Halleluiah in Hebrew and Chaldean or Aramaic, and *Alleluia* in Greek. The word *hosanna* (save us) is Oshaana in Chaldean or Aramean and *hoshanna* in Hebrew. Even if we adopt the word "Syria" to mean the Biblical "Aram" of the Hebrews, as it is translated in the different European languages, how could this misnomer apply to the country lying on the eastern and northern side of the Tigris, and the Assyrian and Median mountains? To say nothing about the extensive territory which intervenes between that river and the Euphrates called "Mesopotamia"!

All the Turks, Yezedees, Coords, Persians, and Indians pronounce the Arabic th (as they are used in the English word *there*) as s, and the dh (as in the word *thou*) as z. Moreover if the critics were to study carefully the ethnology and etymology of the different races inhabiting Biblical lands, they would have no difficulty in arriving at a correct conclusion as to the origin of a people. How Dean Maclean manages to make the natives of Western Persia, Assyria, and Mesopotamia, "Syrians" is more than I can fathom. If according to his new theory the Nestorians are to be styled "East Syrians," and the Syrian Jacobites "West Syrians," then there must be new names invented for the Chaldeans of Assyria and Mesopotamia, and also for the Syrian Catholics of those countries; because the former could not be called "East Syrians," as they are not Nestorians, nor the latter be termed "West Syrians," because they are not Jacobites, unless one will be styled "East Syrian Catholics," and the the other "West Syrian Catholics," names which I presume would be objected to, first by the people themselves, and secondly, by the Ottoman authorities, who would consider such interference strange and uncalled for. The plain question is how are these people styled officially from time immemorial? Certainly not *East* or *West* Syrians, nor were the Chaldeans, whether Nestorians or Catholics, ever called *Syrians*. If the Jacobites chose to style themselves "Syrians" after they separated themselves from the primitive Chaldean church it was their own affair, and they are welcome to adhere to the foreign term which they have assumed.

There is a short article in the present ninth edition of the *Encyclopædia Britannica*, under the head of "Syro-Chaldeans," which reads very strangely (after the testimony of Bar Hebræus regarding the existence of the name of "Chaldean" as a national term), by P. L. Connellan of Rome. Who this gentleman is I have been unable to find out. His information is this, "The Oriental Syrians," he says, "are called ecclesiastically Chaldeans. The name comprises not only the inhabitants of Chaldea, but also those of Assyria, Mesopotamia, and a part of Persia. To distinguish them from those having other rites equally Syrian they were exclusively termed Chaldeans by Pope Eugenius IV (1431, 1447). Previous to the Council of Florence (1438) they were called Orientals or Syro-Orientals." What Oriental or Syro-Oriental has to do with the title of nationality is an enigma to me, to say nothing about what Bar Hebræus had recorded two hundred years before the time of Pope Eugenius IV, as to the existence of the Chaldeans, and much more as to the absurdity of the Pope being able to create a new name for a nation who are not his subjects or in any way subservient to his dictation. On reading the above extract I wrote to my friend the present Patriarch of the Syrian Catholics, who happened to be in Rome at the time, and asked him to find out for me from the archives in the Vatican if there was any truth in that report, and who P. L. Connellan is; but he could find no clue to either one or the other. As I have found two mistakes in the same present edition of the *Encyclopædia*, in vol. iii, page 184, and the other in vol. xvii, page 572, about my discoveries, the former relating to the site of Sippara (Sepharvaim of scripture), which I discovered in 1881, and the other regarding the library I found in Assurbani-pal's palace in 1853, the editor may have been misinformed likewise touching the nationality created by Pope Eugenius IV for the Chaldeans.

As there has been also some dispute about the meaning of the word *Syrian* in connexion with Assyria, I must briefly allude to the discussion. Herodotus mentions (in Book vii, ch. 63) that the Greeks called the *Assyrians* Syrians, upon which Professor George Rawlinson (the present canon of Canterbury) makes the following remark in his *History of Herodotus*: "'Syrian'" and "'Assyrian,'" he says, "are in reality two entirely different words. 'Syrian' is nothing but a variation of 'Tyrian.' The Greeks when they first

became acquainted with the country between Asia Minor and Egypt found the people of Tyre (Tzur) predominant there, and from them called the country in which they dwelt Syria (for Tsyria, which was beyond their powers of articulation). Afterwards, when they heard of the Assyrians, they supposed the name to be the same, though it had really a very different sound and origin. Hence the use of the term *Συριηγενος* by the Delphic oracle (vii, 140), and of *Σύριον* by Æschylus (Pers. 86), where 'Assyrian' is plainly intended. Herodotus seems to have been the first writer who took notice of the fact that the great people of upper Mesopotamia called themselves not Syrians, but Assyrians. The confusion, however, continued after his time. Xenophon, though sometimes drawing the distinction, which Herodotus practically makes, between the two terms (see note on Book i, ch. 6), as for instance in the *Cyropædia* (i, 1, 4, and 1, 2), yet in many places carelessly uses 'Syrian' for 'Assyrian' (*Cyrop.*, v, iv, 5, 1; vi, 11, 19; viii, 20, &c.). Scylax, on the other hand, calls the Cappadocians 'Assyrians' (p. 80), an epithet to which they could not possibly be entitled; yet in this he is followed by Dionysius Periegetis (i, 772), Arrian (Fr. 48), and others. 'Syrian' again is used for 'Assyrian' by the Latin writers, Pliny (H. N. v. 12), Mela (i, 11), &c.

"The difference between the two words will be seen most plainly by reference to the original languages. The root of 'Syrian' is in Hebrew צור (Tzur), the root of 'Assyria' is אשור (Asshur). A still greater distinction is found in the Assyrian inscriptions, where Assyria is called Assur, but the Tyrians are styled Tsur-ra-ya, the characters used being entirely different. With respect to original meaning, Tzur seems to be rightly explained as so called from the rock (צור) on which the town was built; Asshur is perhaps to be connected with אשור, 'happiness,' at any rate it can have no connection with tzur."

It is quite incomprehensible to me how Professor Rawlinson could force the word Syria out of "Tyrian" or Tzur. In all the Semitic languages Tyre is called צור (with the guttural S or Ssadee), and in the Greek and other European languages it has been called Tyre or Tyrus. In the Septuagint version of the Old Testament there is a marked distinction between the words Tyre and *Syrian*. While the former is called *τυρου* or *τυρίων*, Tyrian, the latter is invariably written *Συριαν*, Syrian, which is a corrupt

rendering for Aram. This proves that when the Old Testament was translated into Greek, the word Tyre was understood to have no connection whatever with that of Syria, they being two distinct words. Moreover in Hebrew there is no such word as *Syria*, but the proper name is אֲרָם, Aram, which has been erroneously translated into Greek, English, and other European languages, into that misnomer, having no similarity either in the composition of the letters or the sound. It was very natural of the Greeks to call the Aramaic language Syriac, which was a corruption of Assyrian by omitting the first letter A, seeing that their language was the same as that used in Aram of Damascus and Tyre. Even the late Sir Henry Rawlinson considered that the word *Syria* was a corruption of *Assyria*, as it will be seen from his remark upon his brother's note below in Book i of *Herodotus*, chapter 6, wherein Canon Rawlinson tries to define the questionable geographical limits of what is called Syria. His words are these: "Herodotus regards the words Syria and Assyria, Syrians and Assyrians, as in reality the same (vii, 63); in his use of them, however, as ethnic appellations he always carefully distinguishes. Syria is the tract bounded on the north by the Euxine; on the west by the Halys, Cilicia and the Mediterranean; on the east by Armenia* and the desert, and on the south by Egypt. Assyria is the upper portion of the Mesopotamian valley, bounded on the north by Armenia, on the west by the desert, on the south by Babylonia, and on the east by the Medes and Muteeni." [The only true word is Assyria, from Asshur. Syria is a Greek corruption of the genuine term.—H. C. R.]

The language which is used by the Chaldeans is known in Europe by the name of Syriac, but they themselves term it Chaldean, as it is called in the Targum, Daniel, and Ezra. The word Syriac or *Siryaneæ* is applied by them to the characters used by the so-called Syrians or Jacobites. It is true there is very little difference between the Chaldean and Syriac, but the difference is noticeable both in the formation of the letters and the pronunciation of certain words which no man can mistake.

Formerly the Syrians of Mesopotamia who were of the same stock as the Chaldeans had a like style of writing, but

* This is a mistake; the correct geographical position is Mesopotamia.—H. R.

in the thirteenth century Bar-Hebræus, a promoter of the Jacobites, wishing to make a thorough distinction between the writing of the Monophysites and that of the Nestorians, changed the characters and vowel points. The Chaldean p and a were changed into ph and o respectively, and if we refer to Holy Writ, either Hebrew or Greek, we shall find the present Chaldeans keep the old pronunciation in the case of the words Yegar-sahadutha* (heap of witness), Maranatha† (our Lord's coming), Abba‡ (father), Talitha§ (damsel), Maria (Lord), Allaha (God), which the Syrians pronounce Yogor-Sohodwotho, Moronotho, Obbo, Tolitho, Morio and Olloho.

Though I have no doubt that the Nestorians both of the lowland and highland of Assyria came formerly from the same origin as the Chaldeans of Mossul, Baghdad, and Diarbekir, socially speaking, they do not stand on the same level, because while the former with few exceptions are rural and of the peasant uneducated class, being, like the Coords their neighbours from remote time, stationary, the latter have always been progressive and cultured.

As I said before, the so-called *Syrians* are merely a religious community, and the name has no more to do with a nationality, than that of Wesleyan or Romanist. They are divided into two sects, one follows the tenets of the Roman Catholic Church, and the other, which is the largest section of the two, is named Jacobites, called thus after their great reformer, the celebrated Jacobus Bar-Addæus, to whom I alluded before. They are almost always found together in Assyria, Upper Mesopotamia, and Syria, but the Monophysite party has some adherents on the coast of Malabar, whom they managed to convert to their faith from the community which was in communion with the Chaldean Church in Mesopotamia, through the intrigue of the Vatican party, and the neglect of the Chaldean hierarchy in Mesopotamia, from whence they used in olden times to receive their Prelates. The Syrian Patriarchs of the Jacobites, as well as the Catholics, claim their ecclesiastical succession from the see of Antioch, and they consequently assume the name of "Ignatius," and oddly enough they both sign their names "Patriarch of the see of Antioch."

In faith the Jacobites are Monophysites, and with the exception of the difference of their nationality, language,

* Gen. xxxi, 47.
§ Mark v, 41.

† 1 Cor. xvi, 22.

‡ Mark xiv, 36.

church discipline, and peculiar rituals, they are in every respect of the same communion as the Armenians, Copts, and Abyssinians. The originator of these sects was Eutyches, abbot of a Constantinople convent of monks, who, in opposition to the doctrine of the Nestorian (so-called) heresy, which attributed to our Lord two persons, went to the opposite extreme, and taught that there was only one nature in Christ, that the Divine *absorbed* His human, so that Christ consisted of but one *nature*, and that the *Divine*.* The Jacobites as well as all other Monophysites, however, disclaim all connexion with Eutyches, and claim Jacob Baradæus as their reformer, from whose Christian name they have been called Jacobites by their enemies; but they term themselves *Syrians*, as they consider their doctrine came originally from the church at Antioch. This Jacob Baradæus, who was an indigent monk, and a most indefatigable and persevering man, being ordained bishop by a few prelates, who were confined in prison, travelled all over the east on foot, constituted a large number of bishops and priests, revived everywhere the depressed spirits of the Monophysites, and was so efficient by his eloquence and his astonishing diligence that when he died, in the year 578, at Edessa, where he had been a bishop, he left his sect in a very flourishing state in Syria, Mesopotamia, Armenia, Egypt, Nubia, and Abyssinia.†

The Monophysite churches have generally followed the corruptions and errors which have been introduced in the Greek and Roman Catholic churches; such as prayers to the Blessed Virgin, and the saints, auricular confession, adoration of pictures, the unscriptural administration of the Lord's Supper, and prayers for the dead, though with strange inconsistency they do not believe in the existence of purgatory. They believe firmly in transubstantiation, and worship the consecrated element. Unleavened bread is used in the sacrament, and broken pieces of it are dipped in undiluted wine, and given to the people only, the priests receiving the wine separately. The communicants are not allowed to touch the sacred elements, but it is

* The Monophysite doctrine is not the *creed of the "Ancient Syrian Church"* (a translation of which was published in 1874 by the Syrian Patriarch of Antioch, Ignatius Peter III, and carefully investigated at a meeting of some seventy specially qualified clergy in London, who passed a resolution expressing their opinion that it "completely purged that church of the Monophysite heresy commonly attributed to it").—ED.

† Mosheim's *Ecclesiastical History*, vol. ii, p. 56.

put into their mouths by the priests. They agree with the Greek church, as the Nestorians do, regarding the Holy Ghost, who they believe proceeds from the Father only, instead of from the Father and the Son as the Nicene Creed expresses it. The Nestorians, on the contrary, kept clear of all these innovations, and consequently they have been styled by different American missionaries as "Protestants of the east." They do not practise auricular confession, they administer the Lord's Supper in both kinds to the laity, and with the exception of the plain cross, they do not allow in their churches any pictures or images. It is remarkable though both the Monophysites and Nestorians are considered "heretics" by the Greek and Catholic Churches; they both hold as the foundation of their faith the Nicene Creed, and are in every respect strictly Trinitarians. The reason the Nestorians object to call the Virgin Mary *θεοτοκος*, Theotocos (mother of God), is because they say it is not scriptural, and that it is also opposed to the belief in the atonement, as God, which means in its unity Father, Son, and Holy Ghost, could not have been crucified. The Monophysites, on the contrary, believe that the Godhead suffered on the cross, and they still maintain the old formula, introduced in the fifth century by Peter, surnamed "Fuller, Bishop of Antioch," and this is used in addition to the celebrated hymn,—the Greek *Trisagion*—"O Holy God, O Holy Almighty, O Holy Eternal, Who was crucified for us, have mercy upon us."

The Armenians, both Monophysites and Roman Catholics, inhabit different parts of Coordistan, Asia Minor, Syria, Mesopotamia, and Constantinople. A large part of them reside in Russia, Persia, and India, and of all the Christian nationalities in Turkey, they are the most numerous, the most industrious, and the most progressive, as they have shown themselves in Russia, India, and Constantinople, where they have a scope for their industry and perseverance. A small section of them have joined the Roman Catholic church outside the province known as "Armenia"; but the missionaries of the American Independents have succeeded in proselytizing, in different parts, a large number of them at Van, Bitlis, and other places in Asia Minor; and at Diarbekir there used to be a very important community of them which has been, I believe, nearly annihilated by the late massacres. The Roman Catholic Armenians have a convent at Venice where books on all subjects are printed in different languages.

The Armenians claim a very remote antiquity, alleging that their language is that of Noah, unaffected by the confusion of tongues at Babel, and therefore that it is the primitive language spoken by our first parents in Paradise. There is no doubt they are descendants of the ancient inhabitants of Ararat and of what remains of the site of the Garden of Eden, at the sources of the Euphrates and Tigris, which territory they now occupy. They assert that their language was spoken by Adam, Eve, and Noah. The story is a fabulous invention, from the very meaning of the names of those who lived before and after the flood, which were pure Semitic; whereas the Armenian tongue is, as it is supposed, Iranian. It is well known that the Bible was not translated into their language till the fifth century, by Miesrob. Until then the only version they had was written in the Chaldean tongue called Pesheto. Miesrob was also the inventor of the Armenian alphabet, and until then the Armenians possessed no literature of their own.

The Armenians allege that their Christianity dates from the first century, and class themselves amongst the first who acknowledged Christ as their Redeemer, and they support this theory by claiming Agbarus as their first Christian king. It may be remembered that Eusebius in his *Ecclesiastical History* mentions that Agbarus, king of Edessa (the present Orfa in Mesopotamia, the reputed Ur of the Chaldees, where one of the great massacres of the Armenians took place), sent a letter to our Lord requesting him to come and cure him of a disease from which he was suffering. The said historian quotes from the records of the church at Edessa a translation of this letter, along with another purporting to be a reply from Jesus Christ, promising to send one of His disciples to heal him. How the Armenians came to possess such a tradition it is impossible to explain. Edessa has always been an Assyrian or Chaldean settlement, and from whence all the eminent Divines of the primitive Assyrian (erroneously called Syrian) church went forth. Certainly we have never been told either in the written or unwritten history that Orfa was situated in "Armenia," but in *Aram Nahrain* of the Hebrew Bible, where all the primitive Christians believed Abraham came from, as the place was always considered the historical "Ur of the Chaldees," mentioned in the eleventh chapter of Genesis, especially as a district on the north of it has always been

called Serooj or Serug, after the great-grandfather of the "faithful Abraham," and Haran is situated southwards.

It may not be uninteresting to quote the letter of Agbarus and the supposed answer of our Lord, as the authenticity of both has been cavilled at by different writers. To make the subject better understood, I will begin with the narrative given by Eusebius, who writes thus: "The divinity of our Lord and Saviour Christ being proclaimed abroad among all men, in consequence of his wonder-working power, attracted immense numbers, both from abroad and from the remotest parts of Judea, with the hope of being cured of their diseases and various afflictions. Agbarus, therefore, who reigned over the nations beyond the Euphrates with great glory, and who had been wasted away with a disease, both dreadful and incurable by human means, when he heard the name of Jesus frequently mentioned, and his miracles unanimously attested by all, sent a suppliant message to him by a letter-carrier, entreating a deliverance from his disease. But though he did not yield to his call at that time, he nevertheless condescended to write him a private letter, and to send one of his disciples to heal his disorder; at the same time promising salvation to him and all his relatives. And it was not long before the promise was fulfilled. After the resurrection, however, and his return to heaven, Thomas, one of the twelve, by a divine impulse, sent Thaddeus, who was also one of the seventy disciples, to Edessa, as a herald and evangelist of the doctrines of Christ, and by his agency all the promises of our Saviour were fulfilled. Of this also we have the evidence, in a written answer, taken from the public records of the city of Edessa, then under the government of the king. For in the public registers there, which embrace the ancient history and the transactions of Agbarus, these circumstances respecting him are found still preserved down to the present day. There is nothing, however, like hearing the epistles themselves, taken by us from the archives, and the style of it, as it has been literally translated by us, from the Syriac language.

"Letter written by King Agbarus to Jesus—

"Agbarus, prince of Edessa, sends greeting to Jesus the excellent Saviour, who has appeared in the borders of Jerusalem. I have heard the reports respecting thee and thy cures, as performed by thee without medicines and without the use of herbs. For, as it is said, thou causest the blind to see again, the lame to walk, and thou cleanest the

lepers, and thou castest out impure spirits and demons, and thou healest those that are tormented by long disease, and thou raisest the dead. And, hearing all these things of thee, I concluded in my mind one of two things: either that thou art God, and, having descended from heaven, doest these things, or else, doing them, thou art the Son of God.

“Therefore, now I have written and besought thee to visit me, and to heal the disease with which I am afflicted. I have also heard that the Jews murmur against thee, and are plotting to injure thee; I have, however, a very small but noble state, which is sufficient for us both.”

This epistle he thus wrote, whilst yet somewhat enlightened by the rays of divine truth. It is also worth the time to learn the epistle sent to him from Jesus, by the same bearer, which, though very brief, is yet full of power, written in the following style.

“The answer of Jesus to King Agbarus:—‘Blessed art thou, O Agbarus, who, without seeing, hast believed in me. For it is written concerning me, that they who have seen me will not believe, that they who have not seen, may believe and live. But in regard to what thou hast written, that I should come to thee, it is necessary that I should fulfil all things here, for which I have been sent. And after this fulfilment, thus to be received again by Him that sent Me. And after I have been received up, I will send to thee a certain one of my disciples, that he may heal thy affliction, and give life to thee and to those who are with thee.’”

It is difficult to conjecture what the word “Armenia” or “Armenian” means, unless indeed it is a corruption from the word Aramean or Aram where Edessa or Orfa is situated, as they claim that city as having been their seat of learning, and from where, as they allege, Christianity reached them through Agbarus, the king of Mesopotamia, who as Eusebius asserted had written to Christ to heal him from his disease. They call themselves Hazasdain or Haikh, named after a son of Togarmah, grandson of Japheth, who fled from the tyranny of Bell of Assyria and settled in the country which bears his name. The conquest of the land by Semiramis and the revolt of Barvir against Sardanapalus are the chief events of the early history. It is recorded that this Assyrian queen had founded the city of Wan, and called it after her “Schainamjera,” but after its decay it was rebuilt shortly before the invasion of Alexander the Great, by an Armenian king named Wan, after whom it was subsequently

called. The said queen "had planted delicious gardens in the fertile plain, and which she had watered with a thousand rills," and there she "sought refuge from the intolerable heat of a Mesopotamian summer, returning again on the approach of winter to her palace at Nineveh."*

I have lived in that delightful plain for more than two months, where I enjoyed the hospitality of Captain Clayton, the then Her Majesty's Consul at Wan, where the well-to-do residents of Wan have villas surrounded with orchards which are watered by numberless rivulets running in all directions. Above the valley to the east of the lake stands an artificial mound called "Tooprac Kalaasee," where I carried on excavations for the British Museum, and found there some interesting Armenian remains which are now amongst the national collections in London.

Armenia, after forming part of the Assyrian, Median, and Persian Empires, became subject to the Greek kings of Syria after the defeat of Antiochus the Great in 190 B.C. The Romans afterwards established the kingdom of Armenia, but their power over them was contested in bloody battles by the Parthians. That unhappy country has been the scene of a series of desolating wars; and yet notwithstanding the successive invasions of the Persians and Turks, the Armenians have adhered to the faith of their forefathers. In the beginning of the seventeenth century, Armenia proper was robbed of a large proportion of its inhabitants by the barbarous cruelty of Shah Abbas, who carried off thousands of Armenian families to Persia, where many of their descendants still remain. No nation, with the exception of the Jews, has been more widely dispersed throughout the world. Their merchants are in almost all quarters of the globe where money can be made, and like the Jews, they stick together through adversity or prosperity. They have so far stood firm against the inroad of papal influence, that none of the Roman Catholic Missions have been allowed to have a footing in Armenia proper, *i.e.*, in the Provinces of Van, Moosh, and Bitlis, but the American Protestant Missions have been doing wonderful work amongst them in the way of evangelizing in all the above mentioned districts and Asia Minor.

The present lamented misfortunes of those poor Armenians in the wholesale slaughter and fiendish treatment by the ferocious Turcomans and Coords, of helpless men, women,

* Layard's *Nineveh and its Remains*, p. 330.

and children, induce me to say a few words about what I think has been the main cause of the deplorable present complications. I must point out first, that not only race hatred was at the bottom of it, but that religious as well as political animosity has played a great part in it.

It has been known for the last twenty years that the Armenians have been aspiring to lofty ideas of independence, and it was no secret that agitators for that end in England and elsewhere have been trying to obtain through what they thought European influence, an autonomy for their co-religionists in that part of Asiatic Turkey, which meant that they would govern the Moslem Coords and Turcomans as well as Christians of other nationalities who inhabit that country. As a matter of course, the Coords, who have always looked upon the Armenians, for hundreds of years, as their inferiors and serfs, harboured an intense hatred for them, and this bitter feeling, coupled with jealousy on account of their thrift and prosperity, required only a spark to create a blaze. It is also necessary to point out that the Armenians have been favoured with high positions and honours by the Porte above all other Christian subjects of the Sultan, because they were thought to be more subservient and docile; and this favouritism, in my opinion, was the main cause of the animosity which has been growing in the hearts of the Moslems against them.

There is no doubt that the beginning of the strife by the Sassoon Curdish tribe was engendered by the feeling that the Armenian population were ripe to rebel, and the Turks, who are not overwise in quelling a disturbance or rioting, caused indiscriminate attack to be made upon the guilty as well as on the poor innocent peasantry, by their very hereditary enemies who had been enrolled some time before in the ranks of the Ottoman soldiery. Had the British Government in my opinion taken proper steps soon after this butchery took place, by remonstrating with the Porte about the evil deeds of its employés, and deputed a proper agent to inquire into the cause of the massacre, and secured proper protection to the poor sufferers, as they did on a former and like occasion, I feel sure the dreadful and wholesale carnage would not have taken place. But the great mistake was made at that time when England intervened and sent a commission, in conjunction with agents of other Powers, to inquire into the grave matter; suspicion arose at once in the minds of all Mohammedans that

Christian Europe was going to befriend the Armenians at the cost of the Moslems. It must be borne in mind that all the Mohammedans in Turkey always looked upon the English as their friends and well-wishers, and a proper representative from this country could have allayed the strife without any difficulty, and the very people who have now turned bitter enemies would have been the means of rendering a great help in eliciting the real cause of the Sassoon massacre and stopping further rising.

Then we must not forget the religious aspect of the Mohammedan fanaticism, when it is considered that they believe that the end of the world is fast approaching on account of the weakening power of Islam, which they assert will be the beginning of the end, when Jooj-wa-Ma-jooj, *i.e.*, Gog and Magog, will be fighting against the followers of Mohammed, when Christ will descend from heaven at the time of the world's disruption to succour the Moslems. In that conflict they believe that any man who kills an infidel will be rewarded with everlasting bliss, and those of the true believers who will meet with their death in defence of their faith will be doubly rewarded in the Kingdom of Heaven.

It has always been my regret that, in the different meetings which have been held from time to time in London and in the provinces with the view of creating sympathy for the distressed Armenians, inflammatory language has been used against the Sultan, the Turks, and Coords in general, especially by ministers of the gospel, because the Mohammedans in the interior of Turkey cannot discriminate between philanthropic actions and religious crusade, particularly when they hear that bishops, deans, canons, and other dignitaries of the church take the lead in the abuse of the Mohammedans. It is known that there are ill-disposed people who are always ready to report everything and anything to make matters worse for the Christian in Turkey. Every time a sensational meeting took place I shuddered at the thought that the unwise utterances of some speakers might be the cause of further massacres.*

* There is an interesting account of the savagery of the Coords recorded by St. Chrysostom as far back as the fourth century, or about a thousand years before the Ottoman power came into existence. He says "like ferocious beasts, they (the Kurds) fell upon the unhappy inhabitants of Armenia and devoured them. Trouble and disorder are everywhere; hundreds of men, women, and children have been massacred,

The Coords of whose terrible acts we have heard so much lately, and of whose infamous deeds the Christian world has been convulsed, are descendants of the Medians and Persians, and there is no doubt that their origin and that of the Armenians come from the same source, namely, the "Arians," and what Professor Max Müller most probably would call Indo-Germanic. They all profess Islamism of the Soonee sect, and not like the Persians, who are Sheeas. They consist of nomad and rural, but both are most strict in conforming to the tenets of their religion, especially in the matter of intoxicating drinks. They are most honest, hospitable, and brave, and I always found them generous, polite, and easy to deal with, but when anything happens to wound their sensibility in matters of religion or honour, they become fanatical and unmanageable. They always believed the word of an Englishman and American, whom they consider to be alike, more than a Turk or any European; but they always distrusted the Armenians. The nomad Coords are always on the move with their flocks, and support themselves by selling the produce of their pasturage, mostly cheese and butter, and when they are in want, they help themselves to their neighbours' property. Many of their chiefs can muster ten or twenty thousand horsemen, who are always ready to obey their command when they are wanted. The rustic Coords have a hard task to face, because very often their crops fail; their animals die, and sometimes they have scarcely anything to live upon, and withal their rulers insist upon the payment of every para (farthing) of the imposed taxes. In all my travels I never saw any Christian village in the same condition as those of the poverty-stricken Arab or Coordish villages, especially in the time of war, when the conscription is forced, and few able-bodied men are left to till the soil, or to take in the harvest. Of course, generally speaking, the great fault lies with the Arabs and Coords, who are not as thrifty and industrious as the Christian peasants, because I suppose they often depend upon mulcting their Nazarene* neighbours.

I believe the Coords have a good deal of Israelitish blood in them, as also the Armenians, especially the latter, from

others have been frozen to death. The towns and villages are desolated, everywhere you see blood, everywhere you hear the groans of the dying, the shouts of the victors, and the sobs and tears of the vanquished."—*Review of Reviews*, December 14th, 1895.

*All the Christians in Mohammedan countries are called by this name.

their great physical resemblance and money-making tendency. We know from history that Sargon, the King of Assyria, on carrying away the ten tribes captives, placed them in the cities of the Medes, but it has not been known what became of them afterwards. Had they remained as a separate people, there or elsewhere, they would have populated Armenia, Persia, Media, and Central Asia, but in this nineteenth century not more than about ten thousand families exist in those parts. The late Dr. Grant of the American Board of Missions, who spent a long time amongst the Chaldeans, was of opinion that the Nestorians of Teerec are a part of the lost ten tribes. I do not dispute that there may be some Israelitish blood in some of the Nestorians, because in the time of their conversion to Christianity there must have been a large number of the chosen race who joined in the belief, and as a matter of course they both amalgamated under one faith and name.

It is very sad to visit Armenia, Eastern Asia Minor, and Northern Coordistan, and see what Ezekiel the Prophet calls the "Garden of God,"* in such a deplorable condition. One has only to visit the Pashalicks of Kharpoot, and Diarbekir, where other Armenian massacres have taken place, and see what a magnificent country it is, and what wealth could be got out of it, if it was only better governed.

The languages which are spoken in Coordistan and Asia Minor are Greek, Turkish, Coordish, Armenian, Syriac, and Chaldean. Although a large number of Turcomans are to be found in Asia Minor and Coordistan, who speak coarse Turkish, the official transactions in all those districts is carried on in the modern Turkish embellished greatly with Arabic and Persian words.

In the greater part of Assyria, Chaldean is spoken, though in Mesopotamia the common language is Arabic, but each of the different Christian communities retains its mother tongue in the church services and in correspondence about ecclesiastical matters; so also in Syria, the Holy Land, and Egypt. The Turkish language is only used in official correspondence and government transactions.

The dress of the natives of Biblical lands has undergone a great change in the last fifty years; that is to say, since the government of Ali Pasha of Egypt and his son Ibraheem,

* Ezekiel xxviii, 13; xxxi, 9; xxxvi, 35; Joel, ii, 3.

and the reforms established in Turkey through the influence of the famous Elchee (ambassador), Lord Stratford de Redcliffe. In most places, especially in Syria, degrading restrictions were imposed upon the Jews and Christians in their attire. They were not allowed to wear anything approaching to white or green, especially in regard to turbans; and at one time in a large number of cities, no Christian or Jew was allowed to ride a horse—donkeys were their lot. In some parts of Persia at one time (I do not know whether it is the same now or not), if a Jew was fortunate enough to have a new outer garment made of whatever stuff it might be, he was obliged to sew a patch on a visible part either the back or front. I remember when I was at Bitlis some time ago, the Armenians complained to me that their young men could not wear embroidered jackets, as the Coords told them they had no business to put them on, because the Moslems did not possess any like them, which was true, as the wretched Coords were too indigent to possess any. The turban is rapidly getting out of use, even amongst the Moslems, as most of the respectable class have adopted the fez, and not a few have taken to wearing European clothes, coat, trousers, and waistcoat. The ladies, too, have changed, in a great measure, their primitive costumes, and adapted themselves to European styles, even to the wearing of gloves, boots, and in the carrying of sunshades. The nomad Arabs and Coords, on the contrary, keep to their old costumes, which I think have not changed from the primitive time, excepting in regard to the turban, which is worn by the latter. The food of the Coords, Arabs, and the lower classes of the inhabitants of Biblical lands has not much changed, as the "savoury meat," which Jacob desired Esau his son to prepare for him is still a standing dish amongst the primitive inhabitants of the mountains and the desert. The Arabs' mode of living, especially, resembles at the close of this nineteenth century the life led by Biblical sages. The Arabs, particularly the women, still keep to the habit of not wearing drawers or trousers, as the custom used to be amongst the ancients like Noah* and the Israelites.† Amongst both Christians and Moslems it is a sin to enter a sanctuary or any place of worship with their shoes on, though the former are now following the European habit of performing their religious rites with their dirty shoes or boots on. The

* Genesis ix, 21.

† Exodus xx, 26.

Chaldeans of Mossul still have a dish called the "porridge of Esau," made of lentils and beetroots, which they eat in winter, as they say that when Esau sold his birthright he was cold and hungry, and was glad to give anything he possessed for a hot meal to warm himself and satisfy his appetite. I used to be fond of this dish when I was a boy, but I cannot say I like it now. The ancient Biblical habits still exist in Mesopotamia, amongst both Christians and Arabs, of rending* their garments at a calamity, or grief or anger, smiting upon the breast† at prayer or supplication, bowing their heads to the ground in the act of worship‡ or homage,§ throwing dust on their heads and covering it with their hands|| in great affliction and such like misfortunes.¶

It was prophesied by Nahum respecting the fearful destruction of Nineveh thus:—"And Huzzab shall be led away captive, she shall be brought up, and her maids shall lead her as with the voice of doves tabering upon their breasts." This kind of lamentation is most scrupulously practised in the Irak (Babylonia) by the Sheea sect of the Moslems when the anniversary of the murder of their patron saint Hosain is commemorated. I have seen blood gushing out from the wounds caused by the severe tabering on the breasts of young men when they were bewailing the historical tragedy.

The most remarkable observance which still exists amongst the Arabs is the "covenant of salt," as it prevailed with Biblical nationalities in primitive time. We find it was a divine ordinance amongst the Israelites to celebrate their heave offerings with salt.** In writing to Artaxerxes, king of Persia, of their fidelity to him, the governors beyond the Euphrates tell him thus, "because we eat the salt of the palace it was not meet for us to see the king's dishonour, therefore have we sent and certified the king."††

The only other Christian denominations existing in Asiatic Turkey are that of the Greeks belonging to the orthodox faith, and those who are in communion with the Church of Rome. As the doctrine of both sects is well known I need not enter

* 2 Samuel xiii, 19.

† Luke xviii, 13; Nahum ii, 7.

‡ Gen. xvii, 3; Matt. xxvi, 39.

§ Ruth ii, 10.

|| 2 Samuel xiii, 19; Job i, 20.

¶ This kind of homage can also be noticed on the black obelisk found by Sir Henry Layard at Nimroud, where the Jewish Ambassador of Ahab is seen falling on his face before Shalmaneser.

** Lev. ii, 13, and Numb. xviii, 19.

†† Ezra iv, 14.

into their mode of worship or their respective tenets, but I must explain that though the Roman Catholic party are strict adherents of the papal doctrine, they still retain their own church discipline and rites like all other Oriental sects, who joined the Latin church on these conditions, as the Catholic Chaldean, Syrians, Copts, Maronites, and Armenians. Scarcely any Greeks of either sect are found in Asiatic Turkey, except in Asia Minor, Syria, and the Holy Land. They seem always to be on good terms with all nationalities, even the Turks and Arabs.

NOTE.

[To elucidate his subject the author of the paper, in tracing the history of the peoples referred to, seems to have touched here and there upon doctrinal differences, which not being within the scope of the Institute, are excepted from discussion.—Ed.]

APPENDIX.

Extracts from the Chaldee Version of the fifth chapter of the Prophet Daniel, from 1st to 6th verse, and from 25th to 29th, showing, at a glance, a striking resemblance between it and the Peshito scripture used by the present Chaldean Christians of Assyria and Mesopotamia, both the Roman Catholics and the so-called "Nestorians":—

Copied from the Chaldee commonly styled Peshito.	As pronounced by the Chaldeans.	Chaldee of Daniel in Hebrew characters.	English rendering.	REMARKS. P. stands for Peshito and Ch. for Chaldee.
ܠܫܫܐܘܪ	Baltshasser	בלשאצר	Belshazzar	In the Peshito the name of King Belshazzar is spelled with a <i>t</i> after the letter Lamed (L).
ܡܠܟܐ	Malka	ܡܠܟܐ	the king	
ܥܒܕ	Ibbad	ܥܒܕ	made	In the P. these words end with an Alep (A).
ܠܫܡܐ	Lahma	ܠܫܡܐ	a feast (orig. bread)	
ܪܒܐ	Rubba	ܪܒ	Great	
ܠܐܠܦ	L'allip	ܐܠܦ	to a thousand	The preposition Lamed (L) <i>to</i> , is not in the Chaldee, but occurs in the word "his lords" which follows.
ܕܥܝܢܐܘܗܝ	Rorabnohee	ܕܥܝܢܐܘܗܝ	of his lords	
ܠܩܒܠ	W'lokbal	ܠܩܒܠ	before	

Copied from the Chaldean commonly styled Peshito.	As pronounced by the Chaldeans.	Chaldee of Daniel in Hebrew characters.	English rendering.	REMARKS. P. stands for Peshito and Ch. for Chaldee.
ܠܠܦ	Alpa	אלפא	a thousand	
ܠܠܡܪܐ	Hamra	ܚܡܪܐ	wine	
ܠܠܫܬܐ	Shatay	ܫܬܐ	and drank	
ܠܠܘܥܐ	Hooa		he,	"Hooa" (he) is included in the word ("immar") in Chaldee: and conjunction Waw (O and) occurs only in P.
ܠܠܘܡܪܐ	W'immar	ܐܡܪ	and said	
ܠܠܫܬܐܫܫܐܪ	Baltshasser	ܒܠܫܫܐܫܐܪ	Belshazzar	
ܠܠܬܝܝܡ	B'tayim	ܒܬܥܡ	while tasting	
ܠܠܡܪܐ	Hamra	ܚܡܪܐ	wine	
ܠܠܡܝܬܝܐ	L'maitaes	ܠܠܝܬܝܐ	to bring	Partly dissimilar.
ܠܠܡܝܢܐ	Ma-eenee	ܠܠܡܝܢܐ	the vessels	L (for <i>of the</i>) in Ch. is omitted in P.
ܠܠܕܗܒܐ	D'dahba	ܠܠܕܗܒܐ	of gold	D for <i>of</i> in P. is omitted in Ch.

<u>וּדְסַיַמָּא</u>	W'd'saima
<u>ד'אפּ</u>	D'appek
<u>נבּוּכַדנֶצַר</u>	Naboochadnezzar
<u>אבוּהי</u>	Aboohee
<u>מין</u>	Min
<u>הַיְכָלָא</u>	Haikla
<u>ד'ב'ורִישְׁלִים</u>	D'b'Orishlim
<u>דנֶשְׁטוּן</u>	Dneshtoun
<u>בְּחוּן</u>	Bhoun
<u>מַלְכָא</u>	Malka
<u>וּרְבַרְבָּנוּהִי</u>	W'rorabnohee
<u>וּנַשְׁוֹהִי</u>	W'nashohee
<u>וּדְרוּקַתְּהִי</u>	W'drookathey

<u>וּכְסֵפָא</u>	and of silver
<u>דִּי הַנֶּפֶק</u>	took out
<u>נְבוּכַדנֶצַר</u>	Nebuchadnezzar
<u>אבוּהִי</u>	his father.
<u>מִן</u>	From
<u>הַיְכָלָא</u>	the temple
<u>דִּי בְרוּשָׁלַם</u>	in Jerusalem.
<u>וַיִּשְׁתּוּן</u>	They to drink
<u>בְּהוּן</u>	in them
<u>מַלְכָא</u>	the king
<u>וּרְבַרְבָּנוּהִי</u>	and his lords
<u>שְׁגֻלְתָּהּ</u>	and his wives
<u>וּלְחַנְתָּהּ</u>	and his concubines

This word is dissimilar.

There are H and N in Ch. instead of A in P.

The second letter, Yod, in Ch. is changed into N in P.

} These two words are dissimilar.

Copied from the Chaldean commonly styled Peshito.	As pronounced by the Chaldeans.	Chaldee of Daniel in Hebrew characters.	English rendering.	REMARKS. P. stands for Peshito and Ch. for Chaldee.
𐤔𐤁𐤍	Hiydain	באדן	Then	The Chaldee begins with Beth (B), but Hey in the Peshito.
𐤀𐤁𐤏	Aitio	היתיו	they brought	Hey (H) in Ch. is changed into A in P.
𐤌𐤁𐤏	Ma-annee	מאני	the vessels	
𐤁𐤎𐤔𐤁	D'dahba	דהבא	of gold	D (of) in P. is omitted in Ch.
𐤁𐤎𐤑	D'appek	די הנפקו	taken out	Hey and Noon (H and N) in Ch. are omitted in P.
𐤌	Min	מן	from	
𐤏𐤁𐤌	Haikla	היכלא	the temple	
𐤁𐤎𐤔𐤁	D'allaha	די בית אלהא	of God	Bait (<i>house</i>) in Ch., is omitted in P.
𐤁𐤎𐤔𐤁𐤌	D'b'Orishlim	די ברושלם	in Jerusalem	
𐤀𐤁𐤏𐤏	W'ishtio	ואשתיו	and they drank	

בִּחוֹן	Bhoon
מַלְכָּא	Malka
וִרְבַּנְוֵהִי	W'rorabnahee
וְנַשְׁוֵהִי	W'nashohee
וְדְרוֹקַתְהִי	W'drookathey
אִשְׁתִּיּוֹ	Ishtio
חַמְרָא	Hamra
וְשַׁבְּחֵהּ	W'shabbahoo
לְאֱלֹהִי	L'allahay
דְּדַחְבָּא	D'dahba
וְדְסַיְמָא	W'd'saima
וְדְנַחְשָׂא	W'd'nhasha
וְדְפַרְזְלָא	W'd'parzla

בִּהוֹן	in them
מַלְכָּא	the king
וִרְבַּנְוֵהִי	and his lords
וְנַשְׁלַתְהִי	and his wives
וְלַחְנַתְהִי	and his concubines
אִשְׁתִּיּוֹ	drank in them
חַמְרָא	wine
וְשַׁבְּחֵהּ	and praised
לְאֱלֹהִי	the gods
דְּדַחְבָּא	of gold
וְדְסַפְּפָא	and of silver
וְדְנַחְשָׂא	and of brass
וְדְפַרְזְלָא	and of iron

} These two words are dissimilar.

D for *of* in P. is omitted in Ch.

This word is dissimilar.

Waw (O) for *and* in P. is omitted in Ch.

Waw and Daleth (O and D) for *and of* in P. are omitted in Ch.

Copied from the Chaldean commonly styled Peshito.	As pronounced by the Chaldeans.	Chaldee of Daniel in Hebrew characters.	English rendering.	REMARKS. P. stands for Peshito and Ch. for Chaldee.
ܘܕܡܘܫܘܐ	W'd'kaisa	אֵצֶל	and of wood	} These words are dissimilar.
ܘܕܡܘܫܘܐ	W'd'kaipa	וּמִבֵּינֵי	and of stone	
ܘܕܡܘܫܘܐ	W'bah	בַּהּ	and in that	Waw (O) for <i>and</i> in P. is omitted in Ch.
ܘܕܡܘܫܘܐ	B'shaatha	שְׁעָתָא	hour	Beth (B) for <i>in</i> in P. is omitted in Ch.
ܘܕܡܘܫܘܐ	Npak	נִפְקֹוּ	came forth	The final letter Waw (O) for <i>they</i> in Ch. is omitted in P.
ܘܕܡܘܫܘܐ	Sabaatha	אֶצְבָּעַי	Fingers	Grammatical alterations of the ending of these words in P and Ch.
ܘܕܡܘܫܘܐ	D'eeda	דֵּי יַד	of a hand	This word "hand" begins and ends with Alif (A) in P.
ܘܕܡܘܫܘܐ	D'Nash-sha	אִנְשׁ	of a man	This word ends with Alif (A) in P.
ܘܕܡܘܫܘܐ	W'Kattaban	וּכְתַבְנָא	and wrote	

לסבל	Lokbal
שרגא	Shragga
אל	Al
קילשא	Kilsha
ד'אסטה	D'asta
ד'ב'האיקלא	D'b'haikla
ד'מאלקא	D'Malka
ו'מאלקא	W'Malka
הזא	Hza
פאסטה	Pasta
ד'עדה	D'eeda
ד'קאטבא	D'Katba
ו'קאטבא	W'Ktabba

Verse 25.

לקבל	over against
נברשתא	the candlestick
על	upon
גירא	the plaister
די כתל	of the wall
היכלא	of the palace
די מלכא	of the king
ומלכא	And the king
חזה	beheld
פס	the part
ידא	of the hand
די כתבא	that wrote
כתבא	the writing

This word is dissimilar.

This word is dissimilar.

This word is dissimilar.

The Peshito word ends with
Tau and Alep (T and A).Daleth (D) for *of* in P. is
omitted in Ch.Waw (O) for *and* in P. is omitted
in Ch.

Copied from the Chaldean commonly styled Peshito.	As pronounced by the Chaldeans.	Chaldee of Daniel in Hebrew characters.	English rendering.	REMARKS. P. stands for Peshito and Ch. for Chaldee.
סנז	Hanna	דנה	This is	This word is dissimilar.
בזאז	Darsheem	דירשים	inscribed	
סנז	Minay	מנא	Minay	
סנז	Minay	מנא	Minay	
סכא	Tkkal	תקל	Tkkal	
ספנסן	W'parseen	ופרסין	and parseen	
סנז	Hanno	דנה	This is	This word ends with H in Ch. and with O in P.
פזרח	Psharah	פשר	the interpretation	The P. word ends with H.
במלחא	D'miltha	מלתא	of the message	D for of in P. is omitted in Ch.
סנז	Minay	מנא	Minay	
סנז	Mnah	מנה	numbered	

לסל	Allaha
למלכסח	L'Malkoothak
לסלמס	W'ishalmah
לסל	Tkkal
לסל	Takkail
לס	Ant
לסלסלסל	B'msatha
לסלסלסל	W'ishtakhath
לסל	Hasseer
לסל	Piris
לסל	Preesa
לס	Hee
למלכסח	Malkoothak

ללה	God
ללכחל	For thy kingdom
ללשלמל	and ended it
ללל	Tkkal
ללללל	weighed out
	thou
לללללל	in the balances
ללללללל	and found
ללל	wanting
ללל	Piris
	Divided
ללללל	is
ללכחל	thy kingdom

Lamed (L) for *of* in P. is omitted in Ch.

The second letter Hey (H) in Ch. is changed into Alep (A) in P.

Thou is included in the Ch. word *weighed out*.

This word is dissimilar.

The second letter Hey (H) in Ch. is changed into Alep (A) in P.

The final letter Taw (T) in Ch. is Alep (A) in P.

Copied from the Chaldean commonly styled Peshito.	As pronounced by the Chaldeans.	Chaldee of Daniel in Hebrew characters.	English rendering.	REMARKS. P. stands for Peshito and Ch. for Chaldee.
<p>סמסבג</p>	W'yaheebea	<p>ויהיבת</p>	<p>{ and given</p>	<p>The final letter Taw (T) in Ch. is Alep (A) in P.</p>
<p>סא</p>	Hee		<p>{ is</p>	
<p>למבג</p>	L'Madia	<p>למדוי</p>	<p>to the Medes</p>	
<p>לפזיס</p>	W'Ppiris	<p>ופרס</p>	<p>and to the Persians</p>	<p>The preposition Lomad (L) to in P. is omitted in Ch.</p>

The CHAIRMAN (the Rev. Canon GIRDLESTONE, M.A., here took the chair for Professor E. HULL, LL.D., F.R.S.).—I am sure I may thank Mr. Rassam, in all your names, for his most interesting paper.

The HON. SECRETARY (Captain FRANCIS PETRIE, F.G.S.).—Letters have been received from the Archbishop of Canterbury, who finds "it will not be possible for him to be present"; from the Chief Rabbi, "regretting that having to distribute some prizes places it out of his power to be at this meeting," and I am sorry to say that Professor Legge is detained at Oxford through illness; his presence and co-operation at our meetings is always so pleasant and valued.

The CHAIRMAN.—There is one little point I should have liked Mr. Rassam to explain, namely, how it is that Chaldean is always spelt with the letter *l* while it is spelt in the Hebrew with the *s* where the *l* comes. There must be some reason why it is called *Chasdim* instead of *Chaldim*. I have read various theories, but not any that were satisfactory. As to the map, I am surprised to see that Mr. Rassam puts down *Orfa* as if it were Ur of the Chaldees; whereas many scholars now take it hundreds of miles south-east: of course, the matter is not certain.

The AUTHOR.—As to the difference between *Chasdim* and *Chaldim*, I will leave the reply to my friend Mr. Pinches, who is a greater authority upon the subject than I am. But, with regard to *Orfa* we know of the Chaldean *Ur* from the Bible, and we must go to the Bible for it. Theorists may say that Abraham came from Babylonia in Southern Mesopotamia; but I am a believer in St. Stephen, the Martyr, and he said that Abraham came from Aram-Nahraim in Northern Mesopotamia and not from Babylonia. Theories I do not care about. You must remember that in the cuneiform writing there is no alphabet, but merely phonetic sounds. I could give you ten names in Asiatic Turkey that are almost the same as in Europe and America, *e.g.*, there is no reason because there is Alessandria in Italy that it should be the Alexandria of Egypt, even if the letters were written the same. Supposing it was really Ur that has been found in the cuneiform writing, how do we know that Abraham was there? There might be twenty Urs. If we trust to theories we might as well give up the Bible. I am very sorry that in some newly issued Bibles they have put "Ur of the Chaldees" in Southern Mesopotamia. Other learned

writers agree with me that it is about where I have placed it. Abraham the son of Nahor was born there, and went thence to the land of Canaan.

Mr. THEO. G. PINCHES, M.R.A.S.—As to the question of Chasdim being spelt with an *s*, as we pronounce it and spell it, instead of *Chaldim*, the reason seems to be this: that in Assyrian, before a dental the *s* is changed into *l*. This is a very common thing in Assyrian. I believe that Ur of the *Chaldees* should be in Babylonia. There is just the possibility that *Chasdim* may not be the same as the *Kaldu* of the Assyrian monuments. If that be so, we must seek for Ur of the Chaldees elsewhere, and in that case the explanation Assyriologists have given would not be the correct one. This is a question that has only occurred to me at the last moment; I have not thought over it, or examined it in all its possible complications, but I think Mr. Rassam's point of view, which is an old one, is worthy of consideration. I should like to know what connection (etymologically) Orfa has with Ur, supposing it to be Ur of the Chaldees. Mr. Rassam has very truly said that there is more than one place bearing the same name, and we have, as he points out, more than one Alexandria.

I do not believe, myself, that Mugheir is Ur of the Chaldees. That I have already said before this Society, one of my reasons being that Ur of the Chaldees is a city. Abraham would not, in all probability, have lived in a city, or so near that it would be possible to say that he lived in one.

The full Akkadian name of Ur or Mugheir is *Uriwa*, and I should like to see in the Hebrew form, some trace of that termination *-iwa*. Then there is another thing. The portion of the country known as the land of the Chaldees, viz. Akkad, of which the city of Akkad was the capital, was called by the Akkadians *Uri*, and that could, with much greater justice, be described as Ur of the Chaldees—part of the country itself, and naturally a place where, in those days, possibly flocks might be pastured. It embraced the district where Bagdad now stands, and is a little nearer to the spot where Abraham ought to have been.

Mr. P. F. WOOD.—At the fifth page of the paper does the Author mean to say that spices do not come from Arabia?*

* *Smith's Dictionary of the Bible*, p. 210, says: "The products mentioned in the Bible as coming from Arabia, seem to refer in many instances to merchandise of Ethiopia and India carried to Palestine by

The AUTHOR.—As to Arabia Felix, there is, I hold, only one kind of gum there. Spices came through Arabian merchants mainly from Africa, across the Red Sea. I was in Arabia for many years, and there was, for instance, no more coffee grown in Mocha than in London. The traditions of all nationalities show that the Queen of Sheba came from the African coast.

Rev. F. A. WALKER, D.D., F.L.S.—I should like to mention that in Africa many African fruits are sold as Arabian—dates and such like—which are supposed to have great virtue by coming, or being supposed to come, from the birth-place of the prophet.

The Meeting was then adjourned.

Arab and other traders." *Chambers' Cyclopædia* says, vol. ix, under the head of "Spices": "In ancient times and throughout the middle ages all the spices known in Europe were brought from the East, and Arabia was regarded as the land of Spices, but rather because they came through it or were brought by its merchants." A member of the Institute, the late Mr. Theodore Bent, referred, in a paper read in 1894 before the Royal Geographical Society (and also in other writings), to his travels in the Hadramut, during which he witnessed the culture of spices there as it is in the present day; and Dr. Thiselton C. Dyer, C.M.G., F.R.S., the director of the Botanical Gardens at Kew, speaking on that occasion, said: "The fact is, that the vegetation of Arabia is practically that of Somaliland and Abyssinia, with the same myrrh and frankincense in the one country as in the other."—Ed.

INTERMEDIATE MEETING.*

PROFESSOR E. HULL, LL.D., F.R.S., IN THE CHAIR.

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

ASSOCIATES :—The Right Rev. M. N. Gilbert, D.D., Bishop-coadjutor of Minnesota; F. L. Collie, Esq., M.D., M.B.C.M., Cape of Good Hope; Herbert Garbett, Esq., Isle of Man; Rev. R. Thornton, L.Th., Durham.

A LECTURE “On Niffer, the Last Excavations there, with Readings of Inscriptions”; illustrated by drawings shown by oxyhydrogen light, was delivered by Theo. G. Pinches, Esq., M.R.A.S. A discussion of a general character ensued, in which the Rev. Dr. Heckler (Vienna), the Rev. J. Tuckwell, the Rev. Dr. Kinns, &c., and the Chairman took part. The Author having replied, the Meeting was then adjourned.

* May 3rd, 1897.

ORDINARY MEETING.*

DAVID HOWARD, ESQ., D.L., IN THE CHAIR.

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

MEMBER :—F. A. Cunningham, Esq., M.A., United States.

ASSOCIATE :—Rev. Z. D. Ringrose, M.A., Chester.

The following paper was then read by the author :—

*THE HISTORY OF MĀNIKKA†-VAÇAGAR, THE
“FOE OF THE BUDDHISTS.”* By the Rev. G. U.
POPE, D.D., Indian Institute, Oxford.

§ 1.—*To his Conversion.*

THE history of this remarkable man is involved in considerable obscurity; but, although we can only discern the dim outlines of his figure amid the mists of South Indian tradition, it seems quite certain that he actually existed; that these legends, interesting in themselves, have a considerable foundation in fact; and that this sage was the first in the long and every way remarkable series of devotees of Çiva who engaged in the work of recovering the south of India from the Buddhists and Jains. He is not however regarded in the Tamil lands as the greatest of the Çaiva

* Last of 32nd Session. (1897.)

† “Mānikya” is mere correct Sanskrit; but in Tamil the name has always been written as I have given it. It means “He whose utterances are rubies.”

** For the usefulness of this paper both at home and in S. India—see Note, p. 109.—ED.

saints, that honour being reserved for *Tiru** *Nāna Sambandhar*, some of whose legends are elsewhere given. Nor is it possible with even an approximation to certainty to fix his date. There is good reason however to suppose that, as he evidently flourished at the time when the influence of Buddhism in South India was decaying, if not dying out, he must have lived somewhere about the VIIIth or IXth century of our era. Some further confirmation of this supposition will be forthcoming. The authorities for his history really resolve themselves into two: his own writings, which are very sparingly autobiographical; and the legendary poem called the *Vāthavūrar*† *Purānam*. This latter again is an amplification of the LVIIIth to LXIst sections of the *Madura Sthala-Purānam*, or, as it is commonly called, *Tiru Vīlaiyādal*‡ *Purānam*. This latter professes to be a translation of a portion of the Sanskrit "Skandam," and cannot itself be ancient, dating from about A.D. 1750 probably. The 62nd and 63rd sections give a summary of the sage's *Madura* experiences. Like other collections of the legends of Hindu temples the *Tiru Vīlaiyādal* is full of the most extraordinary stories, from which it is impossible to sift out many grains of historical truth. And the *Vāthavūrar Purānam* is professedly a poetical romance. We must therefore rely chiefly upon the poems for a picture of the devotee, and even here a difficulty meets us at the outset. A multitude of spurious writings are in India (as indeed elsewhere) attributed to nearly every person of historic repute; and interpolations too are always to be suspected. The rivalry between opposing sects has greatly tended to this result. Each *Guru* must be represented as having done greater works than those of the *Gurus* of rival systems; and also his writings must be brought up to date, and must lend support to the most recent development of the tenets of the sect.

* *Tiru* is the Tamil equivalent of the Sanskrit *śrī*, "blessed," "sacred," and when prefixed to the name of persons corresponds to SAINT. The Tamil form of S. Jnāna is *nāna*.

† *Vātham* = disputation [S. *Vāda*]. The town where the saint was born was called "disputation-town." The country was full of polemics in those days.

‡ See NOTE I. "Sacred-sports" of the god, of which sixty-four are given. This work has been printed in Tamil. A summary is given in Taylor's *Oriental Historical Manuscripts*, I, 55-192. The Tamil Verse translation is by Parañjōti-māmunivar. See also Nelson's *Madura Manual*.

I shall give the story as I find it.

The sage was born at the town which goes by the name of *Tiru-Vāthavūr* on the river *Vaigai*, near to *Madura*, and it is said that in consequence the name given to him by his parents was *Tiru-Vāthavūrar* (= *He of Sacred Vāthavūr*). This is very doubtful. But he has two other names, as will appear in the sequel. The epithet by which he is chiefly known is *Mānikka-Vācaḡar* (S. *Mānikka-Vācaḡar* = "he whose utterances are rubies"); and the title of his poems is *Tiru-Vācaḡam* (= *divine utterance*). His father was a Brahman of the *Amattiya* tribe (S. *Amatya* = *Councillor*), whose name is not recorded. The king of *Madura* at the time was *Arimarttanar* (S. *Crusher of foes*)*.

The boy is represented as being from the first a prodigy of intellect, and it is gravely stated that in his sixteenth year he had exhausted the circle of ordinary Brahmanical learning, and especially was consummately learned in the *Āgamas*† of the *Çaiva* system. The fame of his learning and genius soon reached the king, who sent for him, conceived a vehement affection for him, and constituted him his prime minister, giving him the title of *Tennavan-Brahma-Rāyan* (= *The Pāṇḍiyan's Brahman king*).

The poet (*Kāḡavul Mahāmuni*) now invites us to contemplate the young and brilliant courtier as enjoying all the splendid luxury of *Indra*, King of gods, and shining amongst the other ministers and courtiers of the *Pāṇḍiyan* kingdom "like a bright silver moon come down from heaven to earth, and moving resplendent in the midst of the surrounding stars." He is arrayed in royal garments "refulgent with the lustre of innumerable gems, born aloft in a sumptuous litter, surrounded with horses and elephants, overshadowed by a white umbrella of state rivalling the moon in the heavens." The king, who is the incarnation of Justice, Wisdom and Benevolence, leaves the government of the country absolutely in his hands. Yet the balance of his equal mind is not disturbed by all this luxury and absolute

* This king is given in the *Madura* lists as the tenth before *Kūna* (or *Sundara*) *Pāṇḍiyan*, in whose time *Sambhandar* flourished. This would place *Mānikka-Vācaḡar* about 150 to 200 years before this latter. *Sundara Pāṇḍiyan's* date is fiercely disputed. About 1030 A.D. seems to me the safest guess.

† The *Āgamas* are said to be sacred writings inculcating *Çaiva* doctrines and of equal authority with the *Vedas*. The names of twenty-eight of these are given. They were much later than the *Upanishads*.

authority; for he ever ponders the sacred writings which enshrine the truths of the Çaiva faith, and assures himself that all these externals are but the bonds that imprison the deluded soul; and that this embodied life with all its vicissitudes must be renounced, shaken off, forsaken, in order that by Çivan's grace he may attain the "great release." His soul is filled with an infinite pity as he sees the thronging multitudes, who, he knows, are passing ever through the round of births and deaths, and are in these fated embodiments suffering remediless woes. So, "like those who suffer from the intense glare of heat, and seek refreshing shade, his soul was dissolved in passionate longing for Çiva the loving Lord." Yet though he beheld men around him as souls imprisoned through ante-natal evil, and felt how profitless all human existence is, and how surely all sentient beings are mere actors walking in a vain show, he continued with unflagging diligence to dispense impartial justice as his sovereign's representative. Yet there was ever one supreme desire in his soul. He yearned to meet with a guru who (so does Çiva reveal Himself) would teach him the mystery of the "five letters"* and the "way of release."† "As the tiny winged creatures go from flower to flower through every grove," he sought out and held converse with the professors of different Çaiva schools, saying within his soul, "Where shall I find the spotless Guru,‡ who can expound to me the mysteries of the Agamas"? In fact, the state of mind of the youthful prime minister was much like that in former generations of Sakya-muni or Gautama, and of all the great saints and sages whose names live in Indian tradition: the world's infinite woe oppressed him, and there was neither remedy nor teacher to be found. It is evident that at that period the faithful followers of the Çaiva system were few, and rival systems were in the ascendant. The king himself and his courtiers were probably but lukewarm in their religious profession. Jainism was everywhere.

* NOTE II: The "five letters" or syllables, as we should call them, are *Çi-vā-ya-nama* = "adoration to Çiva." A supernatural power is lodged in these sounds. They may be uttered in the reverse order also: *na-ma-çi-vā-ya*. The Tamil student may consult உண்மை விளக்கம் 30-45. திருவருட்பயன், ch. ix, 81-90, given here. சிவப்பிரகாசம் II, 40.

சிவஞான போதம். சூத். ix, 3.

† See NOTE III, "The soul's emancipation."

‡ See NOTE IV, "The Guru."

The recital of these mental troubles, and the touching confession of his ignorance and youthful folly are to be found in many of his poems. (See especially No. 5, "*The sacred Cento.*") They remind one most forcibly of the Confessions of Saint Augustine, and we cannot help saying that in our Tamil sage we find a spirit congenial to that of the great doctor of the West.

The crisis was at hand. One day when the king was sitting in state in the midst of his nobles and dependant kings, messengers came announcing that in a harbour in the territory of the *Çōra* king ships had arrived with multitudes of horses of rare value, from the "Aryan"* land). We may suppose that this means Arabia, and the whole legend points to the traffic ever carried on by coasting vessels between India and the western lands, from whence not goods only but ideas also came. The king at once commissioned his confidential minister to proceed to *Tiru-Perun-Turrai* ("sacred-great-harbour") to buy these horses; and gave him an enormous treasure for their purchase. He, Mānikka-Vācagar, accordingly set out escorted by troops composed of mercenaries from every known eastern land, in more than royal pomp, seated in a magnificent litter. Never was progress more magnificent than that which the poet imagines. It is the last gleam of the predestined saint's secular glories. And so through cities, over vast wildernesses and interposing hills, he made his way to the great western harbour, where he was to make his purchases. The curtain here falls at the end of the first act in the drama of the sage's history. His secular life is really ended. Like St. Paul journeying to Damascus he is on the eve of an unexpected and decisive experience.

§ 2. *Çivan appears. The Sage's conversion.*

And here for a time the poet leaves him journeying on, and introduces us, in the second canto, to a more splendid court than that of the Pāṇḍiyan king; to the court of Çiva Himself, where He sits enthroned with Umā by his side on the silver hill. (A description of this is given in NOTE X.) There the god announces to the assembled deities his intention to visit earth, in the form of a *guru* or human teacher, that he may initiate and consummate the Conversion and salvation of a

* *Arya* seems here to be equivalent to "foreign."

disciple, who shall restore to all the Southern lands the teaching of the truth, and make the Tamil language for ever glorious with the "nectar of sacred and devout poesy." His adoring hosts are to accompany him in the guise of disciples, for one of the titles of Çiva is "Lord of Hosts." (NOTE XII.) The poet has a great many beautiful verses, and some very fanciful ones about this gracious advent of Çiva.

The trees put forth their verdure, the flowers exhale new fragrance, the birds sing on every branch, the beautiful grove around Tiru-perun-Turrai is hushed in expectancy, when under a thick and spreading *Kuruntham** tree, in human form, the mighty *Guru*, attended by his hosts, all like himself to appearance Çaiva saints, takes his seat. Meanwhile the youthful prime minister with his gorgeous company draws near the town, and hears from amid the grove solemn mysterious strains, the voices of the 999 saintly attendants of the god who are chaunting the venerable Çaiva-Āgamas. He at once stops the royal cavalcade, and sends a messenger to inquire the source and reason of this sweet mystic music.

The answer is, that surrounded by a vast multitude of devotees, beneath a *Kuruntham* tree, there sits a venerable saintly guru with braided lock, crowned with a garland of *Konrrai*, in majestic grace, most like unto Çivan Himself.

Our traveller forthwith alights, draws near, and at once is transported with rapture. He beholds a mystic *Guru* who has a rosary of scarlet *Eleocarpus* beads around his head and throat and breast; who is smeared with sacred ashes of dazzling white, has a third eye of fire in the centre of his resplendent forehead, and holds in his hand a book. "What book is this?" he ventures to inquire. The answer is, "It is the Çiva-nāna-Bōdham." We must pause to remark the daring anachronism of this reply. This celebrated work of the Tamil Aquinas, the great Meykaṇḍa-Dēvar, did not exist for probably two centuries after Māṇikka-Vāçagar's time. "And what," inquires the neophyte, "is *Çivam*? What is *Nānam*? and what is *Bōdham*?" "*Çivam*," was the god's reply, "is the incomparable true and divine Essence. *Nānam* is the science of that Essence. *Bōdham* is its right apprehension." No sooner does this answer fall upon his ears than the inquirer, who has reached the

* The tree is the "thorny trichilia." Its flowers are very fragrant.

† The neuter form.

exact stage of religious experience* that according to the Çaiva system renders him meet to hear and receive the *Guru's* words, exclaims, "Henceforth I renounce all desires of worldly wealth and splendour. To me, thy servant, viler than a dog, who worship at thy feet, grant emancipation from corporeal bonds! Take me as thy slave, O king of my soul!" Saying this, he stood weeping and worshipping at the *Guru's* feet. One of the chief of the surrounding host now intercedes for him as worthy to be taught the mystery of emancipating grace, and the god accordingly receives him, and bids the attendants prepare at once for his solemn initiation.

In the grove a stately tabernacle is prepared, surrounded with rich silken hangings, and adorned with myriads of fragrant blooming flowers and innumerable sparkling gems. In the midst a lofty seat is prepared for the *Guru*, and the neophyte is bathed with water from the Ganges, besprinkled with perfumes, and prepared for reception by a variety of minute ceremonies. He then presents food with many kinds of luscious fruits to the great master, after which the initiation begins. The *Mantrams* and holy texts are taught him. He hears these, while his faculties are absorbed in loving devotion. He then worships the sacred feet of the *Guru*, and places them reverently on his head. With the impartation to him of all the mysteries of the Çaiva-Sidhanta philosophy (NOTE XI.), the initiation is complete. And now, how changed is the youthful minister of state! He is become a *Jivan-muttar*, who lives in a body still for a little while, but is one in feeling, soul, power and faculty with the Infinite Eternal. He has put off his rich garments and adornments, is besmeared with white ashes, and wears the peculiar habili-ment of the ascetic.

From his head depends the braided lock of the Çiva devotee, one hand grasps the staff, and the other the mendicant's bowl: he has for ever renounced the world—all the worlds, save Çivan's self. And he is faithful henceforward even to the end. In the whole legendary history of this sage, whatever we may think of the accuracy of many of its details, and whatever deductions we are compelled to make for the exaggerations that have grown up around the obscurity of the original facts, there stands out a character which seems to be a mixture of that of Saint Paul and of Saint Francis of Assisi. Under other circumstances what an

* Çatti-nipātham. (See NOTE V.)

apostle of the East might he have become! This is his conversion as South India believes it; and in almost every poem he alludes to it, pouring forth his gratitude in ecstasies of thanksgiving, and again and again repeating the words "I am Thine, save me"! His poetry lives in all Tamil hearts, and in the main and true essence of it deserves so to live!

The next step was,—and here it is difficult, —to make over the conduct of the new devotee can be justified,—to make over to the *Guru* and his attendants the whole of the treasure entrusted to him by his king for the purchase of horses. By initiation he has become the *Guru's* very own. All that he is and has belong to his new Master. So, together with his own garments, jewels and personal property, the whole of his master's prodigious treasure is at once handed over to be distributed to the devotees of the god and to the poor.

§ 3. *Events in Madura.*

Meanwhile the nobles who composed his escort beheld with astonishment the sudden transformation of the youthful minister, and still more were astounded at this misappropriation—as it certainly seemed to them—of the king their master's property. So they ventured to draw near to the sacred assembly, and to expostulate respectfully; but *Mānikka-Vāçagar* sternly bade them depart, for "why," said he, "would you bring me back to earth's false employments"? Finding all their expostulations useless they at length returned to *Madura*, and announced to the king that his favourite minister had become a *Çaivite Sanniyāsi* ("one who has renounced the world"), and had made away with all the money entrusted to him. As in the case of *Daniel*, there was jealousy at work no doubt, but certainly *Mānikka-Vāçagar* was evidently not blameless, as seen at least from a mundane point of view. The king was exceedingly enraged as was natural, and sent a peremptory order for his Minister's instant return. When the royal order arrived and was presented to the new ascetic, his reply was, "I know no king but *Çivan*, and even were *Yaman's* (the god of death) messengers to come to bear me away, my Master has conquered *Yaman*."* He then took the king's missive and

* See *Nālaḍi-Lex* ௬௩: *Civan* with his left foot kicked *Yaman*, and "death was dead." This is referred to in *Kurraḷ*, 269:

"Ev'n over death the victory they may gain,
If power by penance won their souls obtain."

Nṯi Nerri Vilakkam 51, and *Stokes' note*.

spread it before the god asking for direction. Çivan smiled sweetly upon him, and bade him return fearlessly and tell the king that on the 19th of the month of Avani* the horses which he had been sent to purchase would arrive in Madura. The god also arrayed him in resplendent garments, and gave him a fitting chariot, together with a ruby (hence his name) of inestimable value which he was to present to the king. Accordingly, Mānikka-Vāçagar returned with the messengers and stood before his former master, who sternly required him to account for his conduct. To this he submissively replied as the god had bidden him (though it seems to us to be false!) that the horses had been procured, and were waiting in Perun-Turrai; but that he had not brought them with him now because the Brāhmaus had assured him that the 19th of Āvani was the propitious day for the transmission of these precious animals to Madura. He also presented the ruby, which filled the king with astonishment and delight, and made him satisfied with the explanation, and caused him to regard the report of the others as a piece of mere envious detraction. So the time passed till there were only two days wanting to the date fixed for the arrival of the horses. And now one of the courtiers who had gained the ear of the king, represented the whole matter in its true light, or rather, as it had appeared to all who had accompanied Mānikka-Vāçagar: "Your majesty," said he, "is deceived; your prime minister on the outskirts of the city of Perun-Turrai saw a Çaiva *guru* of imposing appearance and apparent sanctity, whose disciple he at once became, and to whom he made over the whole of the treasure for the purposes of that sect"! It would seem that they themselves, though they had seen everything, had no belief in the divinity of the *guru*; and it is possible that they themselves were Buddhists, who were rejoiced to have the opportunity of bringing this accusation against the Çaiva Saint. It must be remembered too that it is a fundamental doctrine of the Çaiva system that every *guru* is in Çaiva eyes an absolute incarnation of the god; but to these courtiers he was simply a sectarian mendicant. The king now ordered Mānikka-Vāçagar to be thrown into prison till he should restore the treasures he had misappropriated; and this doubtless seems to us to have been but just; yet the poet

* The 19th of Āvani (Sept. 4) is a great annual festival-day in commemoration of this.

tells us that all nature sympathised with the suffering saint; sun, moon and stars withdrew their light, trees drooped, and the whole creation languished. The sufferer in his prison uttered lamentations, and made very touching appeals to the god in whom he trusted. This part of the history is very pathetic, and enjoys a great popularity among Tamilians.

The second canto leaves him in prison, and the date of the promised arrival of the horses is at hand.

§ 4. *The "horses."*

"It is the duty of the father to relieve the woes of his children," and so Çivan appears at the appointed time with the promised horses. But here is seen the characteristic of the god upon which all the Çaiva writers delight to expatiate—his sportive character: he delights to astonish, to bewilder, even to delude the sons of men! So everything in the universe is the sport of Çiva. "He disports himself in the universe and in the individual souls of men."* His dance at Çithambaram† is the symbolic expression of this. So in this case the god gathers together a vast multitude of jackals from the forest around, converts them into magnificent chargers, gives them into the charge of all the inferior gods, who come disguised as grooms, while he himself rides at the head of the troops disguised as the merchant who has brought the horses for sale from a distant land. The tidings reach the king: "the purchased horses have actually arrived! An innumerable host, they cover the plains. The heavens are dark with the dust of their feet." Of course the king sees how wrongly he has treated his prime minister, who is at once released from prison, restored to favour, and goes forth with the king to inspect and receive the purchased horses. Wonderful indeed (and very prolix!) is the Tamil poet's description of the cavalcade, and of the good points of the horses. But the interest of the story centres in the advent of Çiva, whom Mānikka-Vāçagar at once instinctively recognises as his Master, but dares not openly worship, since the deity willed to preserve his incognito. The mighty divinity Himself stands before the Pāñdiyan king, horsewhip in hand, and concludes the bargain; when it appears that the horses delivered are worth four times the

* "Khēlati aṇḍē Khēlati piṇḍē." Comp. Tiru-Vāçagam III, 121-141, and NOTE I.

† See NOTE VI, "Çithambaram."

treasure that had been entrusted to the prime minister for the purchase! The delighted king gives dresses of honour to Çiva and the other disguised gods, but these they receive with manifest contempt, which greatly astonishes and irritates the king. This is explained away however as the result of their foreign customs. The horses are delivered up to the king's grooms, the gods depart, the king and his minister go to their respective palaces, and darkness come down over the land. But the tranquillity is short-lived; for before the dawn the whole city is roused by frightful howlings, which proceed from the royal mews. The newly-arrived horses have resumed their old forms, and are making night hideous with their howlings. They even fall upon the real horses and devour them; and after a tremendous fight and unspeakable confusion make their escape to their native jungles. The king now perceiving that he has been deceived, sends for the prime minister, and furiously upbraids him with the trick, and demands restitution of the treasure. Till this has been restored Mānikka-Vāçagar is handed over to the tormentors, who take him down to the river now dry, and there expose him under the fierce noon-tide sun on the burning sand of the Vaigai with a huge stone on his back. Again he utters pathetic prayers, and appeals to his Master who has deluded both him and the king. This brings us to the fourth canto, wherein the sage is finally vindicated. Of course it is known that the mighty Çivan carries in the midst of his bushy locks the river Ganges; so to that river-goddess he gives command that she shall rush down, filling the empty channel of the Vaigai, and inundating the city of Madura, the scene of the saint's sufferings. "Like a herd of fierce elephants rushing from the mountains," the waters of the Ganges come down and cause the river to overflow its banks, threatening to drown the city. The astonished and bewildered king and his courtiers are now sensible of their mistake, and the sage is once more restored to the royal favour, and entrusted with the task of directing the measures whereby the city is to be saved from destruction. Under his direction orders are given to the inhabitants to build a dam for their protection; and to each one is assigned the extent of wall for which he is responsible. Now in the city was a poor woman, whose name was Çem-mana-Çelvi ("the true-hearted happy one"), a widow, who earned a scanty livelihood by selling rice-cakes.

The order is given her to construct her share of the dam,

but she cannot herself dig and carry earth, and she has no one to work for her, and no money wherewith to hire a substitute. In her despair she rushes to the temple of Çokka-nāyagar* (under which name Çiva is still worshipped in the renowned temple at Madura). Her prayer in the temple is very touching. It comes to this at last, "Helper of the helpless, I flee to Thee for succour!" Çivan is never appealed to in vain, and so He Himself comes in His own quaint way to her rescue. Just outside the shrine, as she is drying her tears, she sees a youthful rustic, a day labourer, clad in ragged garments, with a basket for carrying earth put on his head as a covering, and bearing a spade on his shoulder, who addresses her with the words, "Will you hire me to do your work? I am hungry; feed me, and I will do whatever you bid me." The old woman was in raptures, for had not her prayer been answered? But O the wonder of it! She knew not the whole mystery. The *coolie* was none other than Çivan in servant's form,† thus humbling Himself to bear the burdens of His living ones. So the god undertakes the task, eating the rice-cakes with undisguised delight, but doing his work in very eccentric fashion. It was another of his "sports"! He ran backward and forward, threw a little earth here and a little earth there, danced wildly, and sang strange snatches of songs, till the inspectors of the work pronounced Him mad. Still, on the whole, His work seemed marvellously to prosper; for in fact the river knew him, and shrank away back into its former narrow limits. At length the young *coolie* having eaten all the cakes, crowned all his eccentricities by quietly lying down on the riverbank, and falling asleep with the basket as a pillow. This is reported to the king. The impudent *coolie* is sent for, and having been with difficulty aroused from his slumber, stands before the king as a culprit, making however no defence. The angry king commands him to be beaten. But when the first blow is struck, all the universe shudders. Every god in heaven and every sentient being on earth feels the blow. There goes up a shuddering cry from all creation. And when they look again, the god has disappeared.‡

* This is equivalent to *sundara*, "the beautiful."

† In all this there is much to remind us of Heraklēs.

‡ Comp. *Tiruvā* II, 47; VIII, 47; XIII, 62.

§ 5. *His Ministry.*

When intelligence of this is brought to Mānikka-Vācagar, he is plunged into the deepest grief, both at the humiliation of the God, and because he himself had not been permitted to see and converse with Him. His lamentations and complaints in the poem are as usual very beautiful, if somewhat hyperbolic. The king now pays the saint a visit, acknowledges all his mistakes, declares his unworthiness to have such a minister, and offers to resign to him the kingdom. The sage however has but one wish, and that is, to return to Perun-Turrai there to dwell at the feet of the God. His request is granted, and the king returns to his palace, while the sage, now released for ever from the entanglement of worldly affairs, finally puts off his courtier's dress, and assumes the garb of an ascetic. His conversion and consequent trials are over, and he enters upon the new life. From that day it was his one work to glorify his Master. He loses no time in returning to fall at his *Guru's* feet, and pour out all his soul in the Sacred Presence.

After some time the God announces to His disciples that as His design in coming to earth, namely the conversion and confirmation of the sage is accomplished, He will now return to Kailāsa. To the 999 devotees who are His attendant hosts He gives the charge to remain in the grove with Mānikka-Vācagar, worshipping and meditating until in the sacred tank fire appears, into which they are to cast themselves, and so pass home to their Master. They must patiently wait. And for the neophyte himself, a further trial is enjoined. He is to remain behind, even after all his companions have gone home, that he may establish throughout the whole Tamil country the faith of Çiva, and compose Tamil hymns which shall be the *Vēdas* of the South. The day of the ascension comes, and the Master departs, but halts under a Kondrai* tree, whither the sage follows him, still begging that he may at once accompany Him, and be for ever at His side on the Silver mount. "Nay," replies the God, "learn rather to know that I am everywhere. While thou art doing My will, I am with thee. Wait patiently. In Uttara Kōça-mangai, thou shalt be taught mystery of the eight mystic powers.† From

* A large and beautiful tree of the *Cassia fistula* genus. It has very magnificent golden flowers. (See Ainslie I., 60.)

† The *Siddhi* or supernal powers. (See the sixth song.)

thence thou shalt go from shrine to shrine, till in Çithambaram thou shalt discomfit the Buddhists, and then obtain thy consummation." At length the God disappears, and Mānikka-Vāçagar returns alone to the other devotees. Under the tree they set up a *lingam*, and worship night and day. It was then and there that the Saint began his poetical compositions.* Twenty-one of the fifty-two lyrical compositions he has left are marked as composed in Perun-Turrai. They are all full of the glories of Çiva, the grace that found out and converted the singer, and the grief he feels at his enforced absence from his Master.† This last grief is intensified by the speedy departure of his companions. One day as they are worshipping, a mystic flame blazes up in the centre of the tank, as Çiva had announced beforehand, and they, casting themselves into it, disappear.

And now the sage alone sits under the Konrrai tree from whence Çiva had ascended, and utters his lamentations. The marvellous poem, "The Sacred Century of Verse," (numbered five in the collection,) was then composed. It contains some of his finest verses. There then begins a new phase of his life. He passes from town to town, worshipping at each shrine and composing verses which are headed according to the place of their composition. The places he visited were however very few in comparison of those said to have been hallowed by the presence of Sambandhar and the other saints of the following cycle.

The fifth canto brings the sage to the scene of his greatest achievements and of his consummation, Çithambaram. It will be remarked that he goes back to Madura and the Paṇḍian kingdom no more. He is especially the saint of Çithambaram and the Çōra kingdom. The remainder of his history is a continued glorification of the great northern shrine. Many of the hymns that he composed in reference to the God as manifested in Tillai are exceedingly beautiful.‡ The note of sadness is almost absent, while the rapture of constant worship in the court (Ambāram), where Çivan's dancing form is seen, fills him with rapture."§

* NOTE IX, "Tiru-vāçagam."

† See especially Lyric VI, "Forsaken."

‡ See NOTE VI, "Çithambaram."

§ See NOTE VII, "Bhakti."

§ 6. *The Buddhists, and His Consummation.*

After a while it seems that a restless fit seized him and he passed over to Ceylon, between which and the South of India there was much intercourse. The story represents him as able to converse with the people. It would seem therefore that it was the north of Ceylon to which he went. He is in the garb of an ascetic of the severest order. Almost naked, with his rosary of *Eleocarpus* beads, his body smeared with white ashes, a staff with little bells in one hand and a skull in the other, he wanders about living upon alms, and whether he stands or sits or lies down is always praising the Golden Porch (Çithambaram).

The Buddhists carry the tidings to the king, who sends for him. At first he refuses to go, saying "What have I, a mendicant, to do with kings?" At length, however, he stands before the king, and is confronted with the Buddhist *guru*, who is armed with the three *Piḍākas* of his law, and is as accomplished an ascetic as the Çaivite himself. "What is this Golden Porch?" they ask. "The sacred shrine where Çiva dances and where the Çōra king ever worships." It may be mentioned here that the curious legends of Çithambaram are summed up in the "Kōyil Purāṇam," of Umāpathi. (NOTE VI.) The result is that the Buddhist *guru* in insulting language announces his intention to visit the vaunted shrine, and tear the god from his throne.

The scene changes somewhat abruptly to *Tillai* or *Çithambaram*. The Buddhist *guru*, with his company of devotees, has come to Çithambaram and encamped within the temple enclosure. The king of Īraṃ (Ceylon) with his court has also arrived, and with him a daughter who is dumb. The kings exchange courtesies, the king of Ceylon bringing tribute to the Çōra king as his feudal lord.

§ 7. *The Sage and the Ceylon Buddhists.*

It would almost seem as if there were in this legend a reminiscence of some great expedition of the king of Ceylon with the double intention of conquering the country and establishing Buddhism on the continent. The arrival of these strangers threw all Çithambaram into confusion. The 3,000 devotees of the temple wished to expel the intruders by violence, but the God himself appears to them in a dream, and orders them to send for Mānikka-Vāçagar, who in his

hermitage near at hand was plunged in mystic meditation. Thus bidden by the God he comes forth, and a vast assemblage is convened. The Çōra king, his courtiers, and the Çaiṅva saint are on the one side, while the king of Ceylon, his attendants, and the Buddhist saint are on the other. The Sage on a lofty seat is enthroned as the champion of the Çaiṅva faith. Brahmā and all the gods and immortals of every rank form the audience. The Çōra king addresses the Sage, bowing with lowly reverence, in the following words: "O holy one, to establish the Çaiṅva wisdom over all the world is your province: to exterminate these Buddhists is mine." We shall not go into the details of the disputation, reserving its fuller translation for another place (NOTE VIII.) The whole turns at length upon the argument which the Çaiṅvite urges with great force, that according to the Buddhist system there can be "neither God nor soul nor salvation." At the close of the discussion, the Saint makes his appeal to *Sarasvati*, the goddess of speech: "How canst thou who dwellest on the tongue of Brahmā allow these men by use of speech to revile the Eternal?"

She acknowledges the appeal by striking the heretics dumb. The Ceylon king, convinced by the arguments, and overwhelmed by the miracle, confesses himself a convert, and prays that his dumb daughter may have the gift of speech restored to her. The prayer is heard, and she, her tongue being loosened, begins at once to refute the absurdities of the Buddhist *gurus*. The substance of her words is supposed to be given in the twelfth (or Çāral) song. Finally all the Buddhists put off the insignia of their religion, besmear themselves with the sacred ashes, and take up their abode in the precincts of sacred Tillai; thus the victory is complete.

No mention is made of the use of any violent measures.*

§ 8. *His beatification.*

The last canto relates the final beatification of the saint. After his triumph over the heretics he is supposed to have sung four of his most beautiful songs, in which the note of jubilation is very perceptible [xlvi, xlix, l, li]. At length one day a venerable devotee, ostensibly a stranger from the Pāṅḍian land, presented himself before the saint with the

* A fuller account of this disputation is given in NOTE VIII.

request to be permitted to take down his songs from his own mouth. The saint sang them all, while the stranger carefully noted down every word, and having done so disappeared. It was Çiva himself,—Çokka-Nāyagar—who had quitted his shrine in Madura for the purpose. Straightway the god goes up to his silver mountain Kailāsam, and, assembling all the gods around him, makes them glad with Mānikka-Vāçagar's verse. Next morning, on the pedestal of the image in Tillai, is found the copy made by the god's own hand, and attested by his signature,—a thousand verses without a flaw. The devotees of the temple take up the book with astonishment and reverence, and sing over the songs to the enraptured multitudes. They then in a body go to the sage and ask him to give them an authoritative exposition of the meaning of the whole. In answer he bids them follow him, and proceeding to the Golden Court points to the image of the god, adding "the lord of the assembly himself (Sabhāpati) is the meaning"; and then disappeared, melting into the image of his master. The devotees return to their resting places with joy and thanksgiving.*

These poems, of which it is hoped that the translation may be printed, are sung throughout the whole Tamil country with tears of rapture, and committed to memory in every temple by the people, amongst whom it is a traditional saying, that "he whose heart is not melted by the *Tiru-Vāçagam* must have a stone for a heart." It is probable that a portion of these poems is of later date. It is scarcely possible to determine what sands of truth have been brought down in these traditions, and it is very hard indeed to say how much of their undoubted beauty and symbolic truth is due to influences (historically quite probable) from Western sources; but it is impossible to read the poems without feeling that the sage of Tiru-Vāthavūr was a sincere seeker after God, whom in ways that he then knew not of, he has since been permitted to know and worship.

The success of *Mānikka-Vāçagar* in reviving Çaivism, which seems to have been then almost extinct, was immediate, and we may say permanent; for, although there was a period of declension when the Jain and Buddhist systems again became very prevalent, there arose another set of

* Comp. I, 93, &c.

" . . . Adoring ever, THEE they name,
Whom words declare not; then BENEATH THY SACRED FEET
THEY LEARN THE MEANING OF THEIR SONG. . . ."

devotees who must be looked upon as his disciples, though, curiously enough, scarcely any reference to him is found in their writings. From his time dates the foundation of that vast multitude of Çaiva shrines that constitute a peculiar feature of the Tamil country.

In considering the causes of his success, I feel inclined to set aside all stories of persecution carried on at his instigation. These belong, it appears to me, to a later period. His own personal devotion and fervour of spirit made him an altogether irresistible apostle of his faith. I see no evidence of anything like it in the after-times. He went about testifying that he had seen Çiva in *Perun-Turrai*, and that he had then and there passed from darkness to light. He thus declared to all what he fully believed himself to have seen and handled. He was an enthusiast, but absolutely sincere. The doctrines that he taught will abundantly appear from an attentive consideration of his disputes with the Buddhist *gurus*. He taught the people that there was one supreme personal God, no mere metaphysical abstraction, but the Lord of Gods and men. He also taught that it was the gracious will of Çiva to assume humanity, to come to earth as a *guru*, and to make disciples of those who sought him with adequate preparation. He announced that this way of salvation was open to all classes of the community. He also taught very emphatically the immortality of the released soul—its conscious immortality—as he said that the virtual death of the soul which Buddhism teaches is not its release. It will be seen how very near in some not unimportant respects the Çaiva system approximates to Christianity; and yet in some of the corruptions to which it has led, by what almost seems a necessity, are amongst the most deplorable superstitions anywhere to be found. Here the truth of the old maxim is abundantly verified, “*Corruptio optimi pessima.*”

Again the Çaivites led the way in the propagation of their system by means of popular songs. Anyone who compares the fervid piety of his very beautiful and generally very simple lyrics will feel with what force how they must have struck the chord that vibrated then as it vibrates still in millions of hearts. “One touch of nature makes the whole world kin,” and no one can read the Sage’s verses without profound emotion. Scarcely ever has the longing of the human soul for purity and peace and divine fellowship found worthier expression.

And somehow the error and folly and idolatry seemed to be but the poetic accompaniments of what is mainly most worthy.

The Jain compositions were clever, pointed, elegant, full of satire, of worldly wisdom, epigrammatic, but not religious. In the *Nālaḍiyar's* four hundred quatrains, there is no mention of God. In the sublime *Kurral's* thirteen hundred and thirty couplets there are but ten which speak of a Divine Being. The effect therefore of these songs—full of faith and devotion—was great and instantaneous. South India needed a personal God, an assurance of immortality, and a call to prayer. These it found in Māṅikka-Vāḍagar's compositions.*

The CHAIRMAN (D. HOWARD, Esq., D.L.).—I am sure we shall all join in thanking Dr. Pope for the very valuable and interesting paper he has given us.

It is a little perilous for any one who has not given the time and accurate study that Dr. Pope has to this subject to venture to say much about it, but the interest extends far beyond the power of criticising. I cannot help thinking that such investigations as these are of great value. One point struck me as being of importance; we discuss rather frequently, with more or less knowledge of what the Buddhist system is, the meaning of Nirvāna. I must say that the authority of one like Māṅikka living in Buddhist times, who is arguing against it, is worth infinitely more than our private opinion, especially as it happens that we sometimes import into the consideration our nineteenth century ideas—so that the fact of his challenge to Buddhism is of great value, at any rate to sincere and earnest onlookers. This paper indicates the wonderfully beautiful ideas you find in the Ḍaiva system. The beautiful conceptions one meets with in that which goes by the name of Ḍaivism, I think, lead us to see that which is not quite realised, viz., that mere knowledge is not quite all. There is something more than perception of truth required before we can have the actual practice in the life of those in whom it is met with. Many have a habit of saying, "Here are most beautiful sentiments. Are not they a splendid people?" whereas, those

* NOTE VII, "Bhakti."

who know what the people are, are the best judges of how far these sentiments bear fruit in actual practice.

I am only touching on the very outside points which strike one, and rather in the hope of eliciting the views and opinions of those who are more competent than I am to speak upon the subject.

REV. R. C. KIRKPATRICK, M.A.—In the present day the study of comparative religions is very important, and anything which throws light on any of the religions that prevail in the world is of value. I would also venture to add, that I think we must look for glimpses of truth in all the different religions that prevail.

PROFESSOR H. L. ORCHARD, D.Sc.—We are indebted to Dr. Pope for bringing before us, in a most interesting form, the figure of a man who was assuredly no ordinary man—an earnest seeker after the infinite spirit—a flash-light upon philosophic thought. I think we all concur with the learned author in the closing sentence of his paper—that at that time “South India needed a personal God, an assurance of immortality and a call to prayer,” and in the providence of God this sage was raised up to meet that need.

CAPTAIN F. PETRIE, F.G.S. (HON. SECRETARY).—Before Dr. Pope rises to reply may I say a few words? I think we may congratulate ourselves very much on the fact that this paper has come from his hands. (Hear, hear.) There is no one in England (if he will pardon me for saying so, and I am sure all will agree who know him) who could so thoroughly and ably treat the subject which he has taken up. I think we need not be uncertain of the importance of such a paper, even in England.

Some few years ago a paper “On the religion of Zoroaster” was read by a recognised authority on the subject (*Transactions*, vol. xiii). On that occasion a member—Mr. J. Ferguson, of Ceylon—used the following words:

“Seventeen years’ residence in the East has led me to think that one important point in the preparation for missionary work is a knowledge of the religious beliefs of the people among whom Christianity is to be taught, and a sympathy, so far as possible, with precepts and doctrines not distinctly evil in their tendency. I believe our most successful missionaries in the East have been those who have not only learnt the language of the people amongst whom they have laboured, but who have been enabled to translate their sacred and other notable books, and thus to know and obtain the sympathies of the enlightened among the natives. I think that this paper will be particularly valuable to Christian teachers going to work in Northern and Western India,

and Persia, and I hope that it may pass through the hands of our more enlightened fellow-subjects in India. I think the value of such papers as this is very great to missionaries going to the East, who ought to get an idea of the religions they are about to controvert."

As regards South India the same words aptly apply to the paper just read by Dr. Pope.

The AUTHOR.—If you will bear with me I will make one or two remarks. I am obliged to condense very much what I have to say because the subject is a very wide one. First of all, what I have read is a mere fragment. I have got seven or eight volumes, type written, waiting for the press; but these things do not sell, and the Clarendon Press Authorities hesitate as one might expect. It is a question of "How can we recoup ourselves?" That is another matter, and there it remains. Secondly, the whole subject is invested with a controversial element, about which I am rather loath to say much.

My Hindu friends, with whom I am in constant communication, strenuously refuse to believe that Mānikka ever got anything from such a polluted source as western tradition; so I have not emphasised that point here, but I have argued it at length elsewhere.

Now I will deal with facts. In the second century there were Christian missionaries in Madras—not the Apostle St. Thomas, as tradition has it; but certainly a century later Panteanus came and taught in Madras. Then the Nestorians came to the western coast, and during the time of Mānikka, or about that time, they were so successful that the King of Travancore became a Nestorian Christian. The Christians on the western coast have a tradition that Mānikka came there at this time. Nearly every excellency of his theology can be traced, I think, to intercourse with these Nestorian Christians and the Alexandrian missionaries; but their teaching was wanting in fervour and spirituality. It did not make much of sin, nor did it teach the necessity for the atonement. That was the case with the Nestorian missionaries, and you can see in this tradition of Christianity, defects and hiatuses still remaining in it. With regard to missionary work, I may say that an old Çaivaite, who is still what we call a heathen, is going to translate this into Tamil in India and circulate it. If we can only do this kind of thing and study their system, and meet them, not with antagonism, but as brothers who have a

great deal of truth, to whom God our Father has given much, though He has given us more, I think, if we meet them in that spirit, the time will come when it will leaven the whole lump. Those who can shed tears over these rapturous songs are in a measure prepared for the Gospel. This is as the Book of Psalms to the people of South India, and I think is a preparation for better things.

One word more I would say, and it is this—that our Hindu fellow-subjects in South India are inferior to no people on the face of the earth in that particular element—deep religious fervour. You may say what you like of Hindus in other respects; but they are people who love God—feeling in the darkness after Him that “haply they may find Him,” and they love Him whom they do not as yet fully know. Before I left India, there came a carriage and pair to my door and a fine intelligent Hindu stepped out. I had often seen him in my little church there; but I had never spoken to him. He was a high officer of the Maharajah’s Court. I gave him a seat. He said he had heard I was going, and he added, “I am a Christian.” I said, “My dear sir, is that so?” He said, “If you only knew my mother, sister and wife you would see that I cannot be baptized; but I am a Christian all the same—I would die for Christianity.” He added, “I want a book (I read the Bible regularly) that I can pray over day by day and hour by hour, that will guide me.” I had just received an edition, in two volumes, of Jeremy Taylor’s *Holy Living* and *Holy Dying*, which I took out and showed to him. I did not give them to him, but said, “You can take down the publisher’s name and I think they will suit you”; and so, after a little talk and trying in a quiet way to bring it home to him, he left. Some two months after, just immediately before I left he came and said, “I thank you so much for recommending me those books. I have got them, and I am dealing with the *Holy Living*; it is a way we have, that I work it out as I should Euclid. I am trying to make it my own in thought and in life; but I am getting on very slowly.” I said, “My dear friend, I am not a third, or a quarter through it myself yet.” And there he is still, I believe, studying Bishop Jeremy Taylor’s *Holy Living*. He is one instance of the natural piety of those people, if one may so speak, of people who only need sympathetic and brotherly love to bring them much nearer Christianity.

Then one final word about Buddhism. In the notes in the Appendix you will find a full account of the discussion thereon,

and find exactly where Mānikka differed from the followers of Buddha. He convinced them that Buddhists are atheists. They did not believe in the immortality of the soul, and whether we know much or little, we must be as Browning said, very, very sure of God and of immortality. [The Meeting was then adjourned.]

NOTE.

The final remarks in this discussion suggest that this paper is well worthy of careful consideration, not only in India but nearer home, where it has become fashionable amongst some to speak with high approval of—and even to adopt—Buddhist views.

The warnings of Mānikka convey both a lesson and a reproof to those who, having *The Light*, seek instead a darkness which even he so desired to dispel.—ED.

APPENDIX.

(Being the “notes” referred to in the discussion.)

NOTE I.

ÇIVAN'S ACTS, OR OPERATIONS; THE 'SACRED SPORTS' OF
THE GOD.

In the Çiva legends and poems three kinds of actions are very commonly referred to as having been performed by Çiva, and each of these requires consideration. Sometimes these are five. (See Tiruvāçagam, I, 41; III, 13.)

1. We find Çiva perpetually spoken of as disporting Himself amidst His subjects, and His actions are often represented in a more or less grotesque aspect. This idea of the god as engaged in sport quite permeates the Çaiṅva system. You hear the minstrel in the street singing, *Kēlati aṅḍē, Kēlati piṅḍē*—केलति अण्डे, केलति पिण्डे ('He sports in the world; He sports in the Soul'), and the notion is explained by reference to His omnipotence. All His operations are easy to Him, involving no effort, so that He is said to 'act without acting'; and thus everything is the sport of Çiva: the whole universe is bright with His smile, and alive with His joyous movements. This is so thoroughly

inwrought into the system that such names as 'Deceiver and 'Maniac' (Kalvar, கள்வர்) are perpetually given to the god. The Purānam of Madura, containing the history of the sixty-four amusements of Çiva (திருவிளையாடற் புராணம்), illustrates this. Some of these quasi-divine sports seem to us very ridiculous, but we are required by our Çaiva friends to receive the mystic interpretation of each! In the history of *Mānikka Vāçagar*, which is really taken from hints in the same Purānam, the change of the jackals into horses, and *vice versa*, and the god's behaviour as a labourer are somewhat extreme cases of this, but are not quite incapable, I suppose, of a serious application.

2. Closely connected with this are the very frequent manifestations of the god for the purpose of trying His votaries; and in several of these (not translated) the god is represented in an exceedingly unfavourable light. (See Note VI.) Throughout the whole of the legends there runs the idea that, as there were innumerable mendicants assuming the conventional garb and appearance of the god, He might at any time appear to any of His worshippers in such a form; and thus all pious souls were rendered eager to exercise due hospitality to Çaiva mendicants, as they knew not but that their love might any day be rewarded by receiving the visit of the Master Himself. Of course, the old classical stories, such as that of Baucis and Philemon, are of a similar kind.

3. The dancing of Çiva, especially in the Golden Hall at *Çihambaram*, is connected with an especial legend, which will be given, but is always interpreted in the same way as the sports referred to above. (See Note VI.) His dancing is symbolical of His perpetual and gracious action throughout the universe and in loving hearts. In fact, it takes us back to the manifestations of the *pre-Aryan* demon, or Bhairava, that dances in the burning grounds, smearing himself with the ashes of the dead, and adorning himself with necklaces of their bones, and bearing away with him a skull as a trophy. There are many composite elements in these very ancient histories; and it is but fair to allow those who yet regard them with reverence to give them any reasonable interpretation of which they may be considered susceptible.

NOTE II.

THE MYSTIC FORMULA OF THE FIVE LETTERS (OR SYLLABLES).

The following, which is Ch. IX of *Umā-pati's* great work entitled 'The Fruit of Divine Grace,' gives the whole mystery of 'The Grace of the

Five Letters,' that is, the grace gained by the use of the invocation consisting of Çi-vā-ya-na-ma (= *Adoration to Çiva*). 'This is a help to those who cannot otherwise attain to the bliss of mystic quietude (Samādhi).'

Question 1.—If the unutterable rapture has not been gained by the means already explained, is there any other method ?

The systems of grace (the twenty-eight Çaiṅva Āgamas), the Vedas, and other sacred scriptures have for their object the teaching of that which is the mystic meaning of the 'Five Syllables.' (81.)

Commentary.—On examination by the devout scholar it will be found that the substance of the teaching of the sacred 'Five Letters' is the LORD, the FLOCK, and the BOND. Such is the conclusion of those who are mighty in the Āgamas, the Vedas, and other sacred books.

Summary.—The substance of all TRUTH is included in the 'Five Letters.'

Q. 2.—What does this pentad of letters declare ?

The King, the (*Divine*) Energy, the Bond, the beautiful Māyā, the Soul—all these are contained in the *Ōm-gāram*. (82.)

Com.—The Pirāṅavam contains within it, (1) the grace of Çivan, and (2) of Çatti, with the (3) knowledge of *Aṅavam*, and (4) of fair Māyā, and of (5) the Soul (Note XV.). These are symbolised by the 'Five Syllables,' and in ŌM the whole are concentrated.

Sum.—Here is expounded the doctrine of the mystic Ōm, which is the subtle form of the 'Five Letters.'

Q. 3.—What is the order in which the 'Five Letters' take their stand ?

There is on the one side the mystic dance of weakness, on the other side the dance of mystic Wisdom,—the Soul being between the two. (83.)

Com.—The syllables NA and MA represent the energetic whirl of Impurity both in itself, and also as operating in the Soul ; the

syllables ÇI and VĀ represent the mystic action of Grace and of Çiva. Between these stands YA, which represents the Soul.* The 'dance' is the divine impulse and guidance given to the Soul in this state of bondage, and in the state of emancipation.

Sum.—In this the nature and significance of the 'Five Letters' are explained.

Q. 4.—How is it that by means of the 'Five Letters' the Soul does not obtain the 'Known'?

MA and NA prevail over the mind (or *the mind is dissipated*); thus it returns not to Him; whenever it obtains ÇI its deeds are cancelled. (84.)

Com.—(This couplet admits of two distinct interpretations. Below the more authoritative is given.)

When MA and NA, which are Impurity and Tirōtham, bind the Soul tight, it (the YA) cannot return; when their great bond is loosed, it obtains ÇI, which is supreme blessedness.

Sum.—Here the Bond and the method of release are shown in the 'Five Letters.'

[Compare Çi. Pr. II, 41 (p. 372).]

Q. 5.—How is it that, though there are the 'Five Letters,' Aṇava (Impurity) does not depart?

While the bewildering power of the veiler (Tirōtham) and of Impurity is first, how can they depart? Not unless the dominant Aṇavam change its place. (85.)

Com.—While NA and MA, representatives of Tirōtham and Impurity, are pronounced first, can these be removed? Put these after, and ÇI first, and then Aṇavam will cease to obscure.

Sum.—They who would be set free must utter the formula thus: ÇIVĀYA NAMA, and not NAMA ÇIVĀYA.

[Compare *Un. Vil.*, 44.]

* See Song V, 196, note.

Q. 6.—Will 'Impurity' depart from those who repeat the 'Five Letters'?

Alas, thou mayest worship, but if the foundation, Çivan, be not known, since Çi precedes not, Impurity will still assert itself. (86.)

Com.—When men repeat the sacred formula unmindful of the foundation, which is Çivan, desire will reassert itself, still clinging to *Na* and *Ma*.

Sum.—Here he commiserates those who thus recite them, and still suffer, having no divine assistance.

Q. 7.—Why is this pentad of letters recited thus?

If Çivam come first, and thou so recite it, the pain of embodiments will cease. This is your method. (87.)

Com.—If the devotee recite the pentad so that Çi and VĀ precede, by this position the grief of embodiment will be removed. Thou, O disciple, who desirest release, recite it thus!

Sum.—This teaches that the released say, Çi vā ya na ma.

Q. 8.—What benefit accrues from this order of recitation?

VĀ will in grace give Çi, and bring prosperity. This spotless Form will appear to such souls. (88.)

Com.—When thus recited, VĀ, which is grace, points out Çi, which is Çivan, and establishes YA, which is the Soul, in the abode of delight. And that is the faultless, sacred form of Çivam.

Sum.—Here the significance of VĀ,—the Energy of Grace,—in the sacred formula is taught.

Q. 9.—How will that soul exist in the heaven of liberation?

No longer placed between the spotless NĀ and VĀ, by grace the Soul will stand between VĀ and Çi. (89.)

Com.—The Soul (*ya*) standing no longer between the spotless (it may be read 'Āçin Na' or 'Āçil Na,' i.e. *spotted* or *spotless*; and

each of these presents an orthodox view of Tirotham) *Na* and *Vā* (Çatti), now stands between *Vā* and *Çi*.

(It is said that this arrangement must be learned from a guru.)

Sum.—This defines the position attained by those who rightly use the formula.

[See *Un. Vil.*, 46.]

Q. 10.—Is there any manifest evidence of our being in this state of deliverance?

In every possible way the sacred writings teach that you should fix your mind upon the path that leads not away from Him. (90.)

Com.—The sacred writings teach us every method, so that we should ponder them, and never forsake the sacred influence of Çivan and His Çatti.

Sum.—This couplet sums up the teaching of the last four chapters (VI–IX).

End of Chapter IX : The ‘ Five Letters.’

NOTE III.

THE SOUL'S EMANCIPATION (ஸ்ட). Mutti, (முத்தி, मुक्ति).

In Sanskrit, *Mukti* or *Mōksha*.

The best explanation of the Çaiva Siddhānta doctrine of Mutti, or the Soul's final emancipation from embodiment (*erlösung von den weltlichen banden, Seligkeit*), is found in the treatise called Çiva-piragācam (சிவப்பிரகாசம்) by the same great sage Umāpati (I, 38, etc.). This has been translated by Mr. Hoisington (*American Oriental Soc. Journal*, 1854). Mr. J. M. Nalla-sāmi, of Madras, has recently published a translation of Çiva-ñāna-bōtham, with notes (see p. 100, etc.). This is a most useful compendium.

Ten faulty (or imperfect) theories of this consummation so devoutly wished for by all Hindus are enumerated in these works or in the commentaries on them :—

- (1) There is the bliss aspired to by the Lokāyattar ('Worldlings'). This is simply gross sensual enjoyment in this world. These heretics are continually attacked in the Siddhānta books. [See *Sarva-darshana Saṅgraha* (Trübner's Series).] These were atheistic Epicureans, followers of *Charvāka* (Note XIV.).
- (2) There is the cessation of the five *Kanda*. This is the Buddhist Nirvāna, and is always considered by Tamil authors to be mere annihilation. The South Indian view of Buddhism is illustrated in Note VIII.
(Sar. darsh. Sañ., p. 31.)
- (3) The destruction of the three (? eight) qualities is pronounced to be the final emancipation by some Jains, and by the teachers of the atheistic Sāṅkhya system. This would reduce the human Soul to the condition of an unqualified mass, a mere chaos of thought and feeling.
- (4) There is the cessation of deeds by mystic wisdom. This is the system of *Prabhākara* (Sar. darsh. Sañ., p. 184). The deeds mentioned are 'all rites and services whatsoever.' The devotee becomes in this case, so the Çaivite urges, like a mere image of clay or stone.
- (5) 'Mutti' is represented by some Çaiva sectaries as consisting in the removal from the Soul of all impurity, as a copper vessel is supposed to be cleansed from verdigris by the action of mercury. There is a good deal of abstruse reasoning about the pollution aforesaid. 'Copper is not really in this sense purified by the removal of the green stain on its surface; the innate weakness of the metal is in its constant liability to this defilement. Gold is never coated by such impure matter. Copper will always be so; it is, as it were, congenital. Now these sectarians preach that, by the grace of Çiva, the innate corruption of the Soul may be removed, from which will necessarily follow permanent release from all bonds.' This seems to resemble very closely the Christian idea of the sanctification of the souls of men by divine grace infused. The *Siddhānta*, however, insists upon it that for ever, even in the emancipated state, the power of defilement, the capacity of corruption, remains (*pāçam*, is eternal). The corruption cannot, it is true, operate any longer in the emancipated condition; but it is still there,—dead, unilluminated, the dark part of the Soul turned away from the central light, like the unilluminated part of the moon's orb. Personal identity

and the imperfections necessarily clinging to a nature eternally finite are not destroyed even in *Mutti*.

- (6) Another class of Çaiva sectaries taught that in emancipation the body itself is transformed, irradiated with Çivan's light, and rendered immortal. This system supposed that intimate union with Çiva transmuted rather than sanctified the Soul.
- (7) There is then the system of the *Vēdāntis*, who taught that the absolute union of the Soul with the Infinite Wisdom, its commingling with the Divine Spirit, as the air in a jar becomes one with the circumambient air when the jar is broken, was *Mutti*. But here personality is lost.
- (8) The doctrine of Pālkariyam (followers of *Bhāskara*) is, that in emancipation there is an absolute destruction of the human Soul, which is entirely absorbed in the supreme essence.
- (9) There were some Çaivites who taught that in emancipation the Soul acquires mystic miraculous powers; that, in fact, the emancipated one is so made partaker of the divine nature and attributes, that he is able to gain possession of and exercise miraculous powers, which are called the eight 'Siddhis.' Persons professing to wield such magical powers are not unfrequently found in India, and there is in them very often a bewildering mixture of enthusiasm and fraud.
- (10) There were also some who taught that in emancipation the Soul becomes, like a stone, insensible. This stationary, apathetic existence, if existence it can be called, is the refuge of the Soul from the sufferings and struggles of embodiment.

In opposition to all these faulty theories, the true doctrine of emancipation is thus defined: *When the Soul, finally set free from the influence of threefold defilement through the grace of Çiva, obtains divine wisdom, and so rises to live eternally in the conscious, full enjoyment of Çiva's presence, in conclusive bliss, this is EMANCIPATION, according to the Siddhānta philosophy.*

NOTE IV.

THE 'GURU.' (S. गुरु = venerable.)

The Guru plays a most important part in all Hindu religion. He is the 'venerable' preceptor, master, and embodied god. In the Çaiva

system His dignity culminates. He is one who in successive embodiments has drawn nearer and nearer to final deliverance (Mutti), and is now in His last stage of embodiment (Note V). Çiva lives in Him, looks lovingly on the meet disciple through His eyes, blesses with His hands, with His mouth whispers into the disciple's ear the mystic words of initiation, and crowns with the lotus flowers of His feet the bowed head of the postulant, who thus is to become as his master. (See *Tiruvāçagam*, IV, 95.)

The exact doctrine is set forth in the following ten sections of Chapter V in Umāpati's authoritative work 'The Fruits of Divine Grace' (தீருவருட்பயன்).

Each of these sections consists of a question, an answer with its commentary, and a summary. The answer is the master's teaching, and is a couplet of exquisite Tamil, in imitation of Tiruvalluvar. (See Pope's *Kurral*, Int., p. vii.)

Tiru-arul-payan, Chapter V. [Comp. Notes II-XV.]

The Form of GRACE.

This chapter speaks of *grace in the form of the Guru* (divine Teacher), who is mystic knowledge made manifest. This manifestation is the 'fruit of the GRACE' spoken of in the last chapter.

Q. 1.—Who is He that comes when twofold deeds are balanced?
[Çatti-Nibātham. See Note V.]

He who, taking His stand by the disciple in the time of ignorance and bondage, gives grace,—the King who departs not, made manifest by visible signs. (41.)

Com.—While man is in this state of ignorant bondage, the Divine Lord, the very centre of knowledge, appears in bodily shape as a Guru. Neither from before the eyes, nor from within the Soul, does this KING henceforth depart.

Sum.—Here we are told that divine grace assumes the form of a GURU.

Q. 2.—Is it essentially necessary that He Himself should come as Guru? Will not learned men suffice?

None know the disease that is within but those that are within.
Can the outer world too discern it? (42.)

Com.—In any house if one be diseased, those in the house will be aware of it, but the distant world knows it not ; so, if Çivan, who dwells within the Soul, come as a Guru, our disease shall be healed.

Sum.—This removes the doubt as to the necessity of Çivan's advent as a Guru.

Q. 3.—Can all recognise the Guru thus appearing ?

Who on this earth will be able to discern such a Dispenser of grace not ever given before ? (43.)

Com.—He performed the works of creation, preservation, destruction, and 'veiling' (NOTE XIII, Çatti) without any manifest appearance ; but now His work of grace is performed in a way not known before, while He wears a human form as a robe, and thus conceals Himself. This men know not.

Sum.—Men think of the Guru, who is Çivan Himself made manifest, as though He were a mere man like themselves.

Q. 4.—How is it that inferior souls know not the Guru ?

Souls that are immersed in falsehood and darkness cannot recognise these two things : the teachings of divine grace and the divine Teacher. (44.)

Com.—Those who live in the enjoyment of fleeting, worldly enjoyments, and whose understandings are veiled by the darkness of *Ānavam* [NOTE XV], cannot know the two great truths of the blessedness of mystic Wisdom and of the grace embodied in the Guru, by which it may be reached.

Sum.—This gives the reason for men's ignorance of the Guru.

Q. 5.—Is it necessary that He should have a divine form, visible to such as ourselves ?

The world does not discern that the bodily form of the Guru is but the cloak assumed to take souls, as beasts are taken by the exhibition of a shape like their own. (45.)

Com.—It is common in the world to ensnare beasts and birds by exhibiting their own shape as a lure. Here men would dread

any appearance manifestly divine ; and so grace clothes itself in a human dress, beneath which men fail to discern the divine.

Sum.—In this and the two preceding verses, the ignorance of men in not recognising the Guru is reproved.

Q. 6.—May we not consider any teacher as a manifested image of Çiva ?

What profit would thus accrue to us ? Though any one may know anything superficially, the true meaning of any teaching is known only from the Guru. Seek Him, and be free from doubt. (46.)

Com.—Whether you ordinarily rely upon a particular Guru or not signifies nothing ; seek Him who alone can interpret the truth. So only can you escape from Impurity and emerge into pure light.

Sum.—The real meaning of any scientific treatise cannot be understood without the assistance of the true teacher.

Q. 7.—Is it not enough that divine grace teaches you from within, is the core of your knowledge ? Is it necessary that He should also come as a Çuru ?

When snake-poison has entered the system, the mere presence of the 'Mangûs' (Ichneumon) will not expel it. A skilful physician is necessary to remove the poison. (47.)

Com.—The mystic art of the snake-charmer is necessary to cure one bitten by a poisonous serpent. Thus a Guru bearing Çivan's very image must look upon us with the eye of mystic Wisdom, and darkness will disappear, not otherwise.

Sum.—Here it is taught us that the Bond is only loosed by the divine Teacher.

Q. 8.—Is this gracious manifestation as a Teacher for the benefit of all, or of one class only ?

To those already become *akalar* He gives precious gifts of grace. He cancels deeds. To those still *çakalar* He gives His grace. (48.)

Com.—To the *Vīññāna-kalar* and to the *Piraḷaiyā-kalar*, who are freed from *Kalai* (sense-deception), He reveals Himself in their inner consciousness, and removes *Āṇavam*.* To others, in the form of a *Guru*, He comes and bestows grace.

Sum.—This shows why and for the sake of whom He puts on the vestment of humanity.

Q. 9.—Can salvation not be effected without the coming of the *Guru*?

Who can know unless the gracious Revealer of the wide extended way, the great *Knower*, shall appear? (49.)

Com.—Unless the *Lord*, possessed of the wisdom surpassing the six *ATTVĀ*,† and the *Revealer* of the way of release, shall come in the form of a *Guru*, who can know these things

Sum.—The knowledge of the really existent can only be given by the *Lord* possessed of perfect knowledge.

Q. 10.—Is it necessary that He should come in the form of another devotee? Is it not enough that He is within my sentient mind?

Mystic knowledge can visit us without His intervention when the crystal kindles fire without the sun. (50.)

Com.—The crystal may be faultless, but will not act as a burning glass in the absence of the sun; even so divine and mystic *Wisdom* enters not the mind, whatever knowledge it may possess, without the *Guru*, *Çivan's* grace made manifest.

Sum.—In this it is taught that religious knowledge has no excellence without the teaching of the *Guru*.

* For *Āṇavam* see NOTE XV.

† This word is an adaptation of S. *ADHVĀ*, and expresses the physiological elements of all being. The idea is obsolete.

NOTE V.

Çatti-ni-bātham (சத்தி-நிபாதம், शक्तिनिपात) =
 'Cessation of Energy.'

The souls of men are found here in a state of bondage called the 'combined state' (பந்தம்). The Çaiva Siddhānta system traces its passage into the 'free, emancipated state' (முத்தி). The eternal Soul was, by a gracious interposition of the Supreme, made subject to vanity, combined with material forms, and launched forth in a world of action, in order that, the effect of deeds (eternal *a parte ante*) being removed or cancelled, the Soul might at length be enlightened by special grace, and so become gradually disentangled and purified; the consummation of which is *Mutti* (Note III), or final emancipation, and mystic, ineffable, eternal union with Çivam.* In this second stage of embodiment, then, it is prepared for the third and final stage. The passage into this is the great crisis in the Soul's secular pilgrimage. The man is now no longer of the world, but a devotee (சீவன்முத்தன்), emancipate, yet in the flesh: one in whom a great work of grace is being wrought. The steps by which he has reached this threshold of a new existence are (1) his being awakened by the energy (Çatti) of Çiva, which is, in intention and in fact, entirely gracious; but as it arouses the Soul to painful conflicts in varied experiences of successive embodiments, it is spoken of as an energy of (divine) anger. (2) The second step was his coming under the power of *Māyā*, both pure and impure (matter or its underlying essence, and sense organisation), whereby he has obtained successive bodies, spheres of being, organs, and experiences. In these embodiments he has consumed the fruit of his works,—those which are actually his, and those which have been imputed to him and laid upon him by the Supreme Power (by an eternal fate). (3) The third step is, that the impurities in which from all eternity the Soul has been involved have thus 'ripened,' or their fruits have become mature. This is an idea which it is difficult for us to comprehend. It rests upon a figure. The Soul has to partake of the results of these deeds which are its eternally destined inheritance. This is compared to the eating of fruit; but these fruits can only be eaten when they are ripe, when the

* See Pope's *Nālaḍiyār*, xi, pp. 66-69

Soul has been placed in circumstances where their whole effect and deserts have been brought out and experienced.

The whole effect of any deed is slowly evolved and matured, and the Soul must encounter, from æon to æon, these mysterious powers which constitute its destiny, in all their developments and in their fullest maturity.

(4) And now, in the fulness of the time, as the fourth step, there comes a 'balancing of deeds.' The notion of this seems to be that there is a point in time when the sins and merits that cling to the Soul and are its fate, become equal, and balance one another, or are made equal by the grace of the Supreme. There are now gathered into one the three kinds of deeds, the eternal accumulation of fate, the assignment for expiation during the present birth, and those which will yet accrue before the consummation is gained. These threefold deeds are at once cancelled; and, freed from them, the Soul enters upon its last stage of embodied existence.

(See Pope's *Nālaḍiyār*, Chapter XI, pp. 66-69, KARMMA.)

(5) The energy of Çatti, which is commonly called 'the veiling' energy (*Tirōtham*), is now changed into a gracious energy of enlightenment and repose from physical perturbations; this is called Çiva-çatti-nipātham, or cessation of Çiva's 'veiling' energy. (See Note XIII on Çatti.)

(6) And now the Soul passes into another human form, of the purest and most orthodox Çaiṅva lineage, and is in the third and pure state. Its course and discipline therein must be considered in another place.

NOTE VI.

ÇITHAMBARAM: ITS LEGENDS, AND THE MYSTIC DANCE OF ÇIVA.

THE 'TEMPLE LEGEND.'—Among all the sacred places held in reverence by the Çaiṅvites, there is none that can vie with Çithambaram (Chellumbram). Its legends are published in what is entitled *The Kōyil Purāṅam*, where 'Kōyil' (meaning *temple* in general) is used *par excellence* of Çithambaram.

UMĀPATI.—This Purāṅam is attributed to Umāpati, Çivāçāriyar, the author of many great treatises (before mentioned in these Notes, II.-IV.), and whose date is one of the few of [which we seem to have some certain knowledge. In his statement and refutation of heresies, the date 1313 is given. He was the last of the Çaiṅva schoolmen, whose period is the thirteenth century, contemporaries of the great mediæval Christian

schoolmen. If then this work is his, the reputation of the shrine must have been very great from a very early period. The legends in this Purānam relate to a time long antecedent to that of any of the devotees whose stories are given in the Periya Purānam; and, in fact, belong to the very oldest period of South Indian legend. These myths relate especially to the Vyāghrapāda ('Saint Tiger-foot'), Pathañjali ('the Serpent Devotee'), the dance of Śiva, and the story of Hiranya-vanmā ('the Golden'). With these is combined a great quantity of details of miscellaneous mythology.

I. The history of *Vyāghrapāda*, whose image is very often found in close proximity to that of Śiva, is a very peculiar one, and seems to belong to the very earliest period of the establishment of the Brāhmanical system in the South. The name is found in the Rig Veda; so that these legends are simple inventions to account for the appellation, and to link on the Śaiva system to the Vedic times. There was on the sacred lands in the North, somewhere near the banks of the Ganges, a hermit, a Brāhman of the purest lineage and perfectly conversant with the Vedic rites, to whom a son was born endued with singular gifts and powers. The boy grew up in the wilderness under the tutelage of his father, and when he had learnt all that the father could teach him, the old hermit said to his son and disciple, 'What else can I do for thee?' The son replied, prostrating himself at his father's feet, 'Teach me what is the highest form of ascetic virtue.' The father replied that the worship of Śiva was the highest. 'And where,' inquired the son, 'can I best worship him?' The hermit replied, 'The whole universe is the presence of Para-brāhma' ('the Supreme Spirit'), 'yet there are places on earth where he especially manifests himself, even as the pervading Soul dwells and energises in a visible and circumscribed body. There are many myriads of such shrines, but of all of them Tillai* is the central sanctuary' (*Mūla-sthāna*), 'where Śivan will receive thy homage; for there is established the *lingam* which is light.† So the youthful ascetic went on his journey, after taking an affectionate leave of his mother, followed by his father's benediction. After a long journey southward over mountains, rivers, and plains, he arrived at a spot where he found a beautiful lake, covered with lotus-flowers (*Śiva-gaṅgā-tīrtham*), and a *lingam* established under the shade

* A name of Ćithambaram, which at that time was a vast wilderness, covered with (*excoecaria agallocha*) a tree called Tillai (perhaps S. TILAKA).

† At Ćithambaram is one of the principal *lingams*, generally enumerated as twelve. It is called the 'Air-lingam,' and is now invisible!

of a huge *banian* tree. Falling on his face, he worshipped ; and at once devoted himself to its service, crowning it with flowers, bathing it with water from a sacred pool hard by, and fulfilling all the usual observances. He then went onward a little distance towards the east, and there, under a fragrant tree on the borders of a beautiful tank, established for himself a second *lingam* as his own especial shrine, and built a hermitage of leaves and grass hard by. Thenceforward he divided his services between the two sacred spots, which are still revered in the neighbourhood of the great temple. And now, being alone, he found it difficult to accomplish his daily task according to his mind ; for he wished to gather not only flowers from the tanks, and from the fields, and from shrubs, but also, and chiefly, those that grew on the lofty trees, which were sweetest of odour and richest of hue ; yet, however early he went forth in the morning, before he had gathered the last of his flowers, the first had withered under the fierce sun's rays ; nor could he, while laboriously and slowly climbing the lofty trees in the early hours, see rightly to select perfect flowers. His flower-worship was therefore defective and unsatisfactory. In an ecstasy of passionate prayer, he besought the assistance of the god, who appeared in answer to his loving invocation, and promised him whatever boon he sought. The grace he asked was, that his feet and hands might become those of a tiger, armed with strong claws and furnished with eyes, so that he might rapidly climb the highest trees, and see clearly to select the fittest flowers for the divine worship. This boon was granted him, and so he takes his place among the great devotees of Çiva as the 'Tiger-footed' and 'Six-eyed,' and a part of the neighbourhood derives its name from this circumstance, and is called *Tiru-puli-ūr* ('Sacred Tiger-town').

II. Some time afterwards he was joined by another devotee, whose form is that of a serpent. The history of this mysterious personage is closely connected with the mystic dance of Çiva. This great leader of Çiva's hosts is a form of the *Āthi-cēshan*, or thousand-headed serpent, on which Viṣṇu slept on the ocean of milk through long periods. The wild story relates that Viṣṇu one day arose from his slumber and repaired to *Kailāçam*, there to worship the supreme Çiva, who told him that in the neighbouring forest of *Dēvataru* there were multitudes of heretical *Riṣhis* or devotees, dwelling with their wives in huts of leaves. These seem in some way to have been rebels against his authority ; in fact, a commentator calls them the followers of the *Mīmāñçai*, who, puffed up with pride of learning, regard themselves as independent of Çiva's authority. (The whole history points to some great conflict between *Vēdāntists* and

Çaivites in early days.) It was the intention of Çiva to visit this wilderness, in order to ascertain the state of the Rîṣhis there, and to teach them a lesson. He bade Viṣṇu accompany him in the form of a female, and the two—Çivan as a mendicant, with the usual insignia and the bowl for the collection of alms, attended by Viṣṇu *as his wife*—entered the jungle. It is in connection with this story that Çivan is called a 'deceiver.' (Compare Note I.) The history that follows is in many respects far from edifying, though the author defends it, and gives to everything an allegorical meaning. At first sight all the Rîṣhis' wives were seized with an unspeakable frenzy of passion for the false mendicant; while all the Rîṣhis themselves were equally infatuated by the false dame that followed him,—Viṣṇu in disguise. There was soon fierce wrath raging throughout the whole hermitage. The inhabitants of the wilderness speedily perceived that the mendicant and his wife, who possessed such a mysterious and irresistible power of attraction, were other than they seemed. They became ashamed of the ecstasies of evil desire into which they had been thrown, and gathering themselves together, the 10,000 Rîṣhis pronounced fierce imprecations upon the disguised gods, which their wives reiterated. But the gods were unharmed. They then dug a sacrificial pit and proceeded to offer sacrifices, whose object was to ensure the destruction of the strangers. Every Vêdic rite was observed, for were they not the most accomplished of ritualists? The result was that a fierce tiger was created in the sacrificial fire which rushed forth upon Çiva, who, smiling gently, seized it with his sacred hands, and with the nail of his little finger ripped off its skin, and wrapped it round himself as a soft silken garment. This accounts for Çiva's tiger-skin mantle (Note I.). Undiscouraged by failure, they renewed their offerings, from out of which came a monstrous serpent, which he seized and wreathed round his neck, where it ever hangs; and then began his mystic dance. And now came forth the last monster in the shape of a black dwarf, hideous and malignant, brandishing a club with eyes of fire. His name was *Muyalagan* (*the Club-bearer*). Upon him the god pressed the tip of his sacred foot, and broke the creature's back, so that he writhed on the ground; and thus, with his last foe prostrate, Çivan resumed the dance of which all the gods were witnesses, while his hosts sang wild choruses. The figure of the prostrate foe, writhing under the god's foot, is reproduced in every Çaiṅva shrine. The Rîṣhis, parched with the heat of their own sacrificial fires, and faint with the fury of their anger, and overwhelmed with the ineffable, mysterious velocity of the motion and the splendour of the heavens opening around them, fell to the ground as

dead, and then rising, worshipped the manifested god, acknowledging themselves His faithful devotees.

The very accomplished editor of the Purāṇam and commentator upon it, a zealous reviver in modern times of the Çaiva system, Ārru-muga-nāvalar, of Jaffna, gives his account of the meaning of this strange scene. It seems that the 10,000 Rīṣhis dwelling in the wilderness were adherents of the Purva Mīmāṅga school (founded by Jaimini), whom Çiva resolved to bring into his fold, and by the strange polemic detailed in the legend he accomplished his purpose. According to our editor, these Rīṣhis held seven erroneous doctrines: (1) they taught that the universe as it is is eternal; (2) that souls have no author or Lord; (3) that Çivan and all the gods are not eternal; (4) that the Vēdam alone is eternal; (5) that the words of the Vēdam are the only divinities; (6) that those words reveal no other divine beings than themselves; (7) that by performance of the sacrifices prescribed in the Vēdam, and by close adherence to the Karma-kāṇḍam (the ceremonial part), all blessings here and hereafter can be obtained. These Rīṣhis, who were consummate masters of the Vēdic ritual, considered themselves independent of all deities, showed neither love nor devotion to Çiva, and taught the same absolute reliance upon rites and ceremonies to their wives also. To convince them (both the Rīṣhis and their spouses) of their moral weakness and of the limited power of their most orthodox sacrifices, Çivan now appeared as the Bhiḡshātana-Mūrṭti (*Mendicant Deity*), with Viṣṇu as the goddess of Illusion, in order to bring them to his feet. They were thus forced to recognise their dependence upon Çivan, and to acknowledge that by His grace alone they could obtain remission of sin and merit. They acknowledged that 'the virtue of them who love not Çivan's foot is sin.' The legend teaches that He subdues and wraps round Him as a girdle the tiger-like fury of human passion. The guile and malice of mankind He wears as His necklace, and beneath His feet is for ever crushed the monster of human depravity.

Of course, recognising the spirit of this teaching, it may be allowed us to doubt whether such explanations would ever have been dreamt of but for Christian teaching, and whether myths like these are the appropriate means for imparting this instruction. The fact is that we have here the pre-Aryan divinity, half god, half demon, coming forth from the burning ground where he holds his midnight orgies, dancing in the midst of his rabble rout. The commentator adds that since Çiva himself and his disguised companion, though they excited evil desires in the poor Rīṣhis and their wives, yet felt none themselves, and since no sin was com-

mitted, there is no room for condemnation of the story as a specimen of divine action.*

* The composite character of what may be called the Çaiṅva religion is very marked; it has borrowed much from diverse sources, and is accordingly full of inconsistencies, sometimes speaking the language of absolute pantheism, and then again seeming to grasp most firmly the idea of a personal divinity, who is at once the Creator, the Preserver, and the Destroyer of all things. The original idea of Çiva is found in the Vēdas, but the name is simply a euphemism meaning 'propitious' or 'gracious.' Another name seldom found is Çarva, 'the Destroyer.' It seems most probable that with the idea of Rudra, the god of the Storm, and Agni, the god of Fire, is mixed up the notion of an aboriginal demon such as are still worshipped in the south of India. In the hymns to Çiva the most incongruous epithets are applied and actions ascribed to him. At one time, we see Çiva in Kailāṣa, the Silver Mountain (Note X), surrounded by all the gods in awful state, supreme ruler of all the worlds; at another time he is represented as wandering in the jungle or from village to village, smeared with ashes from the burning ground, a horrible and disgusting object. So he was reviled by Dakṣha. He is at once an awful deity, a frolicsome and mischievous man with superhuman powers, and a ferocious demon; and so his Çatti, or spouse, who is worshipped under a vast variety of names throughout all India, is sometimes the gracious and beautiful mother and sometimes the fearful and malignant DŪRGĀ. There is good reason to suppose that the worship of this malignant demoness may have been an original cult of the pre-Āryan races of India. In this way every species of inconsistency is to be found in the hymns which are sung in honour of Çiva and his spouse. Wherever two views have been held with regard to God, the Çaiṅva system asserts them both without the least attempt to reconcile them or qualify them, indicating thereby the deep feeling of which many illustrations will be found in the translations of Çaiṅva poetry, that the thought of God so transcends human intellect that all statements regarding Him contain some truth, and none are adequate, so that all may be alike affirmed and denied. There is no doubt that the Çaiṅvites of the South learnt the necessity of a visible divine Guru, an incarnate Teacher, first of all from Buddhism. The most elaborate arguments are to be found directed to the establishment of the proposition that man can only receive divine teaching from one who is both God and man. This is perhaps the most prominent doctrine of Çaiṅvism: *The true GURU is an incarnation of Çiva.* (Note IV.) Another tenet that the Çaiṅvites alone among Indian sects maintain is the conscious immortality of the souls of the faithful. Ten different theories of the heavenly state are recounted in the Çiva-pragaçam, of which the last is the authorised teaching of the Çaiṅva Siddhānta philosophy. The soul in *Mukti*, or the state of release, retains its individual consciousness, remains for evermore a separate existence, sharing the blessedness and wisdom of the Supreme, but unmingled with His essence. In fact, the doctrine held by the Çaiṅvites on this head is hardly to be distinguished from Christian doctrine. (Note III.)

The prayers and hymns addressed to Çiva contemplate him in every aspect, and are accordingly exceedingly inconsistent, mingling the most puerile conceptions with those that are in the highest degree exalted. Again, the controversies of the Çaiṅvites with Jains and Buddhists in the South have led to a very elaborate system of mystic interpretation. Whatever Çiva does or says has some mystic meaning; such meaning being sometimes exceedingly edifying and elevated, but appearing very often to be forced and unnatural. One is tempted to say that the myths often obscure and even neutralise the truths which they are supposed to symbolise. The Çaiṅvites are now divided into several sects, which agree in scarcely anything but the assertion of the supremacy of Çiva.

The goddess Pārvathi now descended upon the white bull ; and Çivan joining her, they departed in triumph to *Kailāçam*.

Viṣṇu was thus left alone with Āthi-çēṣhan. Both of them are overwhelmed with the glory of Çivan's mystic dance ; and especially Athi-çēṣhan is possessed by the one desire to behold it again. Seeing this pious aspiration, Viṣṇu tells him that he will release him from further service, his place as servitor (couch and canopy) being occupied by his son, and exhorts him to resort to the northern hill of *Kailāçam*, there by a life of asceticism to obtain the favour from Çivan of this beatific vision. So the new serpent-devotee wends his way upward and northward, while his mighty head, with its thousand crests, each bearing a jewel, diffuses a radiance around him that makes the sun look dim, yet he is prepared to lay aside these splendours and seek only to become the least of Çiva's devotees. After a while Çivan himself, assuming the form of *Brahmā* and riding upon a swan, the usual vehicle of that god, drew near to test the sincerity of the neophyte, who had now plunged into all the austerities of the *Yōga* system. The disguised god represents to Āthi-çēṣhan that he has already done enough to merit for himself all the delights of *Paradise* and all the divine powers of the most exalted of the heavenly beings, and offers to him any boon that he may desire. But the reply is, 'I desire not the blessedness of any separate heaven, nor the miraculous powers of *Siddhi* ; all that I desire is to see for ever the mystic dance of the god of gods.' (Compare *Song* 34 ; 28.) The pretended *Brahmā* argues with him, ridicules him, and urges him to relinquish his pursuit, but he finally replies : 'Here I abide, and if now unsuccessful I die without the beatific sight ; I shall pass into other forms, and finally see that which I desire.' Recognising his immovable fidelity, Çivan assumes his proper form, and, riding with Pārvathi on the milk-white bull, draws nigh and lays his hand in benediction upon his servant's head.

He then proceeds to instruct the new disciple, for such Āthi-çēṣhan now becomes. The teachings of the god who here assumes the character of a *guru* go back to the origin of all things (*Note IV.*). The universe has sprung into apparent existence from primeval *Māyā*, as the result of *Karma* and for the sake of 'souls,' that it may be the scene of embodiments and of action good and evil. As an earthen vessel has the potter as its *first cause*, the clay as its *material cause*, and as its *instrumental cause* the potter's staff and wheel, so the universe has *Māyā* for its material cause, the Çatti of Çiva for its instrumental cause, and the Lord Çiva himself as its first cause. We must note here, however, that *Māyā*,

according to the Çaiṅva system, is really 'matter,' something very different from the 'Illusion' of the Vēdānta system. And now Çivan has two forms or bodies, the one which has parts and is visible, the other which is without parts, invisible and transcendent. (*Sa-Kaḷa* and *Nish-Kaḷa*.)

Beyond these mystic bodies is his own natural form, which infinitely transcends them. It is his essential form of wisdom, which is mere light and splendour. He is thus the supremely blessed soul of all things, and the five acts of destruction, preservation, creation, embodiment, and gracious release (Note J) are his ceaseless mystic dance. Of this dance the sacred Vēdas know the excellence, but are not cognizant of its cause, its time, its place, its full intention. In the forest of Taruvanam, in the midst of the Rīṣhis, the gods beheld it ; but, because that is not the world's centre, it trembled beneath his foot. In sacred Tillai, which is the exact centre of the universe, shall this dance be finally revealed, and there the god promises to Āthi-çēṣhan that he shall again behold it.

'Meanwhile,' adds the manifested Çiva, 'that thou mayest make thy way to Çithambaram, it is necessary to put off thy form of Āthi-çēṣhan, for the inhabitants of earth would be affrighted by thy thousand heads, and gleaming eyes, and expanded crest. Thou shalt be born, or seem to be born, of mortal parents, retaining in part thy serpent form. Then descending into the world of dragons, thou shalt make thy way to where a hill is seen, and a cave, entering by the southern gate of which thou shalt emerge into the groves of Tillai. There is the original *lingam*, and near to that is the shrine which shall be the scene of my manifestation. There, too, thou shalt find my servant the "Tiger-foot," who is performing penance there. Dwell as his companion in the hermitage, and to you both shall in due time be accorded the vision for which you are longing. Accordingly Āthi-çēṣhan, who has now become a devotee, part man and part serpent, under the name of Patañjali,* meets with the Tiger-foot, makes for himself a hermitage, and plants a *lingam*, where he performs his daily worship. The living creatures in the wilderness at first were sore affrighted : 'We first saw the man with a tiger's feet, and now we see another, half dragon and half man,' said they, and fled ; but by-and-by, accustomed to the sight, they roamed around the hermitages in perfect amity.

The next book of the Purānam expatiates at great length upon the first institution, as it would seem, of the great festival still observed when Çivan is supposed to dance in the Golden Hall.

* A word of doubtful origin. PATA = 'falling,' and AÑJALI = 'reverential clasping of hands.'

NOTE VII.

ON THE IDEA OF BHAKTI (பக்தி).

Compare Pope's *Kurral*, Int., p. vi.

The songs of the Āiava saints express a devotion, humility, and love of unspeakable fervour. We are reminded of the Psalmist's language (Ps. cxviii, 1), 'I will love Thee, O Lord my strength.'

This spirit of personal devotion is not found (as Professor H. H. Wilson has taught us) in the Vēdas. In fact, it seems to be something pertaining to the Semitic religion especially, and it possibly came into India from the extreme South, where Christian teaching existed from the earliest centuries of the Christian era. Chaitanya (A.D. 1434) is generally regarded as the great introducer of this idea of Bhakti; but as he lived in the fifteenth century, and Māṇikka Vāṇagar cannot have lived at a later period than the ninth, it is rather to him that we are to attribute its introduction.

Bhakti, or piety, is the main idea of the Āiava system, and the fervent love and worship of Āiava is represented as including all religion, and as transcending all religious observances; and, since all are capable of this, men of all castes can be received as devotees and saints in the Āiava system.

NOTE VIII.

MĀNIKKA VĀṆAGAR'S DISPUTATION WITH THE BUDDHISTS
IN ĀITHAMBARAM.

It seems desirable to give a somewhat fuller translation of the sixth canto of the Vātha-ūrār-Purānam, entitled 'The Victory over the Buddhists in Disputation.' The story tells how Māṇikka Vāṇagar was summoned from his retreat to confront the Buddhist teachers who had come over to Āithambaram with the king of Ceylon. The day of disputation arrived. The conference was held in the hall where the Buddhists were lodged. We are told that the saint with the 3,000 resident devotees repaired to the temple, performed their devout worship, implored the grace of Āiava, and then gathered in the hall of conference. A veil was put over the saint's face that he might not even behold the ill-omened countenances of the heretics! He was then seated on a royal throne, while around and behind him were the faithful Brāhmins and devotees of every class, who had thronged in from all the country round.

Amongst them the Çōra king took his seat upon a gorgeous throne, after he had duly paid homage at the sacred feet of the saint. On the other side entered the Ceylon king, who was received by the Çōra with the utmost condescension. His tributary presents were accepted with many complimentary speeches, and he was invited to occupy a seat near that of the Çōra himself.

The Buddhist guru with his disciples sat opposite, and towering around (presumably invisible as yet) were all the gods and blessed ones from all the worlds. Even the divinities of the Sun and Moon were in presence there. The salutation of the Çōra king to the saint at the opening of the conference was ominous : 'It is thine, O saint of sacred Perunturrai, to establish the truth of the Çaiṅva wisdom. Afterwards it shall be my care to extirpate these Buddhists !' It is said that these words of the king were heard by the Ceylon champions with dismay and by the orthodox champions with delight. Thus encouraged, the saint opened the conference with no very saintly words : 'O Buddhan, who dost utter words of guile, wherefore art thou come ?' The foreign guru replied in no conciliatory strain : 'I am come to tell this town that there is no god but Him whose enduring worship we perform, and to place in sight of all men, in the very Golden Hall itself, the image of our god Buddha. This is all I seek.' The saint, with withering smile, replied : 'O thou who hast performed no austerities in any former birth, can a hare become an elephant ? But tell me who is this good and mighty god of yours. And how shall souls approach his feet ?' The topics then were 'God and the way of salvation.' The foreign guru replied in wrath, 'Can one show the sun's rays to the blind ? Were I to tell of Buddha's greatness, I should require many thousand tongues. But our god has revealed to us the good law of the *piḍagam*,* in which virtue is proclaimed. In love He has been born in many shapes. He has given assurance to millions of souls, and, free from the fourfold evils of murder, theft, falsehood, and intemperance,† He sits in majesty under an *arasu*‡ tree. The 'trouble of birth' is coming into existence, and the ceasing of the multiform cognizance of many things arising from assembling and combination in the womb of the 'Five *Kandas*,' which are *form* (*rūpa*),

* The Tri-pitaka (Tipitaka, in Tamil Piḍagam), 'three baskets,' are three collections regarded as canonical scriptures by the southern Buddhists. The second of these treats of ethics, and seems to be especially indicated here.

† The prohibitions of Buddhism are five. Here adultery is omitted.

‡ This is the *Ficus religiosa*, or poplar-leaved fig-tree. In S. it is called Bodhi, or 'perfect wisdom,' because under it Buddha was perfected. Other names are Aḡvattha and Pippala (Peepul).

sentience (vedanā), *sign* (kurrippu ; saññā), *representation* (bhāvanai ; (sanskāra), and consciousness or *clear apprehension* (viññānam). And the utter perishing of these is deliverance (*mōksham*).' This exposition of the Buddhist creed in regard to God, the universe, and salvation, requires no doubt much elucidation, and many volumes have been written about it in East and West. A summary of it is given in the 'Sarva-Darṣana-Saṅgraha,'* though I am not sure that much light is thrown upon it in that work. In Dr. Barth's work on 'The Religious Systems of India'† fuller information is given, and the authorities there referred to afford the student an opportunity to acquire a knowledge of almost all that has been said and thought on the subject. Here our one object is to show how the native mind in South India apprehended the system. Many of the details of this disputation are doubtless not to be relied on, but they show us what the traditional belief is, and explain why Buddhism lost its hold. For indeed, though Buddhists existed for some centuries afterwards in the South, they never recovered the blow inflicted upon them by the events of which we are trying to gather up the current traditions. To return to our disputants. The saint smiled in derision, and looking into the blameless face of the Çōra king, said, 'What can I reply to this Buddhist, who in unconscious frenzy utters such words as these?' He then replied to the foreign heretic: 'Thou hast told us that knowledge appears and in an instant of time disappears; all is in a ceaseless flux. If so, before thou didst finish uttering forth thy words and meanings, since thine understanding must have passed away, what revelation of truth and virtue can there be? (*Since all apprehension is transient and momentary, there can be no real knower, or knowledge, or thing known.*) Thus there can be in thy system neither code of laws nor revelation of truth and virtue. Again, thou tellest us that thy Buddha thy God, was born in many successive shapes. How then can one who himself is subject to delusion and evil deliver others from these? You say, your Lord was guiltless of murder; but if he assumed all possible forms on this earth, as you say, then as a ravening tiger or as a jackal, when he was hungry was it grass that he ate, and tender shoots of trees? In thy false creed thou tellest us of Five Kandas; and that when these pass away the soul-body perishes; and that when form, etc., cease, the soul-body is no more. If so, where is thy king, and how could he survive and appear as saviour of many men? (*This idealism destroys law-giver and deliverer alike.*)

'Again, since the embodied form, together with its cause (the soul and

* Trübner's Oriental Series.

† Trübner's Oriental Series.

its deeds), perishes, your king, who sits under the *arasu* tree, is formless, is non-existent. So annihilation is your salvation. The destruction of the 'Five Kandas' is deliverance!

'Yet again, you speak of twenty-one Buddhas, who existed before' (twenty-four are generally given); 'and you say that each of these in being born occasioned the death of his mother. Are such beings gods, and not rather worthy of hell?' (The reference here is not clear.)

The next objection to the Buddhistic system is that it makes no distinction between organized living creatures, their life or soul being merely the temporary and delusive product of the same organization. 'You also say that the only difference between living creatures (*souls, lives, breaths*) is that they are formed of different mixtures of the same four elements; yet in the night season, when thou wert asleep, if a serpent climbed over thy face, thou wouldst discern a difference, O silly reasoner. Thou hast denied the existence of any knowledge of spirit (soul, life) beyond the form. When the form then has perished, how can the life reappear under other forms? What and where is the *Ātman*, the *self*? What is it that exists (the *ἰπóστρατις*) when the form identical with the soul has perished?*' You deny also the existence of the 'Fifth Element,' the ether, through which sounds are transmitted; and you say there are no spaces not filled with air, water, fire, and earth. In what medium then do your four elements combine to form living beings? Where then is your Buddha (who, having gained *Nirvāṇa*, must be freed from all elemental combinations), in his northern dwelling under the shade of the *arasu* tree? You deny also that trees have souls; and yet they grow,† and put forth leaves by imbibing water, and become finally dry wood and leaves! In them souls of men can obtain suitable organisms for expiation of their deeds. You say that to kill anything is a great crime, and yet you allow the eating of the flesh of animals which others have slain. Surely if they kill for your sake, you are guilty of the murder which you cause.' (See *Manu* v. 51.) It seems strange that this accusation should apparently be true. The same thing is referred to in the *Kurraḷ* (256), and it was the source of a good deal of controversy between the Jains and the Buddhists; the Buddhists refusing to kill, but not refusing to eat the flesh of the slain, while the more consistent Jains would neither slay nor eat.

* See Oldenberg, 'Buddha,' Hoey's translation, p. 29, etc. (Williams and Norgate, 1882), and p. 243. What appears to man to be his body is in truth 'the action of his past state, which then, assuming a form realized through his endeavour, has become endowed with a tangible existence.'

† Sir M. Monier-Williams, 'Buddhism,' p. 110. Prof. Rhys Davids on Buddhism, and the Bishop of Colombo's work on the same subject are indispensable.

'Again, *while the cause continues to exist, the effect perishes.* This is the doctrine of our Āgamas. But with you it seems that the soul's perishing with the body is its salvation. Your creed is that when the 'Five Kandas' perish the soul is released. Tell me where and what is the released soul, whose only existence was in the momentary and fluctuating existence of the 'Five Kandas.' Surely form and existence and deliverance perish together!' Here the Buddhist guru, beside himself with rage, interposed: 'Thou sayest that we possess neither god nor salvation. What then is your god, and what is your salvation?' To this Māṅikka Vācaṅgar replied, 'Our god, seated in the shade of the beautiful banyan tree, taught the laws of right; and many have beheld His beauty as He performed the mystic dance. His adornment is the sacred ashes. *Umai* is the half of His form. He is full of grace; who can worthily proclaim our god? In Tillai's beautiful Golden Hall, He dwells, wearing as a jewel the crescent moon. Is there any end to the story of His greatness?' Here the Buddhist interposed, as indeed seems quite natural, with the inquiry: 'Whither tends all this verbiage? Answer me plainly these questions: Your god, as He sits beneath the shade of the banyan, has a rosary and repeats His prayers. Is it because He strives to think of some other gracious deity beyond Himself to whom He prays? You tell me He dances in Tillai. Does one dance for the edification of a select company of the wise, or to gratify one's own phantasy? Again, "our god wears ashes on His sacred body," you say, with proud complacency. Is it because even white ashes look pure upon His dark red skin? Then you tell me that half His form is woman! Who has never heard of half a woman in the world? And if *Umai* even thus shares His being, it is indeed to be wondered at that your hermits leave wife and home to dwell quite alone in the wilderness!' But the mocking, cynical laugh of the Buddhist company was too much for the Ṣaiva champion, who scornfully interposed, 'Thou art unworthy to listen to high mysteries, the knowledge of which constitutes the blessedness of these assembled devotees. None can know these things who have not first performed penitential acts to which thou art a stranger. Yet know thou that our god carries the prayer-rosary in order that all His saints may from His example learn to pray and mortify themselves. The rosary is like the weapon in the Master's hand, with which, Himself unassailable, He is teaching His neophytes to make war. Thou sayest that our god dances as dance the wanton ones of earth, that eyes of flesh may see Him. Nay, but as the fire runs through the fuel uncontaminated, so doth our god pervade all souls and all bodies with His mystic energies:

He dances in the universe and in the soul. You ask about the sacred ashes. He wears them to assuage the sorrows of all souls. This act of His is like the nursing mother's taking medicines herself to heal the maladies of her tender infant. And thou askest why Çivan shares Umā's form. The answer is that to give mystic wisdom to His worshippers He assumes this mystic twofold form. Çivan the supreme, who rides upon the mighty bull, commingles with the souls of men like the fragrance* in the flowers ; but this thou knowest not. He is the First ; He is the Yōgi ; He is the Enjoyer ; He is the Forniless ; He is the Splendour ; He is the Being of many forms ; He is the Sea of delight. Who knows His crown, who knows the sole of His foot, save that He fills the Golden Hall where virtue rules, and sorrow is not ?' This closes the controversy, but the sequel as given in the legend is stranger still.

When we sum up this controversy it seems as though strict logic had no place in it, and the result is made to depend upon the double miracle, the infliction of dumbness upon the Buddhist disputants and the restoration of speech to the daughter of the Ceylon king. Each party has expounded his tenets and reviled those of his opponent ; but the only thing that looks like real reasoning is Mānikka Vācagar's treatment of the Buddhist idea of the *Kandas*. It has been too much the custom in India to hide poverty of thought under a multitude of high-sounding words, and to regard an explanation that is not absolutely absurd as a proof. The *Kandas*, or aggregates, represent no facts or realities, but imaginary states or conditions of finite existence, and, according to the popular view of the case, the whole theory means this : there is an unreal something, not embodied, not permanent, indeed not really existent, to which clings the responsibility of certain deeds, how done, or by whom, or when, is entirely uncertain ; and this shadow of being must have an opportunity of expiating or working out the results of these deeds, and therefore this Ego, without fixed principle, or substratum of existence, or soul, or body, obtains in this world an embodiment. Of this the first element is (1) *form* ; the second is (2) *sensation* ; the third is (name or) (3) *sign* (or characteristic qualities) ; the next is the (4) *deeds* which determine the faculties and dispositions of the mind ; the last is (5) *individual consciousness*. These elements combine, arrange, and rearrange them-

* *Kandam* in Tamil (S. *gandha*) means also fragrance. Sweet odours are reckoned to be five, the *pañcha-Kandham*. It seems that there is an allusion to this here. The five *Kanda* (Pali for Sanskrit *SKANDHA*) would be unintelligible to Tamil people, and the general idea among the vulgar was that the Buddhists taught that the universe was formed from combinations of odours ! Compare *Sarva-darçana-saṅgraha*, ch. ii, p. 22, *Kēchana Bauddhā*, etc.

selves, suffering infinite modifications, till death dissolves the bond. If Nirvaṇa has not been obtained, and so another metempsychosis is necessary, what survives,—the deeds without the doer,—instantaneously receives another embodiment, and so on until at length the deeds have been atoned for, and, as it necessarily follows, the shadow of being is annihilated, and, as the whole universe is compounded of the same *Kandas*, it follows that there is in reality no god, no soul, and of course no immortality, nothing in fact but appearance and sensation. As presented in Tamil writings, the whole system seems fragmentary.

Mānikka Vāṇagar presses this upon his opponent, who has nothing to say in defence or explanation, but reviles the Ṣaiva mythology, the origin of which he finds in the Vēdas themselves. Here the Buddhist seems to have had surer ground to tread upon, and the only reply that was possible to Mānikka Vāṇagar was to explain away everything as allegorical and mystical. These explanations are poetical, but very far-fetched, and historically find no sanction in the original myth. They are ingenious, but adapted only to the comprehension of a refined and select body of the initiated: to the world the system is one of puerile idolatries and superstitions. Such was the Buddhist's idea. It will be noted that each party claimed for its master the attribute of 'Revealer of Virtue.' Buddha under the *bōdhi* tree, and Ṣivan under the banyan tree, both taught the ancient law of right, and on this matter no controversy arose. The Tamilians are right in declaring that the morality of Buddhism is essentially that of the Upanishads except in the matter of forbidding sacrifice; and in regard to the last point the fact that the Buddhist sanctioned the eating of the flesh of animals, though he himself would not slay them, overbalanced in the mind of the Ṣaivites all the ethic excellence of their system (Kurral., ch. 33). It will be apparent that the victory of the sage was a victory of sentiment and of authority, but not any way of logic or learning.

NOTE IX.

'THE TIRU-VĀṢAGAM.'

In considering the poetry of Tiru Mānikka Vāṇagar the Tamil student must feel its superiority to all the vast collections of the Dēvāram, although the authors of some of these enjoy perhaps a wider popularity among the Tamil people. Versions can of course give nothing but the very faintest idea of the earnestness and grace of the sage's hymns. They

cannot be rendered into simple prose without entirely misrepresenting them, and to put them rigidly into metre would involve a sacrifice of exactness in the rendering. In a translation I hope to publish they are given line for line, and almost word for word, in language answering, as nearly as I knew how to shape it, to the tone and manner of the Tamil originals. I find this the way in which I can produce the most literal version. It is quite certain that the influence of these poems in South India is like that of the Psalms among Christians, and that they have touched for generations the hearts of the vast majority of the Tamil-speaking people. There is in them a strange combination of lofty feeling and spirituality with what we must pronounce to be the grossest idolatry. And this leads to the thought that in the Çaiṅva system of to-day two things that would appear to be mutually destructive are found to flourish together and even to strengthen one another. The more philosophical and refined the Çaiṅvite becomes, the more enthusiastic does he often appear to be in the performance of the incongruous rites of the popular worship. In general Çaiṅvites pay peculiar adoration to two distinct idols, leaving out of question Gaṅṅeça and Suppiramaṅya, the so-called sons of Çiva. These two symbols are first the 'lingam' with the 'lingi,' and secondly the image of Çiva accompanied with Umā, whose form is generally combined into one with his. These really represent one idea, Çivan and Çatti, the god and the energy that is inseparable from him, which combine to create, sustain, and destroy the phenomenal universe. (Note XIII.)

It is sometimes thought and said that the idols in these temples are mere signs, representing as symbols the Divine Being and some of his works and attributes. This is not altogether an adequate statement of the case. Each image by a peculiar service which is called *Āvāganam* (S. *ĀVĀHANAM* = 'bringing unto') becomes the permanent abode of an indwelling deity, and is itself divine. The worshippers, as will be seen in our legends, seem to believe that the images of the god consume the food presented to them, and are strengthened and refreshed by it. The images are treated and spoken of as living and sentient beings. They are seen to smile, to lift up hands to bless, to move from place to place, and to issue audible commands. Devout and enthusiastic worshippers amid the glare of the lamps and the smoke of the incense seem to be carried away so as to entirely identify the invisible object of their thoughts with that which is presented before their eyes. It was certainly so with our poet. If it is remembered that some of these images have been worshipped, tended, garlanded, and treated as human beings, for a thousand years; that each

generation has done them service and lavished gifts upon them ; that they are connected by association with long lines of saints and sages ; and that it is believed that Çivan's method of gracious manifestation is by, and through, and in these, as what we should call sacraments of his perpetual presence, we shall understand with what profound awe and enthusiastic affection even images, to us most unsightly can be held by multitudes of good and excellent people.

NOTE X.

'ÇIVAN ENTHRONED ON THE SILVER MOUNTAIN.'

'Çivan sat upon his throne, and on his left side was with him his gracious energy, the world's mother, the goddess Pārvathi. He is from eternity free from all impurity, the Everlasting, the All-Pervader, possessed of all wisdom, all pre-eminence, and all spontaneous grace. Through his infinite compassion towards souls, for which they can render him no return, he ever performs, without performance, the acts of creation, protection, destruction, veiling and dispensing grace. He is the first and only god, having one sacred face and three eyes, which are the glowing splendours of the sun, the moon, and the god of fire. His crest of matted hair (சூல, S. Jaṭā) is crowned with the Ganges, the crescent moon, and the *kondrai* (*cassia*) garland. His sacred ears are adorned with earrings of conch-shell and flower-petals (சேரல்). His throat is black with the poison churned out from the milky sea. (See notes to Lyric XII.) His sacred hands grasp, one the antelope, and one the axe ; one gives the sign of safety, and the fourth assurance of gifts of grace. His body, ruddy like coral, is besmeared with sacred ashes. His breast is adorned with the white investing thread and necklaces consisting of the bones of innumerable Brahmās and Viṣṇus and the skulls of Brahmās of innumerable æons. He has girt himself with the tiger's skin (Note VI.). His waist is resplendent with dagger and girdle. His feet, like red lotus-flowers, tinkle with the heroic anklets and sounding bells. Such is the body that he wears as Çrī-Kaṇṭhar (*He of the auspicious throat*). He sits on the silver hill of *Kailācam*, whose innumerable white peaks are adorned with divers jewels. There in a shrine of ruddy gold he gleams, while his crowding hosts make music with innumerable instruments. Many on either side wave the white Çāmaram (the white tail of the Yāk, or *Bos grunniens*), and many others wave flower-

twined fans. The heavenly musicians and choristers of every degree sing in sweet harmony. The leaders of his hosts, their frames dissolved in ecstasy like wax in fire, their quivering bodies thrilled in every part with joy, while rapture fills them as the torrent from the open sluice, plunging into the very gulf of delight, were dancing and singing before his face. The ascetics, hands clasped above their heads, were reciting the Upanishads which are the heads of the Vēdas. Brahmā, Viṣṇu, and Indra with the other gods stood afar off, kept back by the wand of sacred Nandi, and, with hands upon their mouths, humbly made known their wants to him who sat upon the throne.'

I have translated this literally from the introduction to the *Periya Purānam* in order to show the mythological conception entertained by the Çaivas of the object of their worship. Nothing can be nobler and more spiritual than the accounts found in many of their writings of PATI (the Lord); but mingled with everything are the incongruous conceptions a few of which are here shadowed forth. In such descriptions every legend is introduced, every form in which the god is anywhere worshipped is brought in, and the result often to our minds is inexpressibly grotesque. Yet for every particular an explanation is offered, mystic meanings are given, and the whole is resolved into a series of allegories which are supposed to teach the gracious operations of Çiva, the Lord of all. In reading these legends it is necessary to keep always in memory this twofold character of the religious system of South India. Gross and ridiculous representations (so they strike the foreigner) are found in juxtaposition with refined, pathetic, devout, and even sublime expressions. This is peculiarly the case in the lyrics of the profound enthusiast Mānikka Vāçagar.

NOTE XI.

THE Çaiva Siddhānta SYSTEM OF PHILOSOPHY AND RELIGION IN SOUTH INDIA.

The Çaiva Siddhānta system is the most elaborate, influential, and intrinsically valuable of all the religions of India. It is peculiarly the South Indian and Tamil religion, and must be studied by every one who hopes to understand and influence the great South Indian peoples. The *Vaiṣṇava* sect has also many influential followers in the Tamil lands, but these are chiefly immigrants from the North. Çaivism is the old prehistoric religion of South India, essentially existing from pre-Aryan times, and sways the hearts of the Tamil people. But this great

attempt to solve the problems of God, the soul, humanity, nature, evil, suffering, and the unseen world, has never been fully expounded in English. Its text-books (probably its sources) exist in Tamil only, and in high Tamil, in verse, which is often made of set purpose obscure and difficult. Classical Tamil is very little studied, yet this key alone can unlock the hearts of probably ten millions of the most intelligent and progressive of the Hindu races.

In a period quite antecedent to all historic data, the native Dravidian religion was a kind of Çaivism. It had peculiar forms of sacrifice, ecstatic religious dances, rites of demon worship, and other ceremonies which still exist among the villagers of the extreme South,* and more or less among the rural population everywhere. In process of time northern—Āryan, Vēdic, Brahmanical—influences were brought to bear upon these original forms of worship, and those who introduced the Vēdic religion into the South found a place for the superstitions of the aborigines in their own system. The inhabitants of South India adopted to a great extent the social institutions, the myths, and forms of worship of the Āryan settlers. In the Vēdas Çivan is not named, but the god Rudra, the god of storms and tempests, seems to have been the type of a divinity most in unison with the ideas of the inhabitants of the South, who probably came originally from Central Asia, and brought with them their Scythian divinity, who was cruel, and was worshipped with rude and cruel ceremonies. Rudra-Çivan became therefore the type of the divinity, as the destroyer. In process of time Buddhism and the Jain system found their way into the South, propagated by zealous and able men, and thus undoubtedly a softer and more genial character was imparted to the whole of South India. Meanwhile on the eastern coast Christianity was introduced by the Nestorians, and spread abroad very rapidly, becoming widely known and exerting great influence even where it did not make converts. It is undoubtedly the fact that these Christian influences pervaded the whole South. Muhammadanism also in various directions entered the Tamil land, and exerted great influence over the thinkers in those regions. Thus the elements out of which the present and finished Çaivism of the South has been evolved are numerous and diverse. It must also be noticed that since the twelfth century the *Vaiṣṇava* system has been a formidable rival of Çaivism, and the rivalry has tended to develop and systematize the dogmatic parts of the system most decidedly. We have now to do with the historic beginnings of South Indian Çaivism. A sage from the North, whose name was *Kumārila Bhaṭṭa*, in the eighth

* See *Nāḷadi*, 16.

century came from Behar and taught the existence of a personal deity in opposition to the Buddhists. His disciple was the very celebrated sage *Çankara Āchārya*, who is the father of religious philosophy in the South. Various sects claim him as their founder, but he certainly was a *Çaiva*, and is regarded as an incarnation of *Çivan* himself.

The great revival and spread however of *Çaivism* is due to certain saints or devotees who were men of great devotion, unwearied activity, and remarkable power. The first of these was *Mānikka Vaçagar*, whose date is uncertain, but may reasonably be assigned to the tenth century A.D. Probably about a century later arose *Ñāna Sambandhar* and the various lesser devotees whose legends are collected, amplified, and idealized in the *Periya Purāṇam*. Some notice of these is essential to a clear view of our subject. The next stage in the history is the rise of the great philosophical school called the *ÇAIVA SIDDHĀNTA* system. These sages were fourteen in number, and are called the *Santāna Gurus*. (Succession of teachers.) The only date which appears to be reliable is that given by one of these in a polemical treatise. He wrote in 1313. Thus the early fourteenth century was remarkable for the existence of a most able and zealous band of philosophical *Çaivites*, whose influence still pervades the land. This system is called the *Pati-paçu-pāçam* system. Here *Pati* is the Lord or Supreme Being, *Paçu* is the soul, and *Pāçam* is the bond ; and on the interpretation of these three words everything depends. The Lord of course is *Çiva*, and the attributes with which he is invested are very remarkable. In the *Çaivite* catechism the question occurs, What is *Pati*? and the answer is, 'He is the eternal, all-pervading, all-wise, eternally blessed, absolutely independent Creator of all, who is from all eternity free from taint of evil.'

NOTE XII.

THE THREE CATEGORIES (*padārtha*).

In the first quatrain of his greatest work, *Umāpati*, the ablest of the *Çaiva* schoolmen, throws down the gauntlet and challenges the teachers of all the Hindu schools, declaring that the real and only intention of all the *Vēdas* and other sacred writings is summed up in the three mystic words *PATI* (the Lord), *PAÇU* (the flock), and *PAÇAM* (the bond). These are the three categories of the *Çaiva Siddhānta* system. Though this system received its final development some centuries after our sage,

implicitly he held its principles, and it is necessary for the illustration of these poems and legends to bring together, connect, and illustrate the main dogmas of that elaborate, thoughtful, and influential religious philosophy which has been evolved in connection with these words.

The three eternal entities of the system are (1) the LORD, who is Çiva himself; (2) the aggregate of all souls or lives that constitutes Çiva's FLOCK, which, by his grace, he wills to conduct to the blessedness of final disentanglement from all embodiments; and (3) the BOND, or the sum total of all those elements which bind souls and hinder them from finding release in union with the 'Lord.' These three—Pati, Paçu, Paçam—are equally eternal, existing unchanged and undiminished through successive æons. The idea of the 'Lord' is a philosophical refinement of that of the Çiva of the older mythology. Among other titles given to Rudra we find that of *Paçunām-pati* ('Lord of the flocks'), and from that has been evolved the ingenious allegory on which this system is founded. Umāpati's doctrine in regard to the 'Lord' is set forth in many quatrains of his text-book. This is the sum of his theology as to this topic :—

- i. Pati is the Supreme Being ;
- ii. He is neither permanently manifested nor unmanifested ;
- iii. He is without qualities or distinguishing marks ;
- iv. He is free from all impurity ;
- v. He is absolutely one ;
- vi. He is eternal ;
- vii. He is the source of wisdom to innumerable souls ;
- viii. He is not subject to fluctuations ;
- ix. He is immaterial (indiscernible) ;
- x. He is the essence of bliss ;
- xi. He is difficult of access to the perverse, but the final goal of those that truly worship him ;
- xii. He is infinitely small and infinitely great ;
- xiii. He is the true Çivam, or 'blessedness.'

The second of these statements is thus explained : Whatever has a visible form must be subject to the laws of production, maintenance, and decay ; therefore the Supreme is without visible form. On the other hand, that which has no form by which it can become manifest is a mere fancy, like the 'horn of a hare' or 'flowers of the atmosphere.' But Pati is real and makes himself known to souls. This will be further explained in connection with another part of the subject.

Çivan as thus described is said to be *Niṣh-kalam*, i.e., without parts or adjuncts, perfect in Himself, the absolute Lord. But He is capable of manifestation, and in order to energise in souls, and in the various constituents of that eternal aggregate of impurity which constitutes the *bond*, He assumes a Ça-kala nature, i.e. one composed of a species of spiritual body.

NOTE XIII.

The BRIDE, Parā-çatti = Çivan's 'Primal Energy.'

In order that the supreme *Pati* may energise in soul and in the Pāçam (Malam) from which the universe is evolved, there proceeds forth from him an energy (Çatti, S. ÇAKTI) which in its various manifestations will require attentive consideration. The doctrine is thus summed up: "The supreme Çatti, or essential energy that subsists in and one with Çivam, sends forth in successive developments (1) the energy of desire, (2) the energy of wisdom, and (3) the energy of action. These powers in operation constitute the sacred body of Çaiṣa. This 'the uncontaminated one approaches, manifesting himself as inscrutable grace, and thus joins himself to the pure māyā.' He then approaches 'impure māyā, the causal one, and establishes bodies, organs, worlds, and fruition in all their plenitude in order that deeds eternal and inexorable may be consumed,' as it is curiously phrased. Thus souls are embodied, involved in the bond from which, when deeds are consumed, they will be evolved. This is the mystery of the developed and undeveloped forms of the Supreme. What is specially important here is that the supreme divinity (Pati) manifests himself and operates in the universe through his Çatti, or energy, only. 'Çivan and Çatti are as the sun and its radiance.' This noun is in Sanskrit feminine, and thus the effective energy of Çivan is represented as a female, a goddess, and it is very wonderful what an amount of mythology and ritual has been accumulated around this one word. The question is repeated again and again, How is Pati, who is pure spirit, to mingle with and energise in souls and amid impurities? and the answer is, that he does so by sending forth an energy that is like a ray of light, a mighty influence that quickens, illuminates, and purifies all things, and this energy, personified as a goddess, has led to all the developments of Çatti worship. This is in fact the way in which the Çaiṣa philosophy bridges over the gulf between the finite and the infinite. (Compare Çiva-ñāna-Bōdham, p. 54, Madras, 1825.)

NOTE XIV.

‘EVOLUTION,’ ‘PRESERVATION,’ and ‘INVOLUTION’ IN
OPPOSITION TO ATHEISM.

The doctors of the Çaiṅa Siddhānta are strenuous opponents of the atheistic school, or *Lōkātīkas* (see the Sarva-Darsana-Sangraha, Chapter I, where they are called Chārvakas. These deny the existence of a creator, and the argument against them for the existence of a supreme Being, who evolves, sustains, and involves the phenomenal universe, is as follows: ‘The whole universe, with its entire complement of beings, male, female, and without life, comes into phenomenal existence, subsists awhile, and then subsides; this is our experience. It is therefore necessary to assert the existence of a Lord, or *Pathi*, who creates, maintains, and destroys. That after dissolution, the phenomenal universe reappears in a new æon is the result of the bond, *impurity*. For souls must again and again have embodiments; there must be a long chain of metempsychoses in order that these impurities may be matured, work out their legitimate tendencies, and produce their various results in the experience of each being. So when these are exhausted, may souls be released from their power. Since then these embodied living ones (souls) come upon the stage of being, act awhile, and then pass away there must be a Lord (*Pathi*), who directs their course; especially as every element of the bond is unintelligent, and cannot seek out for itself the souls to which it clings; nor can the souls themselves select their own appropriate forms and successive embodiments, and cannot of themselves select the deeds which pertain to them. It is therefore necessary that the Supreme, the Uncontaminated One, should preside over and direct each embodiment. We thus see in this universe a succession of living beings with material environments. Now, what is thus manifestly subject to decay, and is ever being renewed and changed, must have an intelligent Author, Sustainer, and Restorer of its manifold frame. Therefore the Lord exists, and is first, and midst, and last.’

NOTE XV.

ĀṆAVAM, OR THE 'BOND OF IGNORANCE.'

This is in later Çaiṇa books called *Āṇavam* (= *minuteness*), an abstract noun from ANU (அணு, அநு) 'anything minute, subtile.' It is a word in its metaphysical sense coined by the Tamil Çaiṇas.

The following (Chap. III) from the Tiru-arul-payan throws as much light upon this conception as it is perhaps capable of receiving. It corresponds in some ways to 'original sin': Sahaja-Mala.

Presented in this formal way it is the latest development of Çaiṇism. (XIIth Century).

CHAPTER III.

THE NATURE OF THE BOND (PĀÇAM), OR, THE IMPURITY OF DARKNESS.*

The author has spoken of the LORD and of the FLOCK, and here he speaks of the BOND, which is threefold: darkness, deeds, and delusion. But especially he speaks of *Āṇavam*, the first of these, ignorance assuming a concrete form.

Q. 1.—What is the sorrow that clings to the soul?

That (Āṇavam) which denies that there is the unceasing grievous round of embodiment, and that there is also bliss and means of help, is ever existent, though ever hidden. (21.)

Com.—There is an eternally clinging impurity of darkness* that conceals all that the soul should know in regard to afflictions from birth, the joys of release, and the help the Lord imparts.

Sum.—In this and the following couplet (1) the reality of *Āṇavam* and (2) its bewildering power are shown.

[The Tamil name "*Aviçça*," is used as a synonym of *Āṇavam*. It is also called "darkness" (S. A + VIDYĀ) (*irul*, for which *arul* (= grace) is the remedy. (Chapter IV.)]

* *Āṇava-malam*.

Q. 2.—Unto what may this Āṇavam—‘impurity’—be likened ?

There is nothing except darkness that shows itself and hides everything else, so as to make them one with itself. (22.)

Com.—Darkness, and it alone, has the power to abide, hiding things so that their distinctive differences shall not appear. So Anavam hides birth and death, the way of release, and the means of deliverance.

Sum.—The bewildering effect of Anavam is here shown.

Q. 3.—Is it in all things the analogue of darkness ?

Darkness hides objects of vision, but shows itself ; Anavam hides all things else, and itself remains concealed. (23.)

Com.—Darkness in the phenomenal world wraps all things in concealment; but is itself clearly perceived. This mental darkness conceals both divine knowledge and its own presence in the soul.

Sum.—The spiritual darkness of Āṇavam is shown to be more cruel in its effect than ordinary darkness.

Q. 4.—This power which conceals and is itself concealed—does it affect the Lord ?

This Āṇavam exists from eternal ages, commingling with the soul, which is essentially united with the inner light, and abides until now. (24.)

Com.—From all eternity it co-exists in the soul together with the inner light of divine mystic wisdom ; spreads not indeed over the divine essence, but dwells persistent in the soul, and obscures it even until now.

Sum.—Here it is taught that Āṇavam is from infinite ages, and that it does not pass out of the soul like “deeds” and “delusion.”

Q. 5.—Is this Āṇavam really unknown to the souls it enshrouds ?

‘My Lady Darkness’ has an infinity of lovers, but hides herself from all with strictest chaste reserve ! (25.)

Com.—Though this “darkness” pervades and interpenetrates all souls, yet to the soul in which it dwells the energy of ignorance reveals not herself.

Sum.—This teaches the mysterious power of Āṇavam.

[Āṇavam is *one*, though pervading an infinity of souls.

There is a personification here, as in the next. In Tiruvāṇṇam 4 ; 43–45,

‘Soon as I thought of that Being, free from hate, unique,
Delusive powers in ever-changing millions swarmed,
And straight began their ever-varying, delusive play.’

In Māṇikka Vāṇṇagar’s days the theory of Āṇavam had not been fully worked out.]

Q. 6.—How can one come to know this Āṇavam ?

No need of many words ! This ignorance of all that souls ought to know is the gift of the ‘sons of darkness.’ (26.)

Com.—What good can come from using many words ? The condition that is ignorant of the difference between temporal and eternal things must be caused by the powers of black darkness. Āṇavam is the parent of innumerable active energies of unwisdom.

Sum.—We learn here that this root impurity is the cause of a mighty power of darkness, and so is known by its effects.

Q. 7.—If any one denied the existence of Āṇavam,* what would you reply ?

If there be no darkness, why is there embodiment, and the joys and sorrows of earthly life ? If you define it to be nothing else than the soul’s essence, when it departs the soul must perish with it. (27.)

Com.—If you deny the concrete existence of this darkness of ignorance, why was the soul subjected to this sorrow of embodiment, which is the source of the life of sense ? If you say that it is merely the natural condition of the soul, then if divine mystic wisdom be given, this ignorance

* The *Aikkiya-vāthi* school. See *Çiva-piragāṇam*, 22. This school is the second in the ‘refutation of heresies’ by our author.

departing, the soul will itself cease to be. (Cleansing would mean destruction.)

Sum.—This is a refutation of those who deny the existence of a specific impurity to which the name of Āṇavam is given.

Q. 8.—If one should say Āṇavam came incidentally in the course of development, what reply is there ?

If this impurity has a beginning, how can we explain the reason of its sudden appearance in the midst? Also in that case may not this disease spontaneously reappear even in the realms of deliverance? (28.)

Com.—If Āṇavam has sprung up incidentally, there must be some cause for its appearance, as there is for a soil on a white garment or for a tarnish on the surface of a mirror, nor in that case can there be any absolute and final deliverance for the soul, for Āṇavam may again spontaneously appear. The crucial question of *the origin of evil*.

Sum.—This is a refutation of those who teach that Āṇavam has had a beginning.

Q. 9.—If it be from all eternity, surely it never will depart

Though darkness grow and spread, light if received will disperse it. If not, it never can leave the mind. (Even so, if Āṇavam yields not to successive impartations of grace,* the office of the guru is useless. But this office does rid the soul of it.) (29.)

Com.—Material light ever dissipates the darkness that admits it; if it were not so, perpetual darkness would brood over all things. Even thus, if Āṇavam does not yield to the successive operations of grace, ignorance can never be dispersed. The soul must have a faculty of receiving effectual grace.

Sum.—Here one of the means of deliverance from Āṇavam is suggested.

Q. 10.—How would you answer a person who deemed that primal delusion, and not Āṇavam, concealed things ?

* Lit. 'kalai and the rest.'

Like a light that illuminates till the dayspring arise, primal delusion has a form, and associates itself with deeds. (30.)

Com.—Till divine mystic wisdom is imparted by Çiva, and so the darkness of Āṇavam is dissipated, delusion (Tirōtham) appears, and, for the sake of deeds which have to be consumed, is the cause of the phenomenal universe. Even so is it when one lights a lamp and awaits the dawning of the day.

Sum.—Here delusion and deeds in their relation to Āṇavam are explained.

END OF NOTES.

THE RELIGIONS OF THE EAST.

It may be useful here to note the various papers (*with important discussions*) on the above, that have already appeared in the volumes of the Institute's Journal.

1. Islâm. By Rev. W. St. C. Tisdall, M.A.
In this "the rise, progress, and strength of Islâm," are carefully and thoroughly discussed, with a view to correcting the increasing and dangerous misapprehension as to the character of Mohammedanism. Quotations from acknowledged original authorities have been added, in order that those desiring to use the paper in getting up lectures or in conducting arguments on the question with opponents of high culture, may find all that they require. Vol. xxv.*
2. Zoroaster, The Religion of. By J. BROWN, Esq., Jun., F.R.A.S. Vol. xiii.*
3. On the Religion of the Aboriginal Tribes of India. By Professor J. AVERY, Ph.D. Vol. xix.
4. On Buddhism and Christianity. By Rev. R. Collins, M.A. (late Principal of Cottayam College). *Stereotyped*. Vol. xviii.*
5. On Krishna. By Rev. R. COLLINS, M.A. Notes by Sir M. MONIER WILLIAMS, K.C.I.E., PROFESSORS MAX MÜLLER, E. B. COWELL, DOUGLAS, DE LACOUPERIE, Dr. EDERSHEIM, etc. Vol. xxi.
6. On the Sacred Books of the East. By Sir M. MONIER WILLIAMS, K.C.I.E. Vol. xxi.
7. Mystical Buddhism in connection with the Yoga Philosophy of the Hindus. By the Same. Vol. xxiii.
8. A few of the Contrasts between the Essential Doctrines of Buddhism and of Christianity. By the Same. Vol. xxiii.
9. Remarks on the Monism, Pantheism, and Dualism of Brahmanical and Zoroastrian Philosophers. By the Same. Vol. xxv.
10. Buddhism, or the Light of Asia. By Rev. R. Collins, M.A. (late Principal of Cottayam College). Vol. xxviii.

* A few separate authors' copies of these three may be had.

ORDINARY MEETING.*

ALEXANDER MCARTHUR, ESQ., J.P., D.L., 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 Thomas F. Buxton, Bart., K.C.M.G.,
Governor of South Australia, Adelaide ; Percy M. Van Epps, Esq.,
United States.

ASSOCIATES :—Captain Henry Hall, London ; Alex. Henwood Teague,
Esq., F.L.S., Cornwall.

The following paper was then read by the author :—

ON SOME RELATIONS OF MIND AND BODY. By
A. T. SCHOFIELD, Esq., M.D., &c.

THE subject on which I venture to offer a few remarks is not only one of great interest in itself, but it has the special character of being a subject of real practical value in the rational treatment of disease. Indeed, the whole science of mental therapeutics is founded on an intelligent understanding of the relations of the mental and the physical in man.

There can be no doubt in the minds of thoughtful men as to the fact of the great therapeutical influence the mind has on the body. But though some monographs may have been written from time to time on this subject—and it is incidentally touched upon in various works on the brain and mind—its practical application is of the most fortuitous and casual nature. It is difficult to understand why such a powerful means of cure is so systematically neglected, and even ignored, by the profession. I suppose it is because mental therapeutics have been practically for so long the real *modus operandi* of the vast army of charlatans, that the whole subject has acquired such a bad name that most men fear for their reputation if they touch it. Indeed, it is only because I have been taught practically so much of its real value, and feel so strongly that its continued neglect is no small blot on the present system of medicine, that I shall call attention to the wide powers the mind has over the body in relation to disease. My remarks will therefore fall naturally under two heads: the first being directed to what we should

* 7th of 31st Session.

understand by the word "mind" and what is known of its relations to the body; the second pointing out in brief the practical bearing of this knowledge on disease.

Our *ego*, or personality, as defined by Herbert Spencer, is "the permanent nexus, which is never itself in a state of consciousness, but which holds states of consciousness together." I think, however, we all feel, that though the conscious mind would fain arrogate the personality to itself, that personality holds a great deal more than mere "states of consciousness" together.

It is true that what is generally called Mind, whether by materialists or spiritualists, has hitherto been limited to conscious mind.

All writers on psychology take the ground that mind is consciousness. To talk of unconscious mind is said to be a contradiction in terms, and even the unconscious action of the brain, which is now universally acknowledged, was considered, as late as 1876, a most objectionable doctrine. Why the whole region of mind should be limited to consciousness I could never myself understand, although it is plain that the only mental processes we can fully trace are confined to those of which we are conscious. To grasp, however, the relation of soul and body and the scope of mental therapeutics it is necessary to take a wider view—one, indeed, which has long been before me, but which I have not hitherto ventured to formulate, until I recently came across some thoughts, on entirely original lines, ably expressed by the learned professor of Physics in Dublin, which seemed to endorse those suggestions which I have already laid before this Society.*

By mind, therefore, I think we should understand an external directing force that everywhere acts on matter, organic and inorganic. In the organic kingdom this mind is called "life"; for to me life is practically synonymous with mind—if by life we mean the power that purposively directs the

* Since this paper was written I have seen in the *Pall Mall Magazine* for last year, in a paper by Mr. Zangwill, the following remarkable corroboration of the argument of this paper. What we are pleased to call our minds is made up of two parts, our consciousness and our sub-consciousness; the latter is immeasurably the vaster portion. It is a tossing ocean of thoughts which feeds the narrow little fountain of consciousness.

movements of matter, whose first inherent quality is inertia. In the inorganic world mind is called nature with a big N, and its actions are called the "laws of nature." They are surely the laws of mind.

Briefly, the old couplet is the best summary of the relations of *mind and matter*—

What is matter? *Never mind.*
What is mind? *No matter.*

For to attribute the functions of mind to matter, and to regard the former as a sort of self-formed secretion of the latter, is to hopelessly and unintelligibly confuse things that essentially differ. Still, if any object to the application of the word "mind" to sub-conscious intelligence and acts, I do not press it; all I would urge is that the actions of both are spiritual or mental functions, and not material.

Regarding, therefore, as I do, mind as the universal directing agent and mover of matter, it appears to me that the conscious mind is a very small part of the whole even in us, while with regard to the unconscious organic creation generally it forms a most minute proportion. A coral island in the South Pacific is a mere ring of rock in the water, of insignificant size to the sailor; but to the biologist, or geologist, it is the highest peak of a stupendous structure that rises from the bottom of the ocean as a mountain, miles high. Commencing, as it does, in the very smallest beginnings, it remains unrecognised until it rises above the surface of the sea. We only see the top of this structure, and call it an island; indeed, it is all we are conscious of except by soundings, or occasional glimpses of what is beneath on calm days, or at low tides. In the same way, it seems to me the conscious is but a very small part of the vast sub-conscious mind, on which it rests.

The conscious mind has its seat, as we know, in the cortex, or surface, of the brain only: the unconscious mind is connected with—or may we not say is the source of?—all life that lies below, down to the purposive, or, if you please, "reflex" or automatic action of each cell. ("Reflex," by the way, is a very misleading word, for an action is never really reflected like a ray of light from a mirror, the process being a far more complicated one, and always involving the action of mind, or its equivalent.)

Consciousness is not, as far as we know, an inherent quality of the cortex nor of the mind by itself, but is the

result of the interaction of the two; for when the working of the cortex, and hence the harmony of the two, is disturbed, as by narcotics or a violent blow, it is lost. We are also by no means conscious of all that takes place even in the cortex, for innumerable sensations may, and do, continually reach it, of which we are wholly or partially unconscious. On the other hand, it would appear from recent researches that it is not possible to be conscious of any sensations that do not reach the surface of the brain.

The conscious mind has reason, feeling, and volition. By it, and by it alone, we direct and control the main expenditure of life and force. This, however, is not done so much by reason as by feeling—it is in the heart, not in the head, as Dr. Maudsley points out, that our deepest feelings are rooted, and he does ill service to the religious faiths who strive to base them on the feeble apprehensions of human reason; the driving impulse by which men are moved to act comes from feeling rather than reason.

“A psychology,” he says, “which finds the motive power of action in knowledge might be likened to a science which should find the cause of the tidal movements not in the moon, but in the moonshine!”

The sub-conscious mind is on a lower plane, and runs largely in grooves of habit, and follows closely change of association and sensation; but its powers far exceed in the body those of conscious mind. The unconscious powers of life can make eggs and feathers out of Indian corn; and milk and beef out of grass. The new science relating to our protective organisms, so brilliantly worked out by Metschnikoff and others, shows they can carry on, without erring, a thousand complicated and purposive operations and form chemical combinations that no chemist can compass; work with ease and without fatigue, and are only hampered when interfered with by the conscious mind. This is seen when the sub-conscious mind takes up conscious acts, and transforms them into unconscious or sub-conscious habits. It is ever doing this through life; and ease and perfection in any pursuit entirely depend upon the degree in which it ceases to be connected with consciousness and is carried on sub-consciously. Playing the piano, skating, bicycling, skilled trades, and indeed almost everything, depend for their perfect execution on the power of the sub-conscious mind.

The pen of a ready writer, as Miss Cobbe says, seems to dip itself into the ink at the right time to form of itself all

the words, and even to select different words to begin each sentence and to avoid terminating them with prepositions, while all the time the conscious mind of the writer is deeply occupied with the plot. The marvels of playing a brilliant piece on the piano while at the same time conducting a vigorous flirtation show also the greatness of our unconscious powers, especially when we remember that Sir James Paget has pointed out that in rapid playing the finger moves twenty-four times a second, each movement involving at least three muscular acts which if multiplied by ten gives 720 muscular impulses *per second* for both hands.

It is likely that when habits, or artificial reflexes, are established in the brain, that the current of sensation and ensuing motion never goes up to the cortex at all for orders from the conscious mind, the action being short-circuited in the middle brain, and it is not only actions that are "short-circuited" by habits. Sights and sounds frequently repeated are arrested in our unconscious brain, and not allowed to rise to the level of consciousness. If we live near a boiler factory, we soon cease to hear it; or if, as in a friend's case, we live near a large dairy, where milk cans are washed at night, it soon fails to wake us. There appears to be in the sub-conscious mind some power of choice as to whether an impulse shall be short-circuited or sent on up to the cortex. By experiment, I find that if a man moves about the room in the morning when his wife is fast asleep, and makes loud noises of various kinds, they do not wake her; though it cannot be exactly from habit, for probably the exact noise has not been heard before, but rather from an unconscious knowledge of who makes it. On the other hand the faintest noise in opening the door—often heard before—wakes her up, because it suggests someone else entering. The lower mind seems to think it is the only sound-message requiring the attention of the cortex, and so sends it up. It is almost like the action of a private secretary opening all letters and placing a few before his chief, answering the rest himself. The unconscious mind we must remember is not only the active agent in all habits, but in all voluntary conscious actions as well. It is often forgotten that we cannot *will* the contractions of any muscles; we can only *will* the moving of leg or arm, and are quite unconscious of the process by which the act is carried out.

But the sub-conscious mind can do greater wonders than these. It not only carries on all the work of the body from

the action of the lowest cell, but it can use unconsciously the highest cortical centres of thought that are ordinarily worked by the conscious mind. If the conscious mind gives the cortex some work to do, such as solving a problem, recalling a sound, a name, or a place, meanwhile occupying itself completely in some other way, the sub-conscious mind will step in and do the work and give the answer in a surprising way—as O. W. Holmes says, “Our unconscious mind delivers the result at the doors of our consciousness just like a prepaid parcel”; or, on the other hand, it will work alone in forming impulses and recalling memories. This, however, requires time: for a man may try to recall a name and look in a directory for it; but though under his eye he fails to recognize it, for his unconscious mind has not yet had time to find it in his brain. Five minutes after he has closed the book he remembers the name, which he could not do though he actually saw it with his eye. (Carpenter.) That is to say, the visual impression on the brain, though conscious, fails to recall the mental record of the name, which the unconscious mind succeeds in a few minutes in doing. The other day, leaving home for Brighton, I was stopped at the door by a suggestion from my unconscious mind that I had not much money in my purse; I looked and found only a few shillings. I had previously opened my purse often that day, and the sight of these shillings was unconsciously registered in my cortex, and somehow this fact was presented by my lower to my higher or conscious mind at the door. How often in a similar way impulses and fancies of unconscious origin direct our steps and even save our lives. It is probable that the sub-conscious mind is ever working in the cortical region in the way of deepening impressions and memories. It has been well said in Germany, that skating is learned in summer, and swimming in winter. That is to say, that the man who has learned to skate one winter will begin the next winter a very much better skater than he left off: the movement and the impressions connected with skating having been deepened by the unconscious mind during the summer, and the same with the swimming.

But it will do more than this. Of all the thousands of impressions that are being received in the cortex, from various parts of the body, and from our special senses, but very few are even noticed by the conscious mind, though all are registered sub-consciously. We hear a slang expression, or a new song; we do not notice it particularly, but the sub-

conscious mind does, and the result is that we find ourselves unconsciously repeating the words, or humming the tune; and the curious part is, that we can often hum the air perfectly if we will do it with the sub-conscious mind, whereas, if we try to hum it consciously it goes from us. After a time, however, when its impression has had time to deepen, we can hum it at will. For the same reason we can often remember things better when we cease to try to do so with our conscious minds.

During sleep, for instance, thoughts range themselves anew. The powers of the unconscious mind can do more in this way than the most arduous effort, in arranging facts and ideas in due proportions. Hence we like to sleep over a thing before deciding, and Judges in a difficult case always like to take time to deliver judgment—often on the morrow.

More than this, we may read, hear, see, indeed do almost anything involving the highest centres of the cortex, unconsciously—the result being only recorded by our sub-conscious mind.

Our conscious mind, as compared with the unconscious mind, has been likened to the visible spectrum of the sun's rays, as compared to the invisible part which stretches indefinitely on either side. We know now that the chief part of heat comes from the ultra red rays that show no light, and the main part of the chemical changes in the vegetable world are the result of the ultra-violet rays, at the other end of the spectrum, which are equally invisible to the eye, and are only recognised by their potent effects. Indeed, as these invisible rays extend indefinitely on both sides of the visible spectrum, so we may say that the mind includes not only the visible or conscious part, and what we have termed the sub-conscious, that lies below or at the red end, but the supra-conscious mind, that lies beyond at the other end—all the regions of higher soul and spirit life, of which we are only at times vaguely conscious, but which always exist, and link us on to eternal verities, on the one side, as surely as the sub-conscious mind links us to the body on the other.

The mind, indeed, reaches all the way, and while on one hand it is inspired by the Almighty, on the other it energises the body cell or tiny amœba, all whose active life it originates. We may call the supra-conscious mind the sphere of the spirit life, the sub-conscious the sphere of the body life,

and the conscious mind the middle region where both meet.*

The powers of the unconscious mind are seen in a remarkable way in insanity. The sane man is one in whom the conscious mind—the middle part of the spectrum—rules. In an unsound mind, the supra, or sub-conscious, steps in, and, overpowering the conscious mind, produces ecstatic visions and phantasms, or coarse and sensual conduct. It is remarkable to note in this connection that when reason is even partially dethroned how the whole unconscious mind can unite in coupling the highest spiritual ideas with the lowest sensuality, as in some recent heresies. In defective intellects, where the conscious mind is weak, the power of the sub-conscious mind is remarkably seen. Miss Martineau tells of an idiot who had his hands washed and nails cut at 11.10, and who came of his own accord exactly at the same hour each day to have the operation repeated, though he knew nothing consciously of time.

Our conscious mind is like the yellow spot in the eye, which is really the conscious centre of vision, the images falling as a rule unnoticed on all the rest of the retina, and making an unconscious record in the brain. When the conscious mind is in abeyance, as in a dream or reverie, or artificially, as in hypnotism or narcotism, the unconscious mind emerges from its obscurity, and these and other impressions unconsciously formed upon the brain are seen and noticed for the first time, just as a receding tide lays bare the hidden parts of the coral mountain, *e.g.*, a servant in delirium spoke Latin and Greek words which she had absorbed unconsciously from her master years before.

* The Spirit of God is said to dwell in believers, and yet His presence is not the subject of direct consciousness. We would include, therefore, in the supra-conscious all such spiritual ideas, together with conscience—the voice of God, as Max Müller calls it—which is surely a half-unconscious faculty. Moreover, the supra-conscious, like the sub-conscious, is best apprehended when the conscious mind is not active. Visions, meditations, prayers, and even dreams, have been undoubtedly occasions of spiritual revelations, 1 Cor. ii, 3-5; 2 Cor. iv, 7, 16; 2 Cor. xii, 2, are instances of the working of the spirit apart from the action of reason or mind.

A well known Christian teacher, the Rev. Dr. Andrew Murray, writes, "Deeper down than where the soul with its consciousness can enter, there is a spirit nature linking man with God, and deeper down than the mind and feelings, or will—in the unseen depths of the hidden life, there dwells the spirit of God."

If the unconscious mind be stimulated at such times it can exert extraordinary and apparently unlimited powers over the body. An actual blister can thus be produced upon the forehead by its powers, without any external application. Reveries and dreams, unconsciously fixing this mind on any part of the body, have produced the forms of letters and other marks.

Once more the unconscious mind is ever writing the record of the conscious mind on the body, in gait, in gesture, and in the lines on the face. This alone is a great subject, but we can only just name it in passing.

The bearing of all this on mental therapeutics is sufficiently obvious. Our field of action while embracing the whole mind is mainly the sub-conscious region, which not only can be treated without knowledge of the *ego*, but which can affect through its wonderful powers of nutrition and health of the body to an illimitable extent, and indeed is the real agent in most cures.

Bearing this somewhat lengthy preface therefore in mind, which will throw a light on all we yet have to say, let us proceed to consider *longo intervallo*, how the body affects the mind.

A great many manifestations that are classed as mental are really physical. If a piano produce discord, the cause may be mental or physical—it may be the result of the discordant mind of the bad player, or of the discordant tones of the untuned strings. In the same way, we often blame the player (or the mind), when it is the instrument (or the brain) that is at fault.

This instrument can only perfectly respond to the mind when it is in health itself, and this health depends mainly on the quantity and the quality of the blood that is supplied to it; on the proper working of the system that carries off the drainage, or refuse, from it; and on the amount of exercise and rest the cells themselves get.

We need not say more on this head in the present learned audience, but only ask them to remember, that if the mind can profoundly affect the body, the body can profoundly affect the mind through the brain which is its organ, which is dependent on physical conditions for its proper use.

In disease the mind has special power over the body. The very word *dis-ease* is coined to express a mental idea “ease” and not a physical change.

The cortex, or surface of the brain—the seat of conscious

mind—is a special factor for good or evil in every disease. Every organ and function is represented there, and there brought into vital unity. Prof. Laycock says, “The hemispheres, as the organ of thought and mental action proper, are in unity with all the processes of life whatever; whether they be termed vegetative or animal.”* Indeed, the unity of the body and to a great extent of the “ego” is formed in the cortex. All tissue nutrition is influenced from this great centre, and most physiological acts can be arrested mentally by its action. It controls unconsciously anabolic and katabolic cell action; and there is no doubt that a sound, cheerful mind, acting through it, is a great protector against disease of all sorts, and if disease has a hold a cheerful mind can often cure it.

Mental therapeutics can be applied to the body in one of three ways:—

1. *By the unconscious mind directly*—in spiritual or physical influences and surroundings.
2. *By the unconscious mind acted on by the conscious indirectly*—in rousing faith in persons, remedies or places, &c.
3. *By the unconscious mind acted on by the conscious by direct effort*—in determination to get well, to shake off illness, ignore pain, &c.

With regard to the ailments for which mental therapeutics is useful, it is a powerful means of cure in all organic and inorganic diseases; while in hysteria and allied neuroses it is the only reliable means of permanent efficacy.

Let us, then, first consider the influence of the mind in ordinary diseases.

Putting aside all those cases which get well without any means (the cure of which we maintain is solely effected by the action of our sub-conscious mind), we will give just one or two special illustrations of this influence.

At the siege of Breda, in 1625, the whole garrison was down with scurvy; the Prince of Orange smuggled into the town three small phials of essence of camphor, and his physician put three or four drops into a gallon of water, and the men recovered and saved the town.

As to this we may remark that it is a matter for curious conjecture as to how far generally the cures we now attri-

* *Mental Physiology*, vol. ii, p. 144.

bute to drugs in homœopathic or other doses will be considered in the future to be the results of the powers of our unconscious minds.

A patient, suffering agonies with toothache, was told by a medical man to apply to the tooth a silver coin wrapped in silver paper. Believing it to be infallible, she did so several times and was relieved. One day, however, she was told the remedy was wholly mental, and at once it was powerless. Here is an instance of the pernicious effects of the conscious mind inhibiting after first aiding the sub-conscious.

Unzer, in 1771, says: "The expectation of the action of a remedy often causes us to experience its operation beforehand." I have just received a remarkable illustration of this that, however, goes beyond this statement. A colleague of mine gave a patient the other day some opium pills to produce sleep, but forgot to mention their object. Last week he found the pills had not acted as hypnotics, but in a totally different manner, though the patient had had no better sleep. Another patient thought she had taken a large dose of rhubarb, which was effectual; she discovered afterwards that she had forgotten to take the medicine.

Hunter says, "By my will I can fix my attention on any part until I have a sensation in that part"; while Müller affirms that it may be stated as a general fact, that any state of the body which is expected with certain confidence will be very prone to occur as the mere result of that idea. It is easy to produce symptoms by suggestions. If, for instance, you press some particular part of the spine of a neurasthenic, and say, "Do you feel any pain here?" he may say "No." But if you persist in your suggestion for half-a-dozen times, and the nervous centres are at all susceptible, he will say "Yes," and the pain suggested by you will be felt. Now this is true with regard to producing cures as well as in producing diseases.

Let me give one more illustration of the power of the sub-conscious mind in ordinary disease. I refer to the therapeutic value of the common mantel-piece striking clock (I say clock in preference to watch, because it has a greater value; and I say mantel-piece instead of hall clock for the same reason; and I add striking as being of still greater efficacy). Sir Dyce Duckworth, without dwelling on the value of mental therapeutics, has pointed out their use by means of the clock, in showing the great effect in cases of persistent vomiting in giving the liquid food in teaspoonfuls every five

minutes by the clock. If the patient is told that the food thus given will be retained, and if he can see the clock clearly from the bed, it will probably be successful, for at the exact time the sub-conscious mind enables the stomach—probably by some inhibitory power over the vomiting centre in the medulla—to retain the food.

I pass over the extraordinary value of the clock in many ordinary diseases to consider what a fountain of health it may become to both mother and child! The nursery without it is a scene of confusion and bad management, which ceases when mother and nurse have learned that the child must be nursed in the day every two hours *by the clock*, and every four hours at night, and never at other times. The real value of the clock in this, as in other cases, is truly scientific, and relies for its potent effects on rapidly formed accurate psycho-physical habits, or artificial reflexes, in the brain.

It has been well said, "We think as we feel, or think we feel, and we feel as we think. If we feel a pain, we think we are ill; and if we think we are ill we feel ill." If my ideal centre vibrates with the thought of crossing the Channel in rough weather, and pictures the nausea that would then be felt, these vibrations are transmitted to the terminal centres of the sensory nerves running from the stomach, and I actually feel sick from communication with a sensory centre, and possibly, if of a highly nervous organisation, may actually be so from transference to a motor centre.

Real feelings and real acts can be started in entirely ideal centres. If we *think* intensely of any part of the body long enough, we *feel* sensations in that part. If we think of a good dinner our mouths may water. We shiver whether we only think of cold or actually feel cold. The sensation of pain can be produced as really and vividly by thoughts or ideas alone, as light in the eye by striking it in the dark. In short, every sensation of the body ordinarily produced from without can also be produced from within.

These ideal vibrations, acting on motor and other centres, are quite different from the action of a motor centre by the direct impulse of the will; the action being in the latter case voluntary and in the former involuntary. So far we have only spoken of ideas of which we are conscious, so that although the modes of exciting these motor and sensory centres are abnormal, *we know them to be so*, and hence are

not deceived, and do not deceive others, into believing them to be natural.

Thus, when our teeth are on edge from sounds, we do not go to a dentist; if we are sick from ideas, we do not think we are dyspeptic; if we hear noises in the ear, we do not look for them externally; if we shiver from thinking of cold, we do not put on more clothing. But now let us go one step further, into the region of the sub-conscious mind, and of memories and habits; and the theory I wish to present as to the mental causation of these nerve troubles we group under the word "hysteria" will be made plain.

Our brain not only acts by the will and the ideas of the conscious mind, as we have seen, but is continuously vibrating with ideas, memories, and trains of thought of the sub-conscious. It is so even with regard to common sensation. If you concentrate your attention on any part of your body, you become aware of sensations in it that escaped your attention before, but were equally there then. If with a feather I lightly tickle the back of your neck, and at the time you are engaged in very earnest conversation, the vibration aroused in the brain sensory centre is unnoticed by you; and yet if I call your attention to the part it is noticed at once. By increasing the stimulus I can make the waves of vibration set in action other centres; involuntary ones, such as cause a shaking or shuddering of the neck; or voluntary, such as turning the head round or moving away. If you are asleep I may tickle your foot so that you draw the leg away and you wake up. In this case you are probably conscious of moving your leg; but the stimulus that made you do it was too slight to reach your consciousness. We may thus be conscious of a transferred vibration leading to action or sensation, and yet be ignorant of the cause that set it going. Memories again will involuntarily, and it may be unconsciously, arouse both feelings and actions. I may have smelt the strong scent of some flower when some critical event took place, a proposal of marriage or some sudden news; henceforth, whenever the topic is touched on the very scent or vibrations of the nerve of smell that represent it are exactly reproduced by my sub-conscious mind. A certain field always recalls a certain song we used to sing as we crossed it on our way to school. The smell of sandal-wood or the taste of chutnee may set the thoughts of old Anglo-Indians in vibration with Eastern sights and sounds stirred up again in the old centres. Observe in all

these cases we are not considering vibrations deliberately set up by the will in an unusual way. You can, of course, think of a green field when in a drawing-room, until you set in vibration the centre of sight and see the green grass; or the centre of hearing, and hear the lowing of the cattle or the hum of the insects. This is much easier if there are no incongruous sounds, and if you close your eyes; and still more so if there are some insects actually humming in the room. But the memories we speak of are wholly unconscious ones.

Let us now sum up our results, taking a definite case, say, of a pain in the little finger. This pain is felt in the little finger, we say, though we really know that the only seat of any sensation is in the brain. It is there at the central termination of the ulnar nerve which leads from the little finger that all the vibrations take place, of which the mind becomes conscious and calls pain. Whenever these vibrations take place, in the nerve centre belonging to the little finger, in the brain, the mind always refers the sensation to the commencement of the nerve in the little finger, whatever may be its real origin.

In the same way, if in your house the hall-door bell rings, you say there is someone at the hall-door; if the drawing-room bell, there is someone there: and yet such may not be the case. I may have pulled the door bell wire inside the hall, or as I passed down the kitchen stairs; or a rat may have moved it, or I may have struck the bell itself and made it ring, or a shock of earthquake may have shaken it, or a strong gust of wind; and yet, although these causes are so various, you, in the kitchen, always say, "There is someone at the front door."

It is so in the body. (1) The little finger is pricked—there is pain in the little finger. (2) The ulnar nerve itself is pressed on at the "funny-bone," there is pain in the little finger. The hand may be cut off, and still if the nerve be irritated in the stump by pressure, the man feels the pain in his imaginary little finger as truly and vividly as if it were still actually there. (3) Or, again, there may be a tumour in the brain pressing on the nerve centre in the brain of the ulnar nerve, and the most acute pain is felt in the little finger. All these instances are from direct irritation of the nerve in some part of its course. But as we have seen, we may go much further. The hall-door wire may have got caught with the drawing-room one, so that when the latter is pulled it is the hall-door bell that rings; the vibration is thus transferred.

So in the brain. (4) I may set to work to think of my little finger, and so start sensations in it which, if not actual pain, are still sensations. But if I have the idea it is injured, though it may not be, I may feel the pain acutely from an idea alone. A butcher, pale, pulseless, and suffering acute agony, as he said, in his arm, was brought the other day into a chemist's shop. His cries were dreadful, for he had slipped in hooking a heavy piece of beef, and was suspended by his arm on the sharp hook; and yet when the arm was exposed it was uninjured, the hook having only caught in the sleeve. (5) But, again, the pain may have been originally caused by a gathering in the little finger, and afterwards kept up long after the gathering was gone by the ideal centre. (6) Association, as seeing others with crushed little fingers; or (7) memories, conscious or unconscious, of crushed little fingers, may also start and keep up this pain. Observe, then, the varied causes with the same effect. Only, in conclusion, we may add that while in health it is generally easy to discriminate between pain in the little finger caused by injury to the little finger from that set up in other ways, in nerve disease, where the sub-conscious mind has greater sway, it is not. Nay, it is sometimes impossible not only to the sufferer, but to the doctor who attends him.

We have dwelt upon mimetic, or imitative, hysteria, because it shows the wonderful powers of the sub-conscious mind over the body for evil, as nothing else does, simulating every known disease, including tumours, deafness, blindness, dumbness, paralysis, St. Vitus's dance, &c., and is capable of producing the highest temperatures of fevers. Now if the range of psycho-physical ailments is large, the power of mental therapeutics to cure them is equally great, though much less known. The same sub-conscious mind that produces the disease can be used to cure it. If the person is in other ways in good health, and has not entered the vicious circle of dyspepsia and debility, he can probably be cured in a short time, without isolation, going to bed, or any form of long treatment. Anyhow the cure must be effected in one of the three ways already indicated. Perhaps he may be cured instantaneously by applying to the irritated ideal centres, that keep up the disease, good suggestions consciously or sub-consciously sufficiently powerful to overcome the bad ones. We have no belief in their application by means of hypnotism, which

often in the end aggravates the condition which it is meant to relieve; for suggestions are thoroughly effectual without it, if you have confidence and have gained the respect and trust of your patient.

The cure of warts by faith is well known, and in spite of the imposture that has lately been exposed at Lourdes, there is great difficulty in believing that the cures effected there and elsewhere are limited to what we call functional diseases. It is perhaps the connection of mental therapeutics directly with faith healing, hypnotism, &c.; and indirectly with certain liquid electricities, billionth dilutions, and quack remedies of all sorts, that has so far deterred the profession from examining very closely its wonderful powers.

This disgust is natural if we consider, for instance, one or two sentences from a recent work on mind healing :—

“If the disease is consumption, begin your argument by taking up the leading point; showing that it is not inherited; and that inflammation, tubercles, hemorrhage are but thoughts, beliefs, and mental images before mortal minds, not the immortal mind.”

And again :—

“Ossification, or any abnormal condition of the bones, is the action of the mind as directly as insanity. Bones have no more substance than thoughts; *what we call matter was primitively error in solution.*”

Small wonder, in the face of such remarkable statements, if one is tempted to turn away from the whole subject of mental therapeutics.

The relations of the mind consciously or unconsciously with the body are, however, far too interesting, and the issues of such study in its application to disease far too important to be neglected on account of any misuse of these powers by quacks and others. The subject is ripe for further investigation, which can be carried on quite apart from hypnotism, mesmerism, and kindred methods; and we have little doubt that, on the one hand, ere long the vast range of mental action in connection with the body will be recognized and scientifically classified; while, on the other, mental therapeutics will be rescued from the cold neglect with which it has so long been treated by the profession, and take its proper and important place in clinical teaching and in our medical works, from both of which it is, as yet, conspicuously absent. My few words may at any rate serve to call some attention to these important subjects.

The CHAIRMAN (A. McARTHUR, Esq., D.L., V.P.) accorded the thanks of the meeting to the Author, after which a discussion of a general character took place. The meeting was then adjourned. The Institute later on received the following

COMMUNICATIONS IN REGARD TO DR. SCHOFIELD'S
PAPER:—

Professor H. CALDERWOOD, LL.D., writes:—

SUB-CONSCIOUS MIND.—The paper of Dr. A. T. Schofield "On some relations of Mind and Body" is one of marked interest. The importance for therapeutics of the phenomena specially contemplated will be generally recognised; but their precise significance in this relation must be judged by specialists.

I view the paper from the standpoint of mental philosophy—specially from that of the psychologist. From this point of view, Dr. Schofield's discussion presents many questions of importance. Many of his positions must command ready assent. To me their chief interest concentrates on the view given of the sub-conscious mind; and my remarks will be confined to this part of the paper.

The wide range of meaning assigned to "mind" is not only a divergence from the commonly received definition, but it seems non-essential to the position as to the "sub-conscious" exercise of intelligent beings. "Life is practically synonymous with *mind*, if by life we mean the power that purposively directs the movements of matter" (p. 152). The commonly received conclusion is that physical energy is distinct from mental power. So the author speaks of the mind's "relations to the body," and of "the wide powers the mind has over the body in relation to disease." This contrast seems even essential to the author's argument. Nerve energy accomplishes purposive action, independently of mind, that is, not purposed. The winking of the eyes is purposive, without being purposed. Mind accomplishes purposive action, independently of nerve energy, as in our reasonings. Keep up nerve energy to the utmost by food, rest, and exercise, you do not produce *The Merchant of Venice*, *Paradise Lost*, *Waverley*, or *Sartor Resartus*. Physical development does not yield us choice

literary productions. Reflex actions, and reflective actions are accomplished under different conditions. This contrast is essential to discussion of "what is known of the 'mind's' relations to the body."

Holding to this contrast, attention may be concentrated on sub-conscious exercise of mind. The facts illustrating such action are many, and are admirably presented by the author. "Ease and perfection in any pursuit entirely depend upon the degree in which it ceases to be connected with consciousness and is carried on sub-consciously" (p. 154). For illustration, the author refers to "Playing the piano, skating, bicycling, skilled trades." The illustrations are ample. All are *physical aptitudes*, depending on mind. The contrast between mind and body being admitted, the author with full warrant maintains that "the sub-conscious mind is on a lower plane, and runs largely in grooves of habit, and follows closely change of association and sensation." All this seems assured. As long as we concentrate on human activity, the facts are easily classified. When it is said that "the unconscious powers of life can make eggs and feathers out of Indian corn; and milk and beef out of grass," we pass over to a distinct order of facts, belonging to organic life—and not connected with, or dependent on, conscious exercise, such as may *descend* to the lower plane of sub-conscious activity. The difference between these two groups must guide us in our inference as to the "sub-conscious." Conscious exercise is the primary and leading phase of mental activity.

When considering the relations of body and mind, we need to distinguish between *ascending* and *descending* activity. The sub-conscious is on a "lower plane" than reflective exercise; on a higher plane than production of "eggs and feathers." Production of eggs and feathers does not ascend from organic activity to the "sub-conscious"; but exercise of the eyes, arms, and feet in cycling, voluntary at first, descend to the sub-conscious. Mental activities and physical are here blending; but the possibility of the sub-conscious in human life depends on the higher conscious effort, as a necessary preliminary. Every cyclist illustrates this fixed relation. The slow deliberate effort belongs to consciousness; the easy and exact movement belongs to the unconscious aptitude. Unconsciously, "we may read, hear, see, indeed do almost anything involving the highest centres of the cortex" (p. 157). But there is

no evidence that the reflective and constructive efforts of intelligence can descend to the lower plane of the sub-conscious.

The comparative range and importance of the conscious and sub-conscious needs to be considered, in view of the facts noted. "Conscious acts" are transformed into "unconscious, or sub-conscious acts." But when estimating the comparative value of these two sets of actions, there is need for caution when we are tempted to speak of sub-conscious powers as "*far exceeding*" those of the conscious mind. The actions thus classified are mainly connected with physical or physiological activity, not at all with reflective and constructive intellectual effort. There can be no question as to the conscious intellectual exercises *far exceeding in importance* all that descends to sub-conscious effort.

Divergence of opinion is likely to arise chiefly as to the range of sub-conscious activity within the sphere of mind proper. Thus, it would seem needful to turn attention on the statement on p. 157:— "During sleep, thoughts range themselves anew. The powers of the unconscious mind can do more in this way than the most arduous effort, in arranging facts and ideas in due proportions." I am unable to concur in this, because of the conviction that the mind is not unconscious during these exercises; but is deliberately using power of discrimination throughout. Experience shows that a large amount of work can be consciously done in sleep; and that habits could be formed which would greatly aid such effort. A large amount of observation confirms me in this view, and favours the conclusion that we use "sub-conscious" in one sense when we speak of physical aptitude, and in quite a different sense when we point to mental activity during sleep. The reference to judges delaying their award for a day suggests that there is a large amount of thought as to the special difficulties of the case, at the utmost remove from "the customary." My experience, when persistently engaged in abstract thinking, supplies a considerable series of striking examples to sustain the conclusion that, when the mind is intensely interested in a perplexing theme, much systematic thinking is accomplished during sleep.

Professor JOHN CLELAND, LL.D., F.R.S., Professor in Anatomy in Glasgow University, writes:—

The subject of Dr. Schofield's communication is partly philosophical and partly medical. The philosophical aspects of the

connections of mind and body offer a very wide field for investigation. We feel at once on entering this territory the disadvantage of our position in having no experience of mind acting apart from matter, and one is familiar with the futile efforts of many physiologists to get rid of everything which brings them into contact with consciousness, by either confounding the mental operations with their physical concomitants, or by avoiding allusion to psychical considerations. To this school Dr. Schofield does not belong. But when he defines mind as "an external force that everywhere acts on matter" I confess that I must demur to any definition of mind as a force and nothing more. That mind which "acts on matter, organic and inorganic" is the One Eternal Spirit, as indeed I understand Dr. Schofield to mean. I cannot see the advantage of altering the meaning of the words Mind and Intelligence so as to make them applicable to any operations apart from consciousness somewhere. I am painfully aware that to introspection our mental processes present mere results which we cannot trace back, but I am not prepared to allow more than the defectiveness of self-consciousness. The smallest amount of attention given to a voluntary action becomes, after all, self-consciousness; and however feeble the light may be which this consideration throws on the seemingly unconscious steps by means of which we carry out the dictates of volition in habitual actions such as the details of speaking and walking, it probably throws more than is shed by the supposed revelation contained in the favourite word of the present day, "automatic."

As to the current doctrine accepted and stated clearly by Dr. Schofield that "we really know that the only seat of consciousness is in the brain," I still hold, as I did when I wrote in the *Journal of Anatomy and Physiology* in 1870, that the facts of physiology are against it, and that they favour my view, that the sensorium extends at any given moment to any part which is in uninterrupted continuity of nervous activity with the brain or major mass of the great nervous centre. Very likely this will not be admitted for many years to come; but the truth will be acknowledged in the long run.

The Rev. H. J. CLARKE writes:—

The importance of the matters treated of in Dr. Schofield's paper can hardly be over-rated, and the thoughtful contribution he has made to the elucidation of the subject must, I feel sure, be found of great practical value.

It appears to me, however, that the phrase "subconscious intelligence" is a contradiction in terms, and that in using this phrase he is attributing to the human intellect operations which its molecular organ performs without further guidance and direction, when consciousness is in abeyance, than it follows blindly in conforming to the laws imposed upon it by the Creator. The brain is so constituted that, when, in chains of successive impressions (whether established by volitional effort or otherwise it matters not), the links of association have become sufficiently strong, the casual impression of the moment has a tendency to recall associated impressions, and to reproduce them in the order and sequence in which, through frequency of repetition, they are most readily reproducible—in other words, in lines of least resistance. This tendency is sometimes found to be antagonistic to the will, and a resolute concentration of such forces as are properly mental may prove unequal to the task of crowding out unwelcome trains of thought. Efficient impressions (be the immediately exciting cause what it may) on sensory material find response in the obedience of adapted motor-nerves: thus it has been rendered possible for elaborate action and complicated movements which bear witness, not only to hereditary aptitude, but also, and perhaps still more, to antecedent intellectual effort, to be executed unconsciously. The molecular organ of the human spirit does, undoubtedly, in its multifarious operations, react upon the agent, besides supplying the latter with a needful stimulus, namely to such action, both emotional and intellectual, as admits of cognizance in this material world, and with imagery for the embodiment of thoughts that may be printed in a sensorium of flesh and blood. But what I venture to maintain is that the instrument, however fearfully and wonderfully made, discharges no function which warrants the assertion that its laws are the laws of mind. That portion of the brain which busies itself incessantly in a seemingly aimless process of unconscious cerebration may, by tossing up to the surface hidden impressions, render the labours of the watchful and prying intellect incalculably more fruitful than they otherwise would be, and in this humble way may co-operate with the portion to which higher functions have been assigned. But to utilise the services of both, and to conduct the process of ratiocination, is assuredly the exclusive property of the proprietor of the instrument—the indwelling spirit.

A. E. SANSOM, Esq., M.D., writes :—

I listened with great interest to Dr. Schofield's paper, but at the close I did not think that I could add anything of value to the discussion. After consideration, however, of the essay itself and the opinions of the various speakers, I venture to make a few remarks from the point of view of a student of the *ars medendi*. Dr. Schofield's is an argumentative paper. When he defines Mind as "an external force that everywhere acts on matter, organic and inorganic" he states a proposition that is not likely to be universally accepted even by members of his own (my own) profession. Many, myself included, who are prepared in questions of the origin of matter and force to dispense with ordinary scientific methods would go with Dr. Schofield, who, when he further states his position, regards Mind as the universal directing agent and mover of matter, simply expresses his belief in an Omniscient and Omnipotent Originator. Other scientific observers, however, might say that the expression of Dr. Schofield was but a "petitii principii"—it was begging the whole question that he professed to argue.

I believe that Dr. Schofield will agree with me in the view that we should, as men of science, push the investigation of the relations of Mind and Body to the most extreme limit possible. It is our duty to pursue the scientific method with all our powers just as it is our duty to do what our hand findeth to do with all our might. Let us see what explanation we can get of the phenomena of what Dr. Schofield calls the unconscious and the sub-conscious mind as distinguished from the conscious mind. We have instances of the unconscious mind in the phenomena of deep sleep, coma, and trance; and of the sub-conscious mind in dreams, certain conditions of epilepsy, and disorders of the brain, and so-called hypnotism, mesmerism, etc. To bring forward the arguments which lead up to the conclusion would be too lengthy a process; but it seems to me that for the disposing cause of all these phenomena we must look to the circulation of the blood. "From the heart are the issues of life" and "the Blood is the life." The heart may be regarded as one with the vessels which convey the nutrient stream to the various parts of the body and with those which return the current polluted by waste products.

In the case of sleep the Will is the first disponent. It is no unmeaning phrase that is often used to the child, "Try to go to

sleep." The Will says that all the structures of the body shall be placed under conditions of rest. The heart's pulsations are reduced in frequency, the output of blood from the heart is lessened, and the arteries, especially in certain regions, contract by the active agency of the nerves (vaso-motor) which are distributed to their muscular walls. It is proved that in sleep the brain becomes paler than the normal. The nutrient supply to the cerebral hemispheres is almost cut off, but a sufficient circulation is maintained in the medulla oblongata and its neighbouring parts, where are the roots of origin of the vagus nerve which regulates the automatic rhythmical processes of respiration and circulation. In dreamless sleep the cerebral cortex and the higher centres are at rest, whilst in the apparatus of mere animal life the activities are maintained by a sufficient circulation therein. In dreams there are intermittent relaxations of the arterioles in certain areas, so that the nerve-cells in these are incited to activity. In mesmerism and hypnotism these activities are invoked by the impressions made through the sense of vision by the hypnotiser: there is a condition of artificial insanity which should be condemned as an outrage on mental health.

Dr. Schofield in his paper has given many instances of the influence of predominant ideas on the condition of sub-consciousness; whilst the greater part of the cerebral hemisphere is functionless from imperfect blood supply; the nutrition in certain areas is sufficient for the production of thought and action. In trance the circulation in the cerebral hemispheres is practically at a standstill, life being maintained by a sufficient blood supply to the medulla oblongata. The human being is in the condition of a hibernating animal. The state of trance may be induced by the hypnotist, but it is one of danger, and an emphatic protest ought to be entered against the senseless exhibitions of trance which have lately been perpetrated. How dangerous they may be is shown by the well known example of Colonel Townsend, who, by his own will, could put himself into such a condition that the pulse and heart-beats were rendered imperceptible. He performed the experiments too successfully—he died in one of them. It will be inferred from what I have said that I regard the physical causes of the phenomena of unconsciousness (within the limits I have mentioned, for I have said nothing about the effects of diseased states and the results of

physical violence) as identical, but operating in different degrees: the nutrition, and therefore the activity of the cerebral hemispheres, being arrested by the cutting-off of the blood supply, completely and for a protracted period in the one case, and intermittently and regionally in the other.

I am well aware that in referring the chief agency to the vasomotor mechanism I offer an explanation of the mode of working only, not of the working itself. No physiologist can explain the molecular changes in the grey matter of the brain which cause thought and action. The man of science is as powerless to do this as he is to demonstrate the living mechanism of the structureless protoplasm which in one case may remain a homogeneous amœba and in another may develop into the complex organism of the highest form of animal. At certain limits all help from science and from scientific methods leaves us, and we can form our ideas only from the working of the "supra-conscious" mind, the "sphere of the spirit life" as Dr. Schofield terms it. Then we must either except the teachings of Authority or confess ourselves hopelessly unable to understand. It seems to me that it is impossible from the very nature of things that our human powers can understand Mind as Dr. Schofield defines it. Force apart from matter is to us unintelligible. Mind "as the universal directing agent and mover of matter" our ordinary powers do not permit us to comprehend. In the very nature of things we cannot understand it, for in this stage of our existence thought is the result of the reactions of force and matter.

I cannot subscribe to Dr. Schofield's view that sub-conscious intelligence and acts are "spiritual or mental functions and not material." I think they are decidedly material; so distinctly material that the vivid picture of one's own execution, in a dream, may be the result conveyed from the alimentary tract to the sensorium of the irritation of a portion of an undigested supper.

For the acceptance of Dr. Schofield's definition of Mind, therefore, I conclude that we must dispense with scientific reasonings and be submissive to the doctrine of authority. There is no antagonism to science in the opening sentences of the description of Mosaic Cosmogony.

Our powers cannot realise the waste and void immensity of chaos nor the force or spirit which influenced it, but the idea is intelligible that the Will of the Creator imparted a vibration to the particles of matter, and—"there was Light."

The processes of the supra-conscious mind, "the sphere of the spirit life," as Dr. Schofield terms it, are not to be apprehended by the conscious mind. Faith which is a virtue in the case of the one is a crime in the case of the other. The supra-conscious mind has no relation with mental powers or logical faculties.

In regard to mental therapeutics, I confess that I see much difficulty in coming to anything like definite conclusions.

I have said that in ordinary health any attempt to dominate the faculties, and so produce unconsciousness or perverted mental functions, is in my opinion nothing less than a sin. I do not, of course, affirm that in certain states of disease hypnotism is unjustifiable. I have personally obtained evidence that a salutary change may be thus induced; only the process must be undertaken with a due sense of responsibility on the part of the hypnotiser.

In more ordinary ways it is clearly proved that the influence of one mind upon another may be of great service for good. Witness in childhood and youth the effect on body and spirit of one who "doth teach high thought and amiable words and courtliness and the desire of fame, and love of truth and all that makes a man" (*Tennyson*)—and, alas! the converse.

Undoubtedly mental therapeutics can be potent for good by rousing faith, by awakening the dormant will, and also, where recovery to life on this side of the grave is impossible, by inducing a state of happy resignation and trustful hope of a future and more blissful life.

THE AUTHOR'S REPLY.

April, 1898.

I have to thank my critics for the lenient way in which they have dealt with the novel positions advanced in my paper; and would not say more were it not that, to me, some of their arguments seem equally novel. Professor Calderwood says in his most able and instructive letter (para. 3), "nerve energy accomplishes purposive action, *independently of mind*, that is not purposed," and "mind accomplishes purposive action, *independently of nerve energy*." Also "experience shows that a large amount of work can be consciously done in sleep" (last para.). Here are three novel and to me dubious propositions:— 1. that a "purposive" action is not purposed; 2. that mind acts independently of "nerve energy"; and 3. that the "mind" is "conscious" while "we" are unconscious. Dr. Sansom, with regard to this last, adduces sleep as an instance of "the unconscious mind" and dreams as instances of the sub-conscious! At the close of his lucid sketch of the relation of the circulation to degrees of consciousness, he says that the supra-conscious mind "or the sphere of the spirit life" has "no relation with mental powers or logical faculties." Surely this also is a novel position. That it is not dependent on these, is true; but, undoubtedly, it has many and obvious "relations" with them. Of course further researches may modify some of the positions taken up.

ORDINARY MEETING.*

DAVID HOWARD, ESQ., D.L., IN THE CHAIR.

LIFE MEMBER :—Rev. David Gregg, D.D., LL.D., United States.

MEMBER :—Rev. S. C. Logan, D.D., LL.D., United States.

ASSOCIATES :—George Monro, Esq., London ; Rev. T. Ralph Price, M.A., Surrey.

The following paper was then kindly read by Mr. J. W. Slater, F.E.S., F.C.S., in the author's unavoidable absence :—

THE CLASSIFICATION OF THE VERTEBRATA.

By Professor JOHN CLELAND, M.D., LL.D., F.R.S.,
Professor of Anatomy in the University of Glasgow.

THE Council of the Victoria Institute having done me the honour of asking me to contribute a Paper, I have adopted a suggestion, for which I am indebted to your esteemed Honorary Secretary, Captain Petrie, and venture to lay before you a defence of the views which I am known to hold, in accordance with those of Cuvier and Owen, but in opposition to the prevailing fashion of the last thirty years, with regard to the classification of that large and most important division of animals, the Vertebrata.

Cuvier divided the Vertebrata into four groups, viz., Fishes, Reptiles, Birds and Mammals. But the zoologists of the present day prefer to break up the Reptilia of Cuvier into two quite distinct groups, erecting his Batrachia into a group by itself and confining the term Reptilia to the remainder, including the serpents, turtles, lizards, and

* 9th of 31st Session.

crocodiles. This change becomes all the more accentuated when we consider that Owen looked on Cuvier's two lower groups as deserving to be united in one great division of *Hæmatocrya* or cold-blooded animals, contrasting with the warm-blooded Birds and Mammals; while Huxley joined together the Fishes and Amphibians under the name of *Ichthyopsida* and in like manner joined the restricted Reptiles with the Birds under the name of the *Sauropsida*, while he kept the Mammals completely separate.

It will be perceived that the *Reptilia* of Cuvier is the group which has specially been the subject of different opinions. One authority, recognising it as justly to be regarded as a coherent whole, considered it as separated widely from Birds, while another agreeing with him, as every one will do, on the question of the nearness of Fishes to Amphibians, looked on the whole remainder of Cuvier's *Reptilia* as far removed from them and having a near affinity to Birds.

To consider such a dispute rightly it must be remembered that classification has in recent times had quite a different function and importance from what it once had. The first attempts at classification are liable to be of a highly artificial kind like the Linnean system in Botany, principally useful in enabling large numbers of species to be easily distinguished. But inevitably a natural arrangement makes itself known where there is an abundance of species with great numbers of important characters in common. More and more mere resemblance of analogy is distinguished from integral unity of structure, and the idea of affinity becomes clearly defined. This is the stage which in Zoology became thoroughly established under the auspices of Cuvier, but up to a much later date the majority of zoologists and even anatomists gave little regard to other than adult forms. In Cuvier's day the knowledge of the real constitution of organs was comparatively limited owing to the circumstance that Embryology was in its infancy, and generally supposed, on account of the great difficulties which beset it, to be a study unlikely to throw much light on questions of relationship of different animals. It is in this way that one must largely account for what is, perhaps, the greatest error that Cuvier fell into, the formation of the great division *Radiata*, objected to even by his devoted admirer Owen, in language quoted from Rudolphi, as "a chaotic group."

Once the idea of development gets its legitimate place

the way is paved for the appreciation of the whole animal kingdom as a unity, consisting of beings derived from ova, by comparable stages, exhibiting as one may say an orderly evolution both in its totality and in the individuals of each species. In fact such a conception was in a certain fashion elaborated by Oken and his follower Carus, not to mention others, even at the time when Cuvier seemed to be carrying all before him. But such views do not necessarily touch on the question of the mode by which different kinds of animals have made their appearance, though they must naturally lead in the long run to the raising of that question. Nowadays it may be said that naturalists generally have yielded to the doctrine which was most distinctly elaborated at first by Lamarck, that the assumption of the immutability of species was a mistake. In the early part of the century Lamarck and Geoffroy St. Hilaire got thus far, but it was not till Darwin wrote that it was generally recognised that the doctrine of immutability had been accepted on grounds other than scientific, and that there was a great body of evidence in favour of common ancestry of forms widely separate. It has flowed from this change of view that the degrees of genetic relationship or possible consanguinity of distant forms of life are sought for and taken into account in classification.

I do not think that consanguinity can be actually proved between animals far asunder, but willingly grant that it has overwhelming probability in its favour, provided always it is understood that Natural Selection has nothing whatever to do with Evolution, and that to produce any single step of elevation in the scale of animality, there is something necessary of an inherent and not an enviroing description, something acting not only in the life of individual organisms, but on the totality of animal existence from the commencement till now—a something much more akin to the Mathesis of Oken than to Natural Selection. Evolution in organic nature is ever an evolution toward a determinate goal, not the product of "survival of the fittest. The fittest or ablest to survive in the struggle for existence will survive no doubt, but the question is if that principle is sufficient to account for evolution. Is it a main factor, if factor at all, in evolution as distinguished from variation? Confining ourselves to the Vertebrata, can it be worked so as to throw the smallest light on the ancestry of a mammal from a primitive fish or the ancestry of man from any other kind of mam-

mal? No such demonstration has been seriously attempted. On the other hand the determinate nature of Evolution is in my humble opinion quite demonstrable. To that extent Oken was in the right; but the conception which he termed *Mathesis* is better laid hold of, though still incompletely, by using the word *Design*.

It is such considerations as these which invest the classification of the *Vertebrata* with general interest. Let us examine dispassionately how vertebrate animals differ from others, before we proceed to make a rapid survey of the characters of its great divisions. The fundamental characteristic is to be found not really in the vertebral column so much as in that structure which the column protects and supports, namely, the great nervous centre, the cerebro-spinal axis. This centre, though divisible into brain and spinal cord, forms a single continuous structure, beginning in the region of the head and extending away from it originally in the embryo, placed at first superficially, but soon converted into a continuous tube with skeletal surroundings. It at no period presents the appearance of a gangliated chain, though it gives off the nerves in pairs. Its position is dorsal, while the heart is on the ventral side of the alimentary canal. The whole vertebrate body presents a segmented arrangement, that is to say, a serial chain of repeated parts, a phenomenon no doubt pervading many of the *Invertebrates*; but that which distinctly characterises the vertebrate segmentation is that it is one in which the outgrowths of the cerebro-spinal axis take prominent part, and is a segmentation of the specially animal sphere, not of the visceral systems, although these exhibit a certain serial repetition of a more or less independent kind.

It is now twenty-two years since, in a popular text-book on the structure and functions of the human body, I referred to the relationship which had been pointed out between *Vertebrata* and *Tunicata*; stating that the constant ganglion of the latter might fairly be considered as homologous with the anterior or preoesophageal ganglion of *Articulata*, and that it was probable that the cerebro-spinal axis of vertebrates was "a highly developed structure corresponding with that one ganglion." At that time the idea which had been put forward and greatly favoured was that from the *Tunicata* ascent took place through *Amphioxus* to the *Vertebrates* proper; the part played by the notochord in that supposed evolution being much insisted on. It has since occurred very justly to the

generality of zoologists that a structure like the tunicate notochord, present in the larva and liable afterwards to disappear, conforms rather to the characters of a vestigial than of a new structure, so that the evidence favours the speculation that the Tunicates are degenerate Vertebrata rather than precursors of that highest primary division of animals. But what I wrote still remains true, and we are in the position that if we believe that the Vertebrata proceeded from an invertebrate form, the only hypothesis which seems in harmony with the evidence is, that the invertebrate ancestor was devoid of a ventral chain of ganglia, and had a supra-oesophageal ganglion of which our whole cerebro-spinal axis is the grand evolution. This being the case it is plain that there is much to be said in favour of the name given on Okenite principles by Carus to the Vertebrata, namely, Cephalozoaries; but even more is to be said in favour of the appreciations of Lamarck when he divided animals into two grand divisions, viz., Vertebrata and Invertebrata. For the whole scope of the animal kingdom is the evolution of consciousness and of volition, and it is not till the Vertebrata are reached that the organ of consciousness subordinates to it the whole body, and particularly the animal sphere.

A word may be added here with reference to the limbs of the Vertebrata. They are in certain instances suppressed altogether, and in other instances there is only one pair of them developed, but nevertheless no one will cavil at its being considered a characteristic of all the main divisions, from fishes to mammals, that they have two pairs of limbs, always homologous. It is true that there is a plausible theory current among biologists as to the origin of the limbs, that they are remains of two lateral fins which in some ancestor ran the whole length of the body, and were comparable with the mesial fins still existing in fishes. But we may remark first, that there is no evidence of any weight in favour of this theory; it is a *Deus ex machina*. Secondly, there is no explanation offered as to how it came about that it is always the same fore and hind limbs which make their appearance as the evolutions of the assumed lateral fin, and thirdly, the former existence of such a continuous fin, in the days when the assumed forms, bridging the gap between Invertebrates and Vertebrates, were the highest as yet brought into being, does not interfere with the importance of the two pairs of limbs as a characteristic vertebrate feature.

We now come to the classification of Vertebrata, and

I maintain that Cuvier's division into four is correct, not merely on the grounds which Cuvier stated, but for other and it seems to me more important reasons as well. But I am confronted at once with the argument that Vertebrates are divisible into those which have an amnion and those which have none; that the amnion is a structure of very early occurrence in individual development, and that the division which its presence or absence effects must therefore be of primary importance. That argument is founded altogether on a misconception. If, in the early development of one embryo, a part of its blastema is differently developed from what it is in another, that difference will affect every structure derived from the portion of blastema implicated. That is so obvious that every one can understand it, and a very slight study of abnormal developments is sufficient to bring it home to every anatomist. But the amnion is not a part of the embryo, it is not a part of the future animal, it is an envelope round it, a mere complication of part of the germinal membrane outside the embryo proper: and this enormously diminishes its value for purposes of classification. No one would ever think of classifying the animal kingdom according to the characters of the ova from which different kinds of animals spring. Such a procedure would break up the Vertebrata altogether. The limited Reptiles, that is to say, Reptilia as distinguished from Amphibia, would indeed form in conjunction with Birds, a coherent group under such an arrangement, but the group would be sundered as far from the other vertebrates as from any of the invertebrata. The fact is that the peculiarity of the ova of the so-called Sauropsida does not in the least affect their morphological constitution, and that is just what is true also of the presence or absence of the amnion. It is notable in passing that, to whatever cause we may attribute the appearance of an amnion, it must be considered one of those structures which have appeared independently in two different stems, if it be true as is generally held that Mammals are not derived from Birds or the restricted Reptilia, but from an amphibian or pre-amphibian ancestry, a doctrine which I am not disposed to object to. I merely mention the circumstance at the present moment because it is one of those facts which support the doctrine of determinate evolution.

I know of no other argument worthy of serious consideration, besides that derived from the absence of an amnion, for separating the Batrachia of Cuvier from the Reptiles and

raising them to a group of equal value, as is now done under the name of Amphibia; a word which I may mention was used previously by Stannius to include the whole Reptilia of Cuvier; and Stannius was a good judge of the affinities of Batrachia to other Reptilia, for the last edition of his work exhibits enormously more knowledge of their anatomy than has been shown in any book since published.

Let us now look at some of the differences which make a gap between the Fishes and, not the Amphibia only, but all the animals above them. In the first place all fishes and only the Fishes among Vertebrates possess a heart consisting of one series of chambers, a simple heart, receiving the blood into a single auricle and propelling it thence into a ventricle, which sends it into a single trunk, whence every drop has to pass successively through two sets of capillaries. Moreover, although the swimming bladder is undoubtedly homologous with the lungs of other vertebrates, there is no pulmonary artery carrying venous blood. But as soon as we leave the Fishes we come to a construction common to all the Cuvierian Reptiles in so far that while the heart is more complex, the work of circulation and respiration is not more effectively accomplished. A continuous structural evolution is seen which beginning in the Amphibia rises in the crocodiles to complete duplicity of the heart, similar to that of the warm-blooded animals, but prevented from serving the purposes of a completely double circulation by complications in the arterial trunks. I repeat here what I wrote in the text-book already alluded to, that this complexity "though in a manner accounted for as being a stage of progression towards a more perfect organ found in higher animals, might have been difficult to explain if it could have been noted by an observer before birds and mammals appeared on the earth." This illustrates one of the characters of determinate evolution, viz., that it cannot be appreciated till it is completed.

A second great distinction between fishes and all other vertebrates is to be found in the characters of their limbs. There is great difficulty in making in detail the comparison between the different parts of the limbs of fishes and those of other vertebrates. The conclusions usually held at the present time are not founded, I venture to assert, on anything like a complete investigation of the subject; but this is not the place to enter on that question, and it will serve my present purpose sufficiently to point out that, when the limbs are developed in the non-piscine

vertebrates, they each spring from a girdle, present a single boned upper part, constituting the arm or thigh, and beyond this a forearm or leg as the case may be, which is followed by a hand or foot of complex structure, exhibiting usually more or less distinctly the multipartite carpus or tarsus surmounting digits not more than five. That general description is applicable to Amphibia but not to Fishes; limbs easily compared in detail with our own exist in the former, but not in the latter. Also there is no ascertained correspondence of the nerve-supply of the limbs of fishes with those of other vertebrates, and it may indeed be stated that the ventral fins or hind limbs are obviously supplied by different nerves in different fishes, while any one can appreciate the similarity of the nerve-supply of the limbs of amphibians, reptiles, birds and mammals.

Thirdly, the auditory organ of fishes consists simply of an internal ear, and when accessory apparatus is developed to regulate the pressure on the internal ear it is in the form of a modification of the swimming bladder and of ribs and transverse processes of vertebræ. Not so when we leave the fishes. Accessory apparatus becomes the rule instead of the exception, and it is still more important to observe that the regulation of pressure is always effected by an element termed columella in amphibians, reptiles and birds,—the stapes of mammals.

Fourthly, it is already in the Amphibia that we see for the first time the head separated from the trunk by a neck, or region intervening between the head in front and the heart and lungs behind.

In all these particulars of large structural or functional importance the amphibia cohere to the reptiles and are separated from the fishes.

Turn to the Birds. They are so separated from Mammals that biologists have ceased to look for a direct link uniting them with these, and the only question is as to the importance of the gap dividing them from Reptiles. Now it is certainly a thing not to be overlooked or made little of, that the separation of the pulmonary from the systemic circulation, toward which the reptiles show so many stages of anatomical progress, is complete in all birds and mammals; and not unconnected with this is the circumstance that these alone are the warm-blooded animals. Further they differ from reptiles in having their integuments protected by horny epidermal growths each founded on a single papilla, for this

is the character common to hairs and feathers, and distinguishes both distinctly from other horny growths. But it will be said that certain fossil reptiles, such as the *Iguanodon* and the *Pterodactyle*, make near approach to birds, and that the early fossil birds, such as *Hesperornis*, make in important respects an approach to reptiles. This is undoubtedly true, just as it is true that the *Lepidosyren* approaches the Amphibia, and the *Monotremata* approach Birds; but just as in neither of these cases is the approximation the remains of a bridge of transition, so also there is no sufficient evidence that birds are descended from allies of either *Iguanodons* or *Pterodactyles*. In particular there does not appear to have been yet found a fossil reptile with a skull in the least like that of a bird.

The fishes which appear to be nearest to any possible genetic link with other vertebrates are the Elasmobranchs, of which the sharks furnish an example. Those on the other hand which are far more numerous at the present time and may be said to exhibit distinct piscine character in the highest degree, are the osseous fishes, which present remarkable modifications, sundering them far from any possible transition to the other vertebrates. The restricted Reptilia most probably took origin from Amphibia, in which case the Cuvierian Reptilia may be looked on as consisting of a primitive batrachian stem, breaking up into numerous branches of which the serpents, turtles, lizards and crocodiles alone survive; and I may be allowed to doubt if, from any of the extinct branches known, it is possible that birds any more than mammals have descended.

This isolation of mammals is not so remarkable if evolution be determinate, like the development of an embryo into an adult, since in that case the stages of evolution of an organ are not necessarily advantageous. Like the stages of development of such an organ as the eye in the vertebrate embryo, they may be functionally useless. Therefore, one would expect transitional forms to disappear, and also that the character of the whole evolution would not be fully brought out till it was complete or near completion; and in favour of this I have already said something in speaking of the circulatory organs.

The restricted Reptilia, Aves and Mammalia may all three have originated from the Amphibia, but the Amphibia do not differ more from serpents, turtles, lizards and crocodiles than these groups differ one from another. If that be so, there

are only four primary divisions of the Vertebrata. Let us glance at their relationship as regards typical character.

In fishes there are seen all those characters which led Carus to call the Vertebrata Cephalozoa, but so far from the great regions of head and cervico-thorax and abdomen, afterwards met with, being distinct in fishes they cannot be said yet to exist; the viscera are crowded forwards, while the spinal cord, and muscular and osseous segments, are produced backwards, till at last in one great modern group, that to which the haddock and cod belong, not only is the shoulder-girdle attached to the head, but the ventral fins adhere to the shoulder-girdle and the cloaca is immediately behind the ventral fins.

But on leaving the Fishes, there is a more distinct separation of regions having a peculiar relation to the whole animal structure. The body-cavity remains devoted to the structures of the vegetal sphere. The head contains the highest and most characteristic organs of the animal sphere. The neck is the original seat of development of the central vascular system, though the heart is adventitiously pushed in its later development into the part of the trunk which becomes modified for its reception, namely, the thorax.

The Vertebrata, higher than the Fishes, are groups deriving their general facies and characteristic development from the abdomen, the cervico-thorax and the head respectively. The Cuvierian reptiles may be fairly regarded as abdominal Vertebrata; the activity and domination of the circulatory and respiratory system gives character to the Birds; the development of the brain is the characteristic feature of Mammals.

I may be permitted to add what I pointed out to the British Association at Exeter in 1869, viz., that the limbs are not developments of the individual segments of the body, but belong each pair to a region, and that the mandibular arch is the limb arch of the head, while the opercular bone of the fish, the stapes or columella of other vertebrates, is the radiation or limb proper of that arch. To prove this in detail would involve entering so largely on the whole structure of the skull that I acknowledge I have never had time to publish the proof *in extenso*. I shall merely state that if this view is correct, then the Vertebrata have three pairs of limbs, a pair for each region, also that the limb of a region may be perfected in inverse proportion to the central part. Thus the mandibular arch

and limb are at their maximum of development in Fishes while the brain is at its minimum. In Birds, which have remarkable thoracic development in connection with circulation and respiration, the pectoral limb has the hand abortive, and in Mammals, which are specially remarkable for the advance in size and structure of the brain, the quadrate bone which hitherto supported the lower jaw is reduced to an ossicle of the ear, and the jaw itself is simpler than in any other vertebrates.

The CHAIRMAN (D. HOWARD, Esq., D.L.).—We have to thank Dr. Cleland for bringing before us a paper of very great interest, and Mr. Slater for so kindly reading it.

The whole question of Comparative Anatomy, as we used to call it and to which the word evolution may be very fairly applied, especially in the sense used by Dr. Cleland, is one of the most fascinating studies that it is possible to pursue.

It requires an expert to speak on such a difficult subject. But to any of us who have not the privilege of being experts it is simply one of those fields of study which always afford great interest. I would venture to call attention to the very clear and decided way in which the author of the paper defines two things which are so often seriously confused.

The idea of Evolution cannot, I think, be studied without seeing that it is absolutely essential clearly to distinguish between a process of evolution and the cause of that evolution; to many people's minds, the idea of evolution is solely confined to evolution by Natural Selection. Here we have the writer of the paper, who has certainly grasped the relations of different organisms as few have, and yet has no doubt, in his own mind, about the conceivable possibility of mere accident or environment having been the governing factor in that remarkable chain of events.

J. HUTCHINSON, Esq., M.D., F.R.S.—I see a statement in the paper that there is no similarity between the skulls of birds and of reptiles. Is it not forgotten that there is a remarkable similarity in the case of the single occipital condyle?

Inspector-General J. D. MACDONALD, F.R.S.—I have spent more

time on the Invertebrata than the Vertebrata, but still, as an anatomist, I feel much interested in the question that has been so ably brought up. I think there still remains great doubt about the internal evidence of evolution apart from a superintending cause in which skill and design have been most clearly carried out, and no question of environment or any other condition of life in connection with the survival of the fittest will explain evolution. It has been stated so in this paper.

Though the mammal and the bird are very distinct in their leading characteristics, the transitional forms are few and far between: the *Ornithorhynchus* is, perhaps, the most striking example. Again, in the passage from the reptile to the bird we have the *Pterodactyle*, and it is impossible to ignore the construction of the beak and fins of the turtle as exhibiting at least a representative relationship to the corresponding parts of the Penguin.

The reptiles and fishes are singularly connected by the *Lepidosiren*, and it is usual to trace fishes from the *Amphioxus lanceolatus* and the latter from the *Tunicata*, to the exclusion of the *Mollusca* proper, so that whatever had been gained or achieved by Nature in the magnificent eye of the Cuttlefish does not appear to be turned to account in the *Amphioxus*, which has either no eye at all or a rudimentary eye speck.

A good lesson may be derived from the study of the development of the circulatory system, which is so much consulted in reference to classification. It is at first purely ciliary (*Lingula*), and the outgoing and returning currents course along opposite sides of the same vessels. Secondly, without any valvular mechanism the whole round of the circulation in the *Tunicate* sweeps alternately in opposite directions. Thirdly, in the true *Mollusca* the supply of valves determines an irreversible course to the circulation, and the whole organization is as perfect as we find it in any fish.

Finally, with gills or lungs the circulation is either branchial or pulmonic as well as systemic.

J. W. SLATER, Esq., F.E.S., F.C.S.—I have presumed to put down a few of my own remarks as comments on Professor Cleland's address, which may not, perhaps, be without interest at the present juncture. Those who, like myself, have had the advantage of studying Professor Cleland's thoughtful and suggestive paper on "Terminal forms of Life" will be exceptionally in a position to appreciate the paper with which we have just been favoured. It is plain

that, like Owen, but unlike certain more recent classifiers, he lays a full and just weight on the distinction between the cold-blooded and the warm-blooded group of animals. This distinction is smothered if we, with Huxley, join together a part of the reptiles with the birds under the name of "Sauropsida." I have ventured to point out that cold-blooded animals alone secrete physiological venous pigments and textile fibres, whilst in the warm-blooded group (birds and mammals) the energy which would be required for the elaboration of such products serves for maintaining the heat of the system. It is a very interesting fact that in the *Ornithorhynchus*, the only mammal which has the power of secreting a true venom, the temperature of the blood is about 15 degrees lower than that of other mammals. Hence, to write cold-blooded and warm-blooded animals in one and the same group seems to be a grave error. It is very satisfactory to find the author giving his opinion that Natural selection has nothing to do with Evolution, and that to raise an organism to a higher plane we must have some inherent power and not any mere external agency. Whether such agency is temperature, atmospheric pressure, moisture, diet, or the rivalry of co-existing species, is not the capital point. Many writers do not distinguish between evolution and variation. I am much gratified to find to what extent Professor Cleland does justice to the late Professor Owen, whom I have the honour of considering as my old master, some of whose contemporaries and successors, though they may have spoken lightly of his attainments, have been reaping the harvest of what he sowed, although, at times, failing to accord him credit for what he has done.

The meeting was then adjourned.

COMMUNICATIONS RECEIVED IN REGARD TO THE PRECEDING PAPER.

Professor H. W. PARKER (United States) writes :—

I have read carefully and with much interest the paper by Professor Cleland—with the more interest because for ten years I used his compact manual of animal physiology as a text-book in my college classes. It seems to me that he makes out his case convincingly, even in so brief a discussion; and it is refreshing to find that scientific progress with its attendant Babel of classification has not really fused and confused the four vertebrate

classes. I note also what is said of the degenerate Tunicates, which, in a new edition of the zoological text-book most widely adopted in this country, are set up as a group co-ordinate with the other great branches of the animal kingdom. The chief interest of the paper, to me, is its bearing on "determinate evolution," well illustrated by such facts as the development of the heart and circulation from Amphibia upward to the crocodile, and prophetic of perfection and use in the higher vertebrates.

WALTER A. KIDD, Esq., M.D., writes :—

It is well that the Institute should have the opportunity, through the able paper of Professor John Cleland, of contributing to that reaction towards the views of Cuvier and Owen (called by Professor Huxley "The British Cuvier"), which last year a writer in the *Quarterly Review* discerned in the scientific horizon. The Classification of Vertebrata proposed commends itself more to the mind not prepossessed with evolutionary doctrines than, for example, that of Ray Lankester, who places among the Vertebrate Phylum—

- (1) The Craniata (or Cuvierian Vertebrata).
- (2) Cephalocorda (represented alone by Amphioxus).
- (3) Urochorda (Tunicata).
- (4) Hemichorda (Balanoglossus, alone).

Doubtless the divisions (2) (3) (4) possess those three structures characteristic of Vertebrata—noto-chord, gill-slits, and dorsal nerve-plates; but the evidence brought forward by Professor Cleland that the Tunicata are degenerate vertebrates, and the opinion of Professor Alleyne Nicholson that the Amphioxus is usually regarded as a degraded type of the Fishes, make it more correct to place No. (2) No. (3) and (4) in special divisions of the animal kingdom. The late Professor Milnes Marshall admitted that the Tunicata or Ascidians are degenerate animals, but refused to allow this of Amphioxus, saying that it "merely stops at what is an early stage in the development of the higher forms." He is not anxious to claim Tunicata, Balanoglossus, or even Amphioxus, as direct links between the Invertebrate and Vertebrate sub-Kingdoms, but that, of all living animals, Amphioxus most nearly represents the Common Ancestor of Vertebrata. No such half-hearted claims are strong enough for Mr. Edward Clodd in the *Primer of Evolution*, who boldly claims Amphioxus, Tunicata, and Balanoglossus as interesting links between the two

kingdoms! Considering the various opinions held as to these intrinsically unimportant and not very numerous groups of animals, it seems more judicial in men of science to continue the Classification of Vertebrata, as proposed by Professor Cleland, into Fishes, Reptiles in the extended sense, Birds, and Mammals.

The doctrine of Dohrn on Degeneration may have yet much to say on the question of the origin of great divisions of animals, and may seriously weaken the theory of evolution, as usually understood, *at certain of its points*, as in this borderland between the Vertebrate and Invertebrate sub-Kingdoms. To take two higher steps in the supposed ladder of the Ascent of Man, the Monotremata may be no more than degenerate Marsupialia, and not links in the chain between Reptiles and Marsupialia. The distribution of the Monotremata and Marsupialia in the Australian Province would harmonize with this, and the fact that the Ornithorhynchus in early life has teeth and loses them when full grown, and that the other type, the Echidna, has none, would tend to place them among Marsupialia of a degraded type, and to show that they have developed by "progressive simplification from their more elaborate ancestors." Again, the small mammals known as Insectivora, which are looked upon as links between certain Placental Mammals and Lemurs, may reasonably be considered to be degenerate Rodents, having become degenerate through their nocturnal subterranean and hybernating habits.

Indeed, when the doctrine of Degeneration is given full play, and the question of *varieties* fully borne in mind, a considerable weakening of the theory of organic evolution as usually understood may be anticipated. The determinate evolution of Professor Cleland is a much more philosophic conception than that in which Natural Selection, with its indispensable partner, accidental variation, is the main factor. Determinate evolution at any rate harmonizes with the undeniable teleology which stares the observer in the face, let the "naturalist" say what he will as to secondary or natural causes. Here, whether one accepts the view or not, supernatural causation of the life-history of the plants and animals which people the earth finds expression.

*THE AUTHOR'S REPLY.**April, 1898.*

Permit me to thank the Institute, and especially the members who took part in the discussion, for the kindly reception of my communication.

With regard to remarks made on the subject of birds and reptiles, I am constrained to mention that the similarity of a turtle's skull to a bird's consists mainly in the circumstance that modern turtles and birds are both edentulous. Both have beaks, but in cranial osteology they are widely different. It is true that Huxley used the single occipital condyle as a character to link together the parts of his group sauropsida. But I have pointed out the close relationship of the two-condyled amphibia to the single-condyled reptiles, and it will be readily admitted that the single mesial condyle is produced in a very simple way by constriction of the basi-occipital bone and fusion of two articular cavities. Curiously, no one till now has attracted attention to the fact that the seal has the two atlanto-occipital articulations run into one, and yet is as thoroughly mammalian in its skull as in every other part. The greatest care must be taken not to confuse between homology and analogy. Wings are analogous structures; but those of the pterodactyle, the bird and the bat present totally different variations of the skeleton of the pectoral limb, of which they all three are modifications. Homologically a penguin's wings are allied to those of other birds, and are as different as can well be conceived from the fins of a turtle. Questions of this sort are purely anatomical, and those who are familiar with reptilian and avian osteology cannot and do not for a moment admit the possibility of any doubt with regard to them. I have much pleasure in expressing my agreement with Dr. Kidd as to the origin of the Monotremata.

ORDINARY MEETING.*

THEOPHILUS G. PINCHES, ESQ., M.R.A.S., IN THE CHAIR.

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

ASSOCIATES :—Major G. MacKinlay, R.A., England ; H. B. Ford, Esq., D.D.S., Demerara ; D. B. Hewitt, Esq., B.A., L.R.C.P., L.R.C.S., J.P., Cheshire ; Rev. P. H. Cole, D.D., United States ; Rev. J. Hartley, D.D., United States.

The HON. SECRETARY (Captain F. PETRIE, F.G.S.).—I deeply regret to have to announce the death of the Institute's Honorary Treasurer, Mr. W. N. West. He added to his onerous duties as a banker the treasurer-ship of this Institute, which he held for upwards of 27 years. His name will ever be held in high esteem by those who were associated with him on the Council of this Institute, which owes much to that ripe and clear judgment which so specially distinguished him.

THE PROPOSED SCHEME FOR EMBANKING THE WATERS OF THE NILE AT ASSOUAN† IN UPPER EGYPT. By Professor EDWARD HULL, LL.D., F.R.S.

THE extraordinary fertility of Egypt, due to the periodic Nile floods, is an occurrence dating from the earliest period of Egyptian history, and in the days of the Roman Empire caused Egypt to become “the granary of Rome,” while it has placed Egypt at the head of fruitful countries. These periodic floods, utilized by a remarkable system of irrigating canals and minor channels, and worked by an industrious population, are now thoroughly understood, and need not be here described ; but it is to Sir Samuel Baker that we are indebted for a knowledge of their origin.‡ The thunderstorms which burst upon the highlands of Abyssinia in the early summer convert the wide channel of the Atbara from the condition of a chain of stagnant pools into an

* 3rd of 32nd Session.

† The works at Assouan and Silsileh were commenced in April, 1898, Mr. John Aird, M.P., having undertaken the contract.—ED.

‡ *The Nile Tributaries of Abyssinia.*

impetuous torrent. Descending towards the plains, the waters break down the high banks of alluvial mud, churning it into fine silt, and thus held in suspension, the solid matter is carried onwards towards the main stream of the White Nile, two hundred miles below Khartoum; and, impregnating the whole body of the river, passes onwards towards Lower Egypt and the Mediterranean, scattering fertility on either hand along its course. The White Nile rising in the Victoria Nyanza, although augmented by tributaries which descend from the highlands beyond Darfûr as well as the tributaries of the Albert Nyanza,* and other streams such as the Bahr-el-Azrak (or Blue Nile), contributes but little to the sediment which is so essential to the fertility of the Nile valley. The Atbara appears to be the most important source of this fertilising mud; and it is only by a visit to the valley of the Nile, that the traveller becomes impressed with the idea how essential are these annual floods of muddy water, utilised by means of the net-work of irrigating channels, to the fertility of the Nile valley and the great plain of Lower Egypt.† Should this process be interrupted only for a very few years these fruitful terraces and plains would be converted into the condition of the arid sandy deserts which border them on either hand.

In order to approach our subject it is necessary to recollect that under the existing natural system of "High" and "Low" Nile, Egypt is subjected to winter irrigation, which reaches its maximum height during the months of September and October. Early in June the river, which had fallen to its lowest level in March and April and for some weeks onwards, begins to rise; and this rise progresses somewhat rapidly during the months of July and August, reaching its maximum about the beginning of October as stated above, when the reverse process sets in, and after two or three periods of oscillation, the waters begin to fall during November and the following months. As the season of harvesting after the period of "High Nile" begins in December, it would be manifestly of enormous advantage if, with the high temperature which prevails all the year round,

* Which Baker claims as the source of the Nile, but being a smaller lake than the Victoria must give way.

† On the subject of irrigation of Egypt see Three Lectures by Sir Colin Scott-Moncrieff, *Professional Papers of the Corps of Royal Engineers*, vol. xix (1893).

and especially in the valley of the Nile itself, a second period of irrigation, extending from the beginning of March to the middle of July, could be ensured. By such a system the slack season of "Low Nile" might be turned to profitable account, and a second crop might be secured either of the same kind of produce, or different varieties, overlapping one another. Major R. H. Brown, Inspector-General of Irrigation for Upper Egypt, has shown how this result might be achieved,* and it can only be done by means of regulating weirs.

The advantages of such regulating weirs as that now proposed had for several years become apparent to those acquainted with the physical conditions and requirements of Egypt; and in 1873 the distinguished French engineer, Linant de Bellefonds, suggested the Silsileh "Gate of the Nile," a narrow gorge twenty-five miles below Assouân, as a suitable site for such a weir. Somewhat later, another Frenchman, Count de la Motte, further developed the idea, and proposed a reservoir at the same site.† Owing, however, to financial difficulties, nothing was done until 1889, when Mr. Prompt, Member of the Railway Board, pressed upon the Government the necessity of studying the subject; and in consequence, Mr. W. Willcocks, who, in conjunction with Sir Colin Scott-Moncrieff, carried out the reconstruction of the *barrage* for regulating the Nile floods in Lower Egypt, was instructed to investigate the whole question. The report of Mr. Willcocks embodies the result of four years' examination, extending from the Second Cataract to Cairo, and includes a survey of the remarkable basin known as the Fayûn, the advantages of which had been repeatedly urged upon the Government by an American engineer, Mr. Cope Whitehouse. Finally, Mr. Willcocks fixed upon the rapids of Philæ as, under all circumstances, the most favourable for the site of a regulating dam for Upper, Middle, and, to some extent, Lower Egypt; and in this decision he had the support of Mr. Garstin, the Head of the Public Works Department. It is unnecessary here to discuss the relative advantages of

* *Report on Perennial Irrigation and Flood Protection for Egypt.* By W. Willcocks, Director-General of Reservoirs, with note by W. E. Garstin, Under Secretary of State (1894).

† At Silsileh the ridge of the Nubian sandstone is cut through by the Nile, and the rocks terminate on either hand near the banks. The quarries from which the stone used in the construction of most of the ancient temples north of Assouân has been obtained, are situated on this ridge.

the various proposed sites, which are fully detailed in the reports issued by the Egyptian Government; but it should be mentioned that before the site at Philæ was finally adopted it was considered desirable to refer the subject to a commission of engineers of acknowledged eminence in matters of this kind. Accordingly Sir Benjamin Baker, M. Auguste Boulé, and Sig. Giacomo Torricelli, representing three countries which have strong interests in Egypt, were, on the recommendation of Sir Colin Scott-Moncrieff, appointed to visit and report on the various sites recommended from time to time. The Commissioners carried out their examination during the winter of 1894, and on returning to Cairo drew up their reports.* Unhappily the Commissioners were not unanimous in their conclusions; for while Sir B. Baker and Sig. Torricelli concurred in recommending the site at Philæ, M. Boulé was unable to take a similar view, and has drawn up a separate statement containing his objections as regards several particulars connected with the Philæ site. Great weight is justly due to M. Boulé's objections; but regarded from a practical standpoint, they seem capable of being fairly met; and it will be seen in the sequel that one of M. Boulé's chief objections, namely, the threatened submersion of the Temple of Philæ and other monuments, has been removed by the modified project which now holds the field.

The proposed site of the embankment at the First Cataract is one which commends itself for several reasons. Here the newer Tertiary and Cretaceous formations which follow the course of the Nile up as far as Assouân give place to granitic rocks of extreme geological antiquity, from which the huge monoliths that adorn the cities of Ancient Egypt, and now, to some extent, those of modern Europe, have been hewn. At the Isle of Philæ, the Nile enters this granitic region, which extends down the stream to Assouân, a distance of seven miles, and pursues its course along a channel interrupted by numerous rocky islands. Here, indeed, seem to be all the essentials for the construction of an embankment of the largest dimensions; namely, a granite foundation,† abundance of building stone capable of yielding blocks of any required size, and a channel not very deep and

* *Reports of the Technical Commission on Reservoirs*, with note by W. E. Garstin (1894).

† Very different from that of the barrage of Lower Egypt, which is built on "fine river sand and alluvial mud." Sir C. Scott-Moncrieff, Lecture II.

broken by islets laid nearly dry in the winter season. The site itself is situated about a mile below Philæ at Bab-esh-Shellâl, where the eastern bank of the river approaches the western, reducing the breadth to about one kilometre.* As originally intended the level of the upper surface of the water was to have been 114 metres above Low Nile, requiring a structure of enormous dimensions, and one which would have submerged the Temples of Philæ as well as several important monuments in Nubia.†

On the promulgation of this project, it is not to be wondered at that a storm of indignation arose, not only from Egyptologists, but from the educated public of all countries. Philæ, the gem of Egyptian islands, decorated with the most picturesque, if not the largest or most ancient of the temples, and containing many works of art and inscriptions of great historical interest, was to be submerged in order to benefit the agricultural population and to bring fresh revenue to the Government! Protests and petitions against such an act of vandalism poured in on all sides; the Society for the Preservation of Ancient Monuments taking a leading part in the movement. But it is only due to the Egyptian Government to recognise the fact that it was not slow to admit the reasonableness of these protests. A general reconsideration of the whole question was undertaken, and the merits of the various suggested sites were carefully weighed; with the result that the First Cataract was found beyond all question to be the best for the supply of Middle and Lower Egypt. In order, therefore, to retain this site and to meet the wishes of those who deprecated the submersion of Philæ, a compromise was determined on, by which the advantages of such a reservoir would be largely secured and injury to the monuments averted. This compromise consists in the simple plan of diminishing the height to which the water is to be carried by 8 metres, or 26·24 feet.‡ As the project now stands the highest level of the water will be 106 metres (347·7 feet) above Lowest Nile surface. At this level the surface of the water will only reach

* 1,094 yards.

† *Note au Conseil des Ministres* (1894); Willcocks in his *Report* states, "105 or 106 metres," p. 22, para. 51.

‡ *Note au Conseil*, p. 5. The *Illustrated London News* lately contained some views of Philæ, with others showing the limit to which the water will rise when the reservoir has been completed.

the base of the columns, but by means of a wall of solid masonry even this amount of submersion will be avoided.

The æsthetical objections having been thus amicably settled, let us see what are the substantial advantages likely to accrue to Egypt from the proposed works. The works themselves will be of stupendous proportions, and will cost much money; but the experience of the benefits derived from similar works, though on a smaller scale, in Lower Egypt is regarded as fully justifying the expenditure. Let us recollect, as Sir Colin Scott-Moncrieff has stated as the result of his own observation, that no river approaches the Nile in the fertilizing properties of its sediment. For thousands of years this sediment has proved sufficient to keep the soil productive without recourse to artificial manures.

Major Brown, who is a high authority on this subject, estimates that the increased profit for Middle Egypt between Cairo and Assyût alone will be as follows:—

- (1) The value of the land will be increased from £20,426,400 to £43,575,240.
- (2) The rental, from £3,159,998 to £5,506,905.
- (3) The value of the annual yield from £5,178,786, to £9,864,429.

The “gain to the state” from Lower Egypt has been estimated by Mr. E. W. P. Foster, Inspector-General of Irrigation for that province, as likely to vary from £278,000 to £300,000,* to which has to be added £8,000 per annum, the interest at 4 per cent. on the sale of cultivatable lands. It should be recollected that at the present day, notwithstanding their productiveness, certain tracts only enjoy perennial irrigation in good years of high Nile in summer, while other parts are irrigated only when the river rises to an exceptional level. In order, therefore, to obtain from the land its maximum supply of products, it is necessary that all the tracts should be insured a yearly irrigation; and the ultimate increase to the revenue and gain to the State, which may be eventually looked for on the completion of the works, are estimated by Mr. Garstin, for Middle and Lower Egypt as follows:—

* The former figure by Mr. Garstin (*Rep.* p. 13), the latter by Mr. Foster (Appendix xii, p. 19). In estimating the amount of enhanced value to the State, Mr. Garstin excludes Upper Egypt, on the ground that it is exceptionally poor, and distant from a sea-port. The fertile province of Dongola is, of course, not included.

1. Gain to the State £850,000 per annum.
2. Increased value of the crops from Upper, Middle, and Lower Egypt £16,000,000 per annum.

The above estimates are sufficiently remarkable, but may be accepted as resting on the authority of officials well acquainted with the conditions and requirements of the country. We have now to consider the mode by which the perennial irrigation is to be carried out.

The massive dam to be thrown across the river below Philæ is to be furnished with a large number of undersluices at short distances, and of sufficient size to allow the entire summer flood to pass freely as at present, and to carry off the sediment with which the waters are at that period so largely charged. This arrangement will prevent the deposition of the sediment over the bed of the reservoir and its ultimate silting up, as has been too often the case with reservoirs in India and elsewhere. After the flood waters have subsided towards the end of October, the regulating gates will be closed, and so remain during the three following months; and as the waters at this period are mainly drawn from their Central African sources and contain but little sediment, no silting is anticipated. By the end of this period they will have risen to their flood-level, and will be available for the second process of irrigation by means of the great lateral canals which will be carried down on both sides of the valley. There will, however, be a slight difference in the periods during which the water will be drawn from the reservoir for Upper and Middle Egypt. For the former the period is fixed as between the 1st March and the 15th July; whereas for the latter, the period will extend from the 1st April to the 31st July. This arrangement is necessary owing to the difference of climate in the two regions. The further south we go the higher is the temperature, and the earlier the demand for the increased supply of water. In addition to this it is to be recollected that the relief afforded by the arrival of the early flood is felt sooner in Upper, than in Middle, Egypt, which latter more nearly approaches the lower province in its agricultural conditions.*

* *Report*, pp. 9-16. In the history of Joseph we read, Gen. xli, that seven fruitful years preceded seven years of famine in Egypt. May not this have been brought about by periods of abundant Nile flood followed by short floods, each of seven years' duration?

The estimates of the engineers as to the requirements of storage in the proposed reservoir are as follows :—

For Upper Egypt ..	1,160,000,000	cubic metres.	
„ Middle Egypt ..	950,000,000	„	„
„ Lower Egypt ..	1,551,000,000	„	„
	3,661,000,000	„	„
Total ..			

Such in brief are the proposals, and such the expected advantages of the proposed scheme. Egypt has ever been the country of great public works, and the Assouân embankment, and the system of irrigation connected therewith, will not fall short of any hitherto attempted. By such an undertaking the British occupation will have conferred on the country an enormous benefit in addition to others already enjoyed. As regards ways and means there ought to be little difficulty in raising the money for carrying out the works; the financial condition of Egypt is sound, and its credit stands high. The amount required may be distributed over several years, and it has been shown that the profit returns will allow for a large outlay. The part played by irrigation in adding to the productiveness of the land-surface of the globe is little known outside the circle of experts. For many countries it is a question between irrigation or barrenness. Such are those of the valley of the Indus in India, the whole of Egypt, the great plains of Turkomania north of Persia and east of the Caspian, the plains of Northern Mexico, Colorado, Arizona, Kansas, and parts of California, the western coast of South America, and a great portion of the Australian continent. The rainfall in Cairo is about 1·4 inches per annum; yet agricultural land within a radius of twenty miles of its suburbs sells as high as £80 per acre, a price which may well call forth the envy of the British land-owner.* The ancient Egyptian flung a beautiful maiden to the crocodiles, when the time for the rise of the Nile waters began, in order to propitiate the god of the river for a full flood. The statesmen and engineers of these days adopt a more certain, as well as a more merciful, course for effecting the same object; namely, by building embankments and *tarrages*, and distributing the

* Sir Colin Scott-Moncrieff: Lecture I, p. 5.

stored up waters through a system of canals and aqueducts. Let us hope that the commencement of the greatest of these works will be one of the events which will add lustre to the Victorian era, and render memorable the progress in arts and works of civilization of the nineteenth century. The victory of progress as against savagery, which we have witnessed with admiration in the Soudân, may have imposed a check upon this great work in the Nile valley; but it ought to be only a temporary check, and the early years of the twentieth century ought to witness its completion.

The CHAIRMAN (Mr. T. G. PINCHES, M.R.A.S.).—We are much indebted to Professor Hull for his very interesting paper, and shall all be glad to hear any remarks thereon.

A MEMBER.—Would the scheme described by Dr. Hull tend to interfere with the dwellings and possessions of the inhabitants of that part of the country or the preservation of any ancient monuments there?

The AUTHOR.—No, that is a question which has been carefully considered by the engineers, both as regards the ruins of Philæ and the possessions of the inhabitants.

[A discussion of a conversational character here followed upon this point.]

Mr. BALDWIN LATHAM, M.I.C.E., F.G.S.—Allow me to say I am much indebted to Professor Hull for having brought this paper to the attention of this Institute. I know the Nile very well and have seen it at flood and at low water. There can be no possible difficulty in getting rid of the question of flood, if the sluices are kept open, as they would have to be open during the whole of the year. It is only a question of regulating the sluices. When there is a superabundance of water coming down, you let out a sufficient amount of water for the practical purpose of continuing irrigation, and as the year goes on these

sluices still keep open, so there is no liability of the sluices themselves ever silting up. But what is intended by this impounding reservoir is to continue irrigation over the present area during the whole year, instead of part of the year, so as to give increased fertility to the land. From the fact that water is dammed up on this high ridge, it does not follow that you can irrigate it at this high level. It is simply to irrigate on the same area now irrigated, only for a longer period. And it is a simple matter, and easy to understand by those who are acquainted with irrigation works. I regret one thing being omitted from the paper, and that is an estimate of the cost of these works. We should then have been able to judge better whether the thing is likely to be a success or not. With reference to the Nile I may tell you this also, that it varies immensely from year to year in its floods, and that even Egypt often suffers from an excess of water. An impounding reservoir would therefore cure that evil by regulating the supply where many of the inhabitants of the plain run great risks of being sacrificed by an over-bountiful flow of the Nile.

The AUTHOR.—I am gratified to hear the remarks of so eminent an engineer as the last speaker, who has himself had so much experience in engineering work in Cairo. I think his words alone will help to dispel any such doubts as those expressed by the first speaker.

There are some tracts which at "high Nile" are flooded, but which are unirrigated when the waters fail to come up to that level by 4 feet or 5 feet. Some of these terraces are very flat, and their perennial irrigation will add considerably to the extent of ground that it will be possible to keep under cultivation, and so add enormously to the value of the often isolated lands along the valley of the Nile.

As regards the estimates, I have not thought it part of my subject to go into the question; the documents are public, and the reports and the representations to the Egyptian Government are accessible and exceedingly interesting to anyone who has had to do with works of this kind.

The Khedive himself, I understand, warmly approves of the project, and trusts that it will in due time be carried out.

The CHAIRMAN.—We are very much obliged to Professor Hull for his interesting paper. As an archæologist I should like to say

that I hope there will be no destruction of any ancient monuments, and one wishes, also, that the inhabitants may not sustain any damage on account of the works that have been referred to. I think we may trust the administration of Egypt, and the British officers there, to see that everything shall be done to protect both the monuments and the welfare of the inhabitants.

The Meeting was then adjourned.

ORDINARY MEETING.*

COMMANDER HEATH, R.N., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following Election took place :—

ASSOCIATE :—H. Hartshorn, Esq., M.D., A.M., Japan.

A paper entitled "Common Errors as regards the relations of Science and Faith," by Prof. Macloskie, LL.D., of Princeton University, United States, was read. [The discussion on this will shortly be complete.]

* 6th of 32nd Session (1897).

ORDINARY MEETING.*

THE VEN. ARCHDEACON R. THORNTON, D.D., VICE-PRESIDENT,
IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and

The following paper was then read by the author :—

PROBLEMS OF ABORIGINAL ART IN AUSTRALIA.

By the Right Rev. S. THORNTON, D.D., Bishop of Ballarat.

I TENDERED a paper on another subject; but, by request, submit one on the topic announced. In doing so, I disclaim personal credit for any interesting products of research it may contain. I have often held converse with Aborigines in Australia, during a residence there of twenty years, but have never myself seen any of the rock-paintings or sculptures (some of them to be found in my own diocese) which present the special problems I am to introduce to you this afternoon. In doing this I am largely indebted to a lucid and copious address given at Brisbane in 1895, before the Australian Association for the Advancement of Science, by the President of its Ethnological and Anthropological Section, Thomas Worsnop, Esq., Town Clerk of Adelaide, South Australia. Expressions in a letter received by me from that gentleman warrant the belief that he will be gratified, rather than aggrieved, by my making free use of the materials collected by him, in drawing attention to the problems presented

* 8th of 32nd Session.

by the antiquities (if I may call them so) of the Australian continent, and awakening interest in the history, condition, and claims of its aboriginal population. Again, it is only right to mention that all labourers in this field cannot help being large debtors to R. H. Mathews, Esq., of New South Wales, medallist of the Royal Society of that colony, who has been indefatigable in its investigation.

So extraordinary is the ignorance still prevailing among educated English people about distant parts of the empire, that it hardly startled me to encounter the other day a gentleman who was unaware that any Aborigines at all remained in Australia; while it is not uncommon to meet with the entirely gratuitous idea that the Australians belong to a different order or species of humanity from ourselves, incapable of evangelisation or civilisation.

How many Aborigines remain it is impossible to say with confidence, the census enumerator not finding it convenient to pay his calls in the far interior of the Island Continent. That a process of diminution has been going on amongst them for a long time—as among the Maoris of New Zealand—accelerated where they have come into contact or conflict with white men, seems believed by all who have acquainted themselves with the subject. It is not difficult to conjecture some of the causes of this decay, but impossible to speak plainly of them. The abominations of heathenism do not bear discussion; but infanticide, pre-natal as well as post-natal, cannibalism, blood revenge, the killing of a man at every death (which prevails in some parts of the country), and the cruel treatment and excessive labour of the women among the heathen blacks, in addition to the precariousness of the means of life in Mid-Australia, would account in measure for the decrease referred to, which is retarded, if not stopped, by the influence of really Christian civilisation. It stands to reason that such decrease, while going forward, would be accompanied by deterioration in the qualities and capacities of the race itself. And a non-progressive race always tends to wither away. Still, the diminution does not seem to have gone on very rapidly. It may be mentioned that twins among the blacks, and even triplets, are common, which leaves some margin for infanticide. And the mutual battles between tribes do not appear to have been largely destructive of human life.

Wallace says the blacks “must have exceeded 150,000 when Australia was first settled by Europeans.” He estimates

them in 1879 (I know not on what grounds) at between 70,000 and 80,000: and writes, "it is not improbable that the degraded Australian will long outlast the much higher Maori or Tahitian." It is certainly noticeable that comparative survival of races does not bear direct proportion to nobleness of race, and is compatible with a process of extinction in the survivors. The Red man in America wiped out the far superior Toltecan, and then dwindled, himself: and the idea that the present Aborigines of Australia have superseded some more artistic people seems, at any rate, not untenable (though I do not adopt it); is confirmed, as some think, by the remains of by-gone art we are to consider presently; and not discouraged by the fact that, from time to time, fresh types of Aborigines are met with, such as the fair-skinned type, encountered by Grey in the N.W., and the stout and jovial examples found near the McDonnell Ranges by the recent Horn Expedition to Central Australia.

But the question remains a problem to be solved, and is one of the most interesting suggested by the Art remains we are to consider.

Some of the products of aboriginal art, indeed, do not in themselves suggest any profound problems. The black of to-day, in common with other savages, is not only strongly mimetic, but has his own sense of beauty in form or colour, and craves to give it expression in the decoration of his person, his weapons, and his utensils. He paints circles round his eyes; scars, with sharp shells, patterns on his back and shoulders: marks his face and body for festive occasions in red and white geometric lines; adorns his head with grass or cockatoo feathers, his forehead with bandeaux, his nose with bones thrust through the septum, his neck with strings of beads or teeth, and his legs with anklets of green leaves. His long, narrow crescent-shaped shield, his waddy, his throwing-stick, and even his boomerang exhibit the bar, the zig-zag, the herring-bone, the lozenge, the chevron, the St. Andrew's Cross (never the Latin or Greek cross), the circlet, and the oval. Strange to say, he never employs flowers or shells as ornaments, while of precious stones or metals he knows nothing. His love for removing the central front tooth may be dictated by a desire for symmetrical effect, or else for some conspicuous badge of initiation into certain religious rites.

Of utensils the black uses few, but his nets are beautifully made, and his grass baskets are not only grace-

ful in shape, but ornamented by lines of vari-coloured material.

His special delight, however, is in pictures; in painting or carving on trees, wood, bark, leaves, rock, hard clay, or the surface of birds' eggs; not, singularly enough, on bone. The delight with which the Aborigines at our mission stations adorn their huts with plain or coloured prints might be thought a result of civilisation; but a corresponding taste is unmistakeable in the uncivilised Australian. He smokes sheets of bark, and then draws on them with his thumb-nail, but with singular accuracy and spirit, the totem of his tribe, the forms of vegetation, turtles, birds, fishes, reptiles, marsupials, and men. Sometimes the representations are intentionally grotesque. Conventional types are adopted on his "message sticks" for trees, lakes, and rivers; and such devices as throwing up objects into relief by dark or white back-grounds, or concentric surrounding lines, evidence the true artistic spirit, while, problematically enough, all tangential lines are carefully avoided. He manufactures paints—red, white, and black—out of burnt earth, coloured tubers, pipe-clay, plumbago, and charcoal (not—except rarely, and in drawings commonly thought to be ancient—blue and yellow), and he gives his colours metallic lustre and permanence by mixing bird- or fish-oil or fat with them. His tool for carving is the opossum tooth, or flint. His circles are wonderfully true; his geometrical patterns sometimes beautiful, especially on (seemingly) ancient drawings, in which opportunities are cleverly availed of, such as a hole in the rock to draw a snake issuing, or an arm stretched out, from it. Above all, there is nothing deliberately indecent or revolting, in which he contrasts nobly with the artists of cleverer and more cultured races. Sometimes he forms patterns or figures on the flats by clearing grass away; sometimes digs them out in the sun-baked soil, or removes a hard and rough outside of rock to get a better surface, or moulds effigies of snakes—like the serpentine tumuli in Ohio or Missouri—in turfy ground.

The number of aboriginal carvings and paintings in different parts of Australia is simply prodigious. None, however, have been found by miners in the drift. Beneath the surface of the earth no remains of art have as yet, to my knowledge, been discovered.

The objects we have so far referred to present, as I have said, for the most part, no particular problems for solution.

They only evidence the possession of the artistic faculty in the race, in common with other untutored races; and, to that extent, the baselessness of the idea that the Australian is essentially different from the rest of mankind. His skull is long, small, and poorly-shaped, and his intellectual capacity low; but generic or specific "differentia" there is none: "God hath made of *one blood* all the nations of the earth." The corpuscles in that of the Australian are absolutely indistinguishable from those of blood flowing in the veins of Mr. Gladstone or Mr. Balfour. There is nothing in the Australian to militate against the idea of unity in the origin of mankind.

The art which hitherto has engaged our notice is, no doubt, inferior to that displayed by the Maori, the Fijian, or the Polynesian. But a somewhat different class of aboriginal work will now occupy our attention.

Lieutenant Grey (now the octogenarian Sir George) discovered, in 1841, in N.W. Australian caves, coloured drawings of a very remarkable kind; and many more have since been met with, presenting features of a most *piquant*, and distinctly "problematic," character. Mr. Worsnop has collected descriptions of many of these, and I shall have the honour of submitting representations of some of them; familiar, probably, to some present, but possibly fresh to not a few, and of unquestionable and peculiar interest.

In a temple-like cave of sandstone, in an elevated and romantic situation, and approached by a rough staircase of scattered rock some 5 feet in height;—a cave 35 feet wide at the entrance, 16 feet deep, and 8 feet high in front, roofed by a solid slab some 9 feet thick, rapidly inclined towards the back of the cave, where the height was some 5 feet, Grey found, painted imposingly inside the sloping roof, the first figure I show [Fig. 1]; the rock about it blackened, and the figure itself a vivid red and white, so that it seemed to lean out from the rock. Its head was encircled by red rays, inside which came a brilliant red stripe, crossed by lines of white, and bordered by a deeper red. The face was vivid white, the eyes black, but surrounded by red and yellow lines; the body was outlined in red, marked with red stripes and bars. This awe-inspiring figure was seemingly being contemplated [Fig. 2] by four other figures on the left-hand wall, which I also show; vividly coloured upon white ground, the four heads wearing a turban-like head-dress (unlike any now worn by Aborigines) of a bright blue



FIG. 1.
Red, eyes yellow.



FIG. 2.
Figures red.
Shading—horizontal = blue.
Perpendicular = red.
Stippled = yellow.

colour, and one figure wearing a necklace. Two had a dress with red stripes and bars, and one a waistband. Each face had a distinct expression: all were somewhat attractive: none of the faces had mouths. The colours were apparently indelible.

The next most remarkable drawing in the cave was a large *ancile*, or elliptic shield; the outside line deep blue, the body yellow, dotted over with red lines or spots, crossed by two lines of blue. On it was a kangaroo; two spear heads pointing in opposite directions; and two black balls.

A third sketch was of a man carrying a kangaroo.

There were some 50 other drawings of men, kangaroos, &c., in this cave, but altogether inferior in merit, and surmised to be subsequent additions; but at the back of the cave was a hand and arm painted black on white, of most striking appearance; while on the ceiling at the end, at the height where a sitter's head would have touched it, was a greasy mark, as though a human head of hair had habitually rubbed against it.

Here assuredly are "problems." What did the principal figures portrayed in this cave represent?

The sun-like glory round the head [Fig. 1] surely

suggests the supernatural, or Divinity. The markings on the body resemble nothing so much as Polynesian cloth, never worn by the Australian Aborigines of our time; to whom, again, blue and yellow pigments seem almost, if not quite, unknown. What, then, may be inferred from the absence of a mouth in all the figures? It is said to be sometimes omitted in modern aboriginal face-pictures; but may not that be a traditional convention? The mouth is the most conspicuous feature in the Aboriginal; it is large, thick-lipped, and sensual—a mere gobbling machine. Have we here the suggestion of an attribute of divinity—of a being conspicuously possessed of the more spiritual faculties of sight and smell, but superior to the need of food and drink?

Another solution of the problem has been suggested. Justin Martyr, *Apologia*, i, § 55, says: "The human form differs from the brutal in its uprightness and extended hands, and in the nose-protuberance from between the eyes, through which the creature breathes": and he adds, "it exhibits nothing else than the shape of the cross." If he means that the head, trunk and arms of man reveal the figure of the Roman instrument of torture, one is reminded of the wiseacre who traced Providential goodness in the arrangement that rivers flowed near great towns. If the philosophic Justin cannot be suspected of falling into this trap—and I think better of him, though Tertullian (*Ad. Nat.*, i, 12) seems to quote him in that sense—one may conclude that he indicated the cross made by the intersection of the nose and eyes of man; and *this would be emphasised by disregarding the mouth*. May it be supposed, then, that we have in these mouthless faces a *Christian* symbol? But, if so, why is the Latin or Greek Cross itself—and even the Tau—nowhere discoverable in the caves?

A third solution suggested is that we have here the half-veiled face of Oriental women. It is hard either to controvert, or to accept, this idea.

Blue—the colour of the sky and ocean—may well be a hue in the *nimbus* round a celestial head. Yellow, again, is the colour of the golden sunlight; while red, blue, and yellow, with white as their combination, are the emblematic colours of religion all the world over, their symbolism being abundantly employed in Holy Scripture.

Are not these likely to have been Sacred figures? May we trace here a representation of *Baiamé*—the Creator, in Australian theology—presented by this effort of sacred art

to worshippers frequenting the temple-cave, attended by *wundas*, or ministering spirits? May the cloth-robe suggest that these drawings—occurring in a part of the continent where it is thought its first colonists entered Australia from Asia—were executed at a very early time, before the manufacture and use of fibre-cloth (retained by their fellow-emigrants who went eastward to the islands) were forgotten by the degenerate Australians? And may the grease-mark on the ceiling show that in the *adytum* of this Cave-Temple a *chorargie—chirurgien*, medicine man, or priest—was wont officially to sit and face the worshippers?



FIG. 3.

The whole case is a “problem,” and conjecture one’s sole resource. It would be interesting to know for certain what the Aborigines of to-day say and think of these caves; but testimony on the point is conflicting. Some of them are said to repudiate all knowledge of the origin of the drawings: they were done “murry murry (that is, very very) many moons (ages) ago”; and they superstitiously shun the caves as fetish-places—“too much dibble dibble.” Others of them are said to camp in the caves without hesitation, and to claim the drawings as done by their fathers. But it is plain that the religious associations and reverence connected with them and with their symbolism have decayed. It seems to charac-

terise the religious observances of the blacks, that they are a decayed mechanical survival of forms that must once have had meaning and reality.

As for the *ancile*, or elliptic shield, one can make nothing of it. Grey fancied it was some charm connected with the finding of game; but such an explanation sorely needs explaining.

Another cave introduced a fresh problem. [Fig. 3.] Fronting it, high up on the vertical face of a cliff, and unreachably without mechanical aid, had been carved out of the solid stone a human head in profile, which I show. It was 2 feet long and 16 inches across, and 1½-inch thick; and I leave my hearers to say whether it is not a striking and distinguished face. It is absolutely different from the heads of modern Aborigines. The worn edges of the cameo, where it joined the rock-surface, seemed to mark a long interval since it was carved: the difficulty of carving it where it stood must have been immense—unless, indeed, the rock-face had been near the ground at the time, and the ground had worn away since—which, again, would probably imply antiquity.

What a problem this Caucasian face presents! Is it that of some stranger from Europe long ago—perhaps before the Portuguese or Spanish visitors of the sixteenth and seventeenth centuries? In all probability European ships traversed the Pacific before the days of Balboa; for Greek columns are found in an island of the South Sea: and the prevalence of small-pox among the Australians when we first settled there is said—with what truth I must leave pathologists to decide—to postulate previous residence of Europeans amongst them. There is nothing, however, to identify the head before us with any particular time or country. It presents a problem gruesomely suggestive. The severed head has been carved on the rock, probably from a sense of its beauty: the body was in the hands of cannibals, and may have been “carved” after a more tragic fashion!

In another cave, elevated several feet above the surrounding ground, was a painting [Fig. 4] 10 feet 6 inches

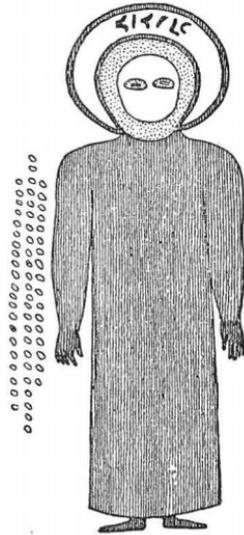


FIG. 4.

Stippled circle and eyes = yellow.

in height, of a man clothed to the wrists and ankles with a red garment, in a way unknown among modern aboriginals. The head was encircled with what seemed like bandages—red, yellow and white—and the eyes were the only features represented. On the highest tier of bandages was an inscription, in red lines: on each side of the cave were figures of turtles and gigantic snakes. On the right of the figure were depicted 62 small o's, or rings.

What meaneth this? One anxiously studies the inscription, but experts can make nothing of it. The characters perhaps resemble Thibetan more than any other. Is it a clumsy tracing of some Thibetan title? Have we here a standing Buddh—or a Buddhist bonze,—an evidence that Buddhistic teaching was brought over from Asia long ago? Nothing else has been found, so far, to confirm the speculation. Do the 62 little o's represent the limited company of adherents or converts obtained? One finds them employed as tattoo marks on the shoulders of the blacks. Acquaintance, somewhere, with races of men wearing turbans seems implied, in the portrayal by the Aborigines of such a figure: but whether as a reminiscence of days before they colonised Australia, or through visitors from the Asiatic continent or islands, who shall say?

Crowds of drawings are found in the cliffs and in the caves of the Kimberley district, West Australia, many of them artistically filled in and shaded, the mouths in the faces, alone, being badly done. May that feature have been added by a later hand? A figure resembling a monkey is noticeable, as a link of connection of some kind with Asia;—the animal is unknown in Australia.

On, or near, the Alligator River are forty caves in a radius of 100 miles, containing immense numbers of drawings and hieroglyphics, pictures of canoes and of human skeletons (perhaps the skeleton is the Aboriginal symbol for man in his higher condition, after death, for in their solemn dances they trace the skeleton on their persons); many of the human figures have all the features; some have European features and clothing. One man has his arms crossed over his breast. On the Darwin River, excellent drawings are found on the trees: on the overland track between Queensland and Port Darwin is drawn a full-length black pursuing two little white men, whose hair stands on end with fear; a third lies speared on the ground: these drawings may well be modern. In the McDonnell ranges, however, are numerous paintings in yellow,

red, and black, which the old men of the place emphatically declare had meanings once, long lost to later generations.

Similar drawings in vast numbers are found in the north-east and centre of Australia. In one case was found a shield with the Roman V and I painted on it: in another the picture of a man with a broad tail: in another a colossal frog, jumping.

At Buckland's tableland, Central Queensland, on the banks of the Nardoo Creek, is a high cliff on the face of which, under a projecting ledge of rock, and 21 feet at bottom from the highest foothold, is a magnificent representation some 70 feet across, covering 500 square feet, in red, blue, white and yellow, of a lake of sulphurous fire, out of which are stretched hundreds of dusky arms, life-size, in every conceivable position, the muscles knotted, and the hands grasping convulsively, or pointing heavenwards.

They are faithful in an anatomical point of view: every joint is seen, and looks alive: the hands are like those of the blacks, and some of the fingers are bent back, as the blacks can bend them. The natives of to-day have a horror of this place, and say neither their fathers nor they know anything of the origin of the picture. Does it represent a volcanic eruption, such as long ago may have occurred in Australia; or was it suggested by teachings about Hell?

An immense number of representations of the human hand are found: many are red in colour—the red hand, I believe, being found all over India and other countries, as well as in the scutcheon of our baronets! Frequently they seem impressions of hands dipped in pigment: but in many cases the hand is done in splash-work, pigment having been squirted over it, leaving a blank pattern behind. This would account for the hand being mostly the left, and pointing upwards, very seldom downwards,—as that would be the most natural and convenient method in doing the work. The hands are found on almost inaccessible cliffs.

One group inside a small cave appears to record a combat, or hand-hunting expedition. It would seem to read "there were four boomerangs (fighters): we cut off six pairs of hands." Another picture shows four red hearts—wonderfully well outlined—pierced by black spears.

I now exhibit some most extraordinary paintings in caves and recesses on the Regent's River, which I cannot possibly explain. They are in red, black, brown, yellow, white, and pale blue; and in some cases have manifestly been used on

palimpsest principles; a more recent drawing surmounting an older one.

In the first [Fig. 5] I direct attention to the extraordinary decapitated figures, with a man in the attitude of adoration behind them. Have we human sacrifice here? Also to the aquiline character of the nose—quite different from the

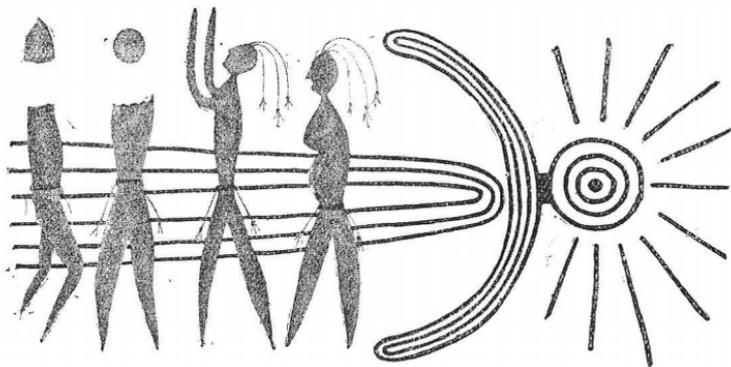


FIG. 5.

existing type; to the very peculiar tasselled head-dress and girdles—quite unknown among present-day natives; and to the tapering limbs of the figures, which end in points. The transverse form looks like a deity—the Sun, perhaps—and resembles a Polynesian idol.

The next shows two figures painted over a huge shark [Fig. 6] or marine creature. The figures are unlike current

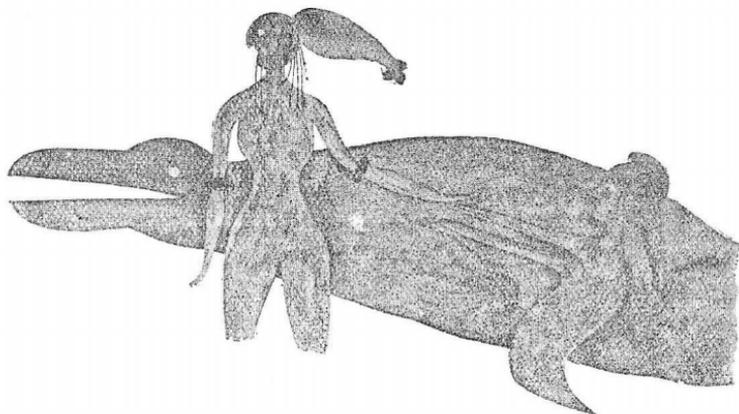


FIG. 6.

types, in face and head-dress, the latter being most peculiar—like an elongated bladder, curved, and ending in a trefoil. The lower figure wears a Phrygian cap, to which this strange head-dress is attached. The limbs taper in an extraordinary way. The tassels reappear, in abundance, on the larger figure.

A very remarkable cave-drawing has been figured by Westall, and can be seen at the Colonial Institute library. It represents a procession of 32 men and women with a kangaroo at their head. Most of the figures are draped to the ankles; and two, much larger than the rest, brandish a hilted sword, and a long staff, respectively. It was found at Memory Cove, South Australia.

The next picture shown is puzzling indeed [Fig. 7].



FIG. 7.

Over and across the figures of a snake and an old-man kangaroo have been drawn (as shown) five quite abnormal human figures, with the strange tapering extremities (sometimes ending in lumps), the tassels, and the bladder-like head-dress; except in one case, where a countenance somewhat like that of an ancient Assyrian is surmounted by a turreted hat, reminding one of the tablets of Chaldea and Assyria. A learned friend writes: "The figures are not Assyrian or Egyptian, nor do they seem to be Indian. They are so unique I have never seen anything like them before."

Over this drawing and on the left of it are strange hieroglyphic marks, hitherto undeciphered, or at least uninterpreted.

The next picture is still stranger. [Fig. 8.] Upon, and

encased by, a huge bladder-like form reminding one of a cuttle fish, but with glory round its head, stands an armless and featureless human figure, in shape apparently female, with tassels and head-dress. Protuberances from the bladder-like case bear a mask and a snake's head on two extremities, with tassels here and there. The whole has a hideous and "nightmare" appearance. It is what an Eton boy might listlessly draw on his blotting-paper at an examination, when he could not do the questions. Was this

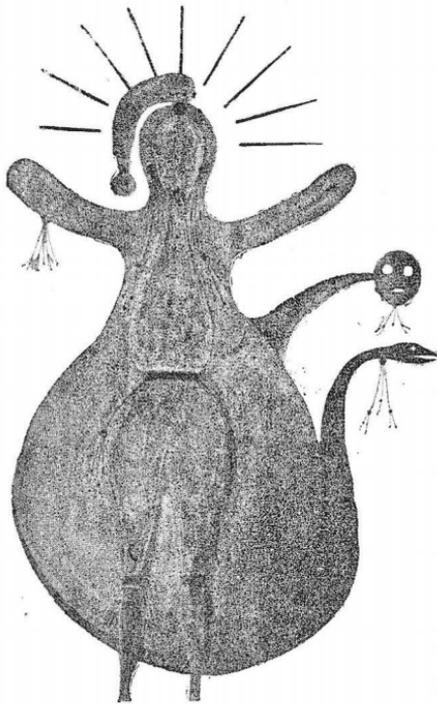


FIG. 8.

figure done by children,—or in some grotesque, wild mood, as a fantastic, unmeaning thing?

The next picture is to me very *piquant* indeed. [Fig. 9.] On a hard, smooth-faced cliff, 45 feet high, and about 15 feet above the bank of a creek 15 or 20 feet deep—so that access to the bottom of the carving is impossible without a ladder—are cut five vertical grooves, about $1\frac{1}{2}$ inches in diameter and $1\frac{1}{4}$ inches deep. On the right are two disjointed grooves. Underneath the five grooves are five round cavities; between them are cut arrows (the arrow, be it remembered, being unused by the Aborigines), notches, and ten well-executed representations of the *Jewish seven-branched*

candlestick! Of the problem here presented I offer no solution: but I saw lately what certainly awoke my special curiosity in connexion with it, viz., that in the hitherto unexplored interior of Vancouver Island, Mr. F. W. Laing, F.R.G.S., had found cut on the face of a giant rock, in the great Central Lake, some strange markings: "five parallel lines resembling a musical staff," and beside them "a seven-branched Candlestick!" The Smithsonian Institute is in-

vestigating this discovery; and one awaits with interest the conclusions that may be reached about it.

Once more [Fig. 10, next page] I submit a representation of a diaper pattern of singular beauty—red on a white ground—covering the interior of a cave at Ooraminna, on the overland telegraph track from Port Darwin to Adelaide. The diaper covers a wall-face 12 feet high by 16 wide: and access can only be obtained to the cave by passing behind a curtain of falling water. At the bottom appear two medallions, of singular and symmetrical form.

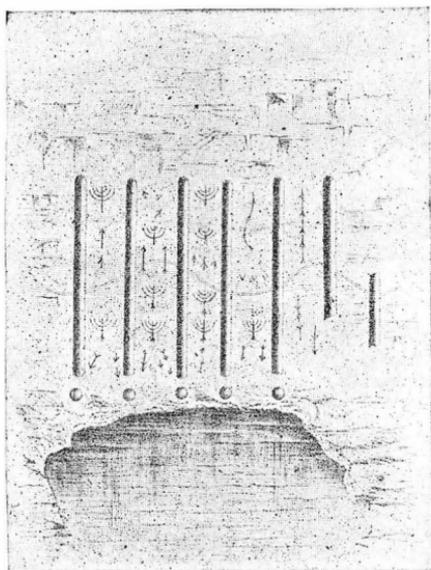


FIG. 9.

Last September I was in Ireland, a fellow-guest with the late Archbishop of Canterbury, in whose company I visited the "seven churches" at Glendalough. It certainly constitutes a "problem," that we should have found, covering the entire face of an Irish Bishop's tomb supposed to be of the sixth century, the precise pattern which I here show as decorating a cave in Mid-Australia! I drew the Archbishop's attention to the correspondence, which he admitted to be unmistakable, and in a high degree remarkable and interesting.

I have now submitted to you enough examples, I hope, of Aboriginal Australian pictorial art to justify my view, that it presents problems of much interest and difficulty. In other kinds of art, the Aborigines of Australia offer little to challenge attention. For music they use rude trumpets of long, hollow bamboo; wooden cymbals; drums of rolled-out opossum skins; and a *sistrum*, consisting of shells with the apices ground off, strung together on fibre, looped up to the

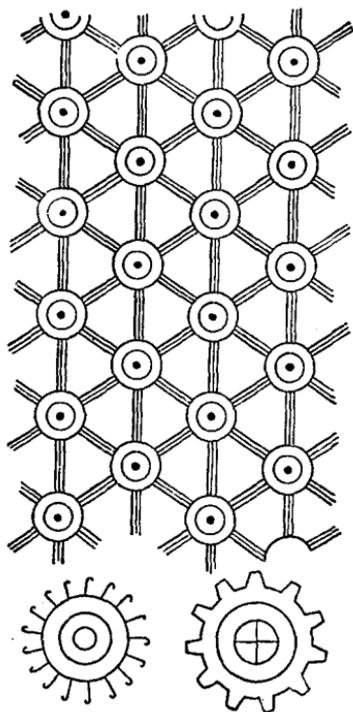


FIG. 10.

vertebra of a dog. By this handle it is held and shaken, and produces a melodious jingle. But the music of the uncivilised blacks, if plaintive, is monotonous, and hardly interesting. When taught better music they delight in singing it; and some of the Christian blacks have been trained to play, and even teach, the harmonium.

Play-acting is not unknown among the blacks as a charm against visits of ghosts: and their dances are not without an artistic element of their own.

But now, what can be said by way of inference from the facts before us? It would be unscientific, indeed, to dogmatise on the subject. On the question of the late or early date of the paintings and carvings opinion is not a little divided.

One thing emerges, I think: it is a conclusion also drawn by Mr. Fraser in his paper read before this Institute on the observances of the "Bora," or ceremonial induction of a youth into the privileges of manhood among the Australians, as compared with similar observances among certain African tribes: namely, that the former are only a branch of the one great human family, and not an isolated and independent genus or species of "humans." As I have said before, there is nothing in the essential qualities or faculties of the

Australians differentiating them from other races of men, or in itself opposed to a belief in the descent of all from a single stock, or pair. There is much to point to the conclusion that, though long resident in the Island Continent, its Aborigines came over from Asia—probably from India *via* Java and Timor and New Guinea—being a part of the eastern branch of the great Cushite race, of which a western section passed into Africa from its cradle north of the Persian Gulf. It also seems probable that the race has degenerated from more cultured days to its present inferior condition. All these conclusions are in harmony with the indications of Scripture. We will briefly examine them—omitting the first (the identity of the Australian in ultimate origin with other peoples), on which enough has been already said.

The affinity of the Australian to the Dravidian peoples in Central India and the Deccan—originally Cushite—is inferred from a certain correspondence in features, language, and weapons. The boomerang, for instance, is known to the Dravidian tribes of India, as it was to the ancient Egyptians (and perhaps, also, as the “Cateia” of the Latin poets, to the Teutons). In language a connection is unmistakable. The pronouns I, thou, he, we, you are the same in Australian as in the Dravidian tongues of the Madras Presidency. (One is familiar with the scorn with which Max Müller treats seeming coincidences in words of the same meaning in languages of different families: but it is singular almost to laughableness that the Australian *cooe* for “here” should be so like the Italian *qui* and the Persian *koo*; *gin* for “woman” so like the Greek *γυνή*: *nāo* for “ship” or “boat” so like *ναῦς*—the Australian has no *s*; *kalia* for a “beautiful” woman so like *καλή*: “writing” or “mark,” *kalama*; *giber gunyah*, a “rock shelter” or “covering,” almost pure Arabic for the same; and may I add the *corroboree* of wild religious dancers, so like “Corybantes”? Such curious examples might be multiplied.)

But the separation from the parent stem must have taken place early, or the Australians must have strangely lost what their kindred of the same stock possess. The *s*, *f*, *x*, and *z*, for instance, are unknown to them: so are numerals above 3,—or at any rate 4: so are the bow and arrow, pottery, tillage, the custom of buying and selling, or even barter, and navigation of the seas. Moreover, the resemblances they present to their kindred in other parts seem to be not specific resemblances to any particular tribes—only

general, in characteristics shared at an early stage of their common history; which points to identity of original race, but in the distant past.

The antiquity of their arrival in the land may be inferred from various circumstantial evidences, in default of all records and traditions: such as the complicated diversity of their tribal vocabularies; and the length of time required for the whole continent to have been overrun by them, and partitioned into *dowdai's*, or *taorai's*, i.e. tribal districts. Strangely enough, they call Australia "the Little Country," *Kei Dowdai*, and New Guinea *Murry Dowdai*, or "the Great Country," a term suggestive of a time when they reached the former from the mountainous islands north of it, and saw the prevailing flatness, before they learned the scale, of Australia.

The absence of the slave institution amongst them favours their antiquity: and it has been inferred also from the vast scale of quarries from which they have hewn from generation to generation certain small stones they use for pounding *nardoo*; from the size of trees growing above their so-called "ovens,"—full of bones, stone-axes, and relics of human food; and from the enormous heaps of broken shells in their favourite places for consuming, at particular times, certain kinds of shell-fish,—underlying, in some cases, the silt of river-beds.

The fact of the immigration itself seems to point to a time when either navigation of the open sea was not unknown to them, or very different geological conditions made crossing Torres' Strait (perhaps on rafts) much easier than to-day.

The great antiquity of any of the drawings has, no doubt, been challenged, and it is hard to establish it with any confidence: but the above considerations seem to render it probable, in the case of some of them. It is true that in some places—perhaps owing to the character of the local rock-surface—they are perishing rather rapidly, which may imply that they cannot have existed long: but generally the case seems otherwise; and marks *known* to be many years old seem as fresh now as if made yesterday. The yellow and blue in some of the best drawings appear to favour the idea of antiquity, pigments of those colours being little, if at all, known to the modern black.

The degeneration of the artistic and other capacities of the race—as notably among the races of India—seems indicated

by the inferior art of the more modern drawings, and the absence of a lofty or religious *motif* in them. The originator of the throwing-stick—peculiar, I think, to Australia—must have been highly ingenious. Some wise and sagacious mind in the past must have instituted those most peculiar caste customs among the Australians which have the effect of shifting aristocracy by degrees from one family to another, and preventing the growth of a hereditary dominant class: as well as the salutary interdiction of marriage between persons doubly related to each other. And it seems significant of some religious traditions coming down from a bygone time of higher religious civilization, that observances prevail bearing a strong resemblance to those alluded to or prescribed in Genesis xxiv, 9; Deuteronomy xxiii, 12, 13, and Leviticus xii, xv.

The singular custom of circumcision exists in several tribes. Surely it must have been inherited from some other time and country! Strange to say, the habit of prayer to a Deity seems to have died out amongst them.

Happily, the true religious sentiment, however dormant, can be re-awakened in their case. The pollutions of savagery are not speedily effaced in a people: but I speak of what I know when I say that the Australian Aboriginal can apprehend and embrace the Christian Gospel, and that, when embraced indeed, it can transform his life. The Victorian Government, though rigidly non-religious, encourages religious ministrations in the governmental Black stations, on the ground of the potent and salutary influence of religion upon the conduct of the Aborigines.

I owe this audience an apology for some discursiveness in dealing with my topic. And I pray it to remember, that I only profess to bring forward in this Paper some of the problems suggested by the art of the Australian Aborigines; not to be competent to solve them. Doubtless there are those among the ladies and gentlemen I have had the honour to address infinitely better qualified than myself to undertake the task. I shall feel thankful if I may hope that my Paper will have excited in their minds some increased interest in a subject with which few educated persons in this country seem to have much acquaintance at present.

The CHAIRMAN (The Ven. ARCHDEACON THORNTON, D.D.)—I am sure I may return the thanks of the meeting to the Bishop of Ballarat for the extremely interesting subject which he has disclosed to us. Perhaps someone will begin the discussion upon it.

Rev. W. S. LACH-SZYRMA, M.A.—I think the suggestion as to these ancient people having come over from Asia is very interesting. To my mind Mrs. Langton Parker, in her work on *Legendary Lore*, seems to throw light on the theory as to Australians being similar to Europeans—of the later Stone Age—and a good many ancient legends and traditions seem to be somewhat similar to those found in Europe, which I believe really existed in the early periods—perhaps in this island in the Dolmen period—probably some thousands of years ago. Some of the legends of the Folklore of Europe represent that sort of transition or mixture of men and animals which is certainly very striking in these Australian tales.

Mr. D. HOWARD, D.L., F.C.S., &c.—This is one of those papers which are exceedingly interesting from a point of view which it is no novelty, perhaps, to remark on; but which needs to be kept in mind now as much as ever; that is, the necessity for suspense of judgment. Not long ago, certainly in my early days, it was said that the aborigines of Australia had been cut off from the rest of mankind for unlimited periods. Now we cannot help feeling that the evidence is all the other way. The fact that there are no traces of man in the drift—nothing corresponding with the discovery of human implements in the drift of many caves in Europe, points to these people being recent rather than ancient. Certainly what one sees of them helps to point to the fact that they belong to the descending scale rather than the ascending, and so far from indicating what we came from them, on the contrary, indicate the horrible *terminus ad quem* to which the human race may come.

Mr. L. THRUPP.—I spent many years in Australia, and have turned my attention to some of the subjects alluded to, and I desire to express my agreement with the last speaker—that the Australian is a degenerate race. It has gone down in the scale instead of being an example, as is so frequently urged by some scientific people, that the savage is the original specimen from which we have all risen. In too many parts of the world there is distinct evidence that in places of the earth where savages have existed civilisation once existed. We can well understand this

fact in the case of Australia. It has been practically isolated, and has, therefore, fed on itself as far as intellect is concerned, and has gone down to a most extraordinary degree; not but what, as has been pointed out by the author—and very properly, the race is yet improvable. They can be made to utilise a thing and they can be utilised not only for the ordinary purposes of work, but they are also receptive of religious feeling and religious teaching. In some parts of South Australia there have been institutions for training the aborigines for many years, and not without success, though there have been disappointments; but the extraordinary thing is, that throughout that continent there should be such an obliteration of all the leading features of modern civilisation.

Some things that the author has drawn our attention to exist a thousand miles inland, and therefore they could not have been brought about by any persons touching on the coast of that country at a late period; this shows that the period in which they were done must have been very many ages ago, and that, therefore, anything that can be found there must be a relic of the long past.

Mr. HAWKINS.—It seems to me that if these rock-carvings and paintings were done many years ago, by the ancestors of the present inhabitants, who were more civilised than those of the present day, it raises this difficulty—that they appear to have neglected the representation of the living. If the race who did these carvings had a certain amount of artistic talent they would probably have attempted to delineate the features of those living; but these representations do not give anything like the type of face you now have; these rock-carvings are quite different, and that seems rather to militate against the idea that they were done by the ancestors of the present inhabitants.

A MEMBER.—The scientific may object that the paintings are not by the aborigines of Australia, but by foreign races. I think it is important to know whether the present aborigines are still given to writing and painting. The American Indians are, but the Arabs are not. So I would ask whether the present aborigines of Australia are still a picture-making race.

The BISHOP OF BALLARAT.—I may answer that in the affirmative. The aborigines are fond of painting, and still carve the rocks, and also paint inside caves, and draw on bark. The art of the present day is distinctly inferior to the specimens I have shown you;

but they are a picture-drawing race, and fond of attempts in that direction.

A MEMBER.—The ethnological problem suggested by these various drawings and inscriptions is extremely interesting when you notice that the author has associated the aborigines of Australia with the Cushite race. Some two years ago I was in Australia, and had many conversations with Mr. Worsnop, referred to in the paper; and, as I had some knowledge of Akkadian inscriptions, he asked me if there was any resemblance between the remains of the aborigines of Australia and those of the Syrians and Babylonians. I carefully looked at them, and can see no connection or resemblance. Of course there is the general resemblance that seems to exist in the writings of a number of ancient races—that of picture-writing. I have noticed that the curious head which appears in the Australian drawings with the absence of a mouth, and something like that which has been shown to us, appears in the Hittite inscriptions. In all likelihood, therefore, I should say there must be some connection between the descendants of Ham and the aborigines of Australia, though it is a long jump to go back from the present aborigines to the time when the Hamitic race occupied Babylonia, and wrote those remarkable Akkadian inscriptions which are being read at the present day. Undoubtedly the Akkadian inscriptions belong to a race which had the art of writing even before they came into Babylonia; but these inscriptions were evidently originally made on stone, and in Babylonia there was no stone, and the older cuneiform inscriptions are developments of the older Akkadian. No doubt there must have been a considerable amount of intercourse between Australia and other countries long before the English or even the French set foot upon the island. Mr. Worsnop told me he had—in fact he showed me—an object found buried some 20 feet under the earth at the root of a tree. I am not able to point out the exact geological position where the object was found; but he was good enough to give me an account of it, and to allow me to bring it home and take it to the British Museum, and there the head of the Chinese Department examined it and said it was evidently of Chinese origin, and put the date at something like 200 or 300 years ago. It is the figure of a sage, bearing a pitcher in his hand, which is an emblem of wisdom. The explanation of these objects being found there

may, of course, be accidental intercourse resulting from shipwreck, or something of that kind, or there may have been intercourse for the purposes of trade, or some military expedition; but it certainly shows that the Australians were not absolutely cut off from the rest of the world, but that communication existed between the Australians and other nationalities.

The CHAIRMAN.—We shall be glad to hear the opinions of any visitors who are not Members or Associates.

A VISITOR.—I should like to ask the Bishop of Ballarat what were the compositions of these paints? Was it distemper, or what kind of material?

The BISHOP OF BALLARAT.—Well, the yellow and blue are not decided—I cannot say what they are. The red was burnt clay raddle; the black, charcoal with fish fat mixed with it; the brown is a mixture of black and red. There is also a certain root grown in Australia which produces a kind of red pigment if puddled with water, and that is largely used; but in most cases there is a mixture of oil or fat.

A VISITOR.—Is not it true that the natives do possess considerable and marked intelligence to-day?

The BISHOP OF BALLARAT.—What I have specially dealt with to-day has been art. I do not think what they can produce now is to be compared with what I have shown you to-day.

As to their intelligence, it is very fair in youth; but at sixteen or seventeen years of age they cease to progress, and as a rule no longer care to read, or to pursue their studies. In a few cases they keep up their knowledge. One black in my diocese is a Government sewing-mistress; another teaches the harmonium. Naturally we are anxious to see if we can get an aboriginal ministry from among them, but as yet I see no prospect of it. The little boys and girls are quite equal to our own in apprehensiveness; but in the case of the adults, if you try to exchange ideas with them you find continuous dialogue very difficult. Their mental capacity, although originally promising, seems to have no progressive character.

The CHAIRMAN.—It is generally expected that the Chairman should say something on the subject before the meeting. I must therefore thank those who have spoken, and venture to give you my own views.

Several theories are proposed as to the possible origin of these

extraordinary paintings and carvings. I confess I incline to the idea that they represent a Buddhist Mission. I observe that the features which are represented are not at all of the Australian type, but are very much indeed of the type of the Buddha. The aureole with rays appears to me to have a Buddhistic significance. The aureole, or nimbus, is not, as some imagine, essentially Christian: it is found in Indian coins and sculpture. I notice in one of the designs a sort of likeness to the Indian mark known as *svastika*. The theory that they have belonged to a Buddhist Mission, I think, is a tenable one. But why are the faces without mouths? Because of the silence which is enforced on those who are initiated into the Buddhist mysteries. I would suggest that this view, although not without its difficulties, is the one that explains the peculiarities we observe, better than any other. I would further suggest that in the time of Buddha, 500 years and more before the Christian era, there was a group of islands where the Australian continent is now. I always understood that Australia was rising rapidly, and that the wharfs in Melbourne, now some distance from the sea, were not long since quite close to it. I fancy that Australia, some 500 years before the Christian era, was a Polynesia; and, therefore, we can more easily understand Buddhist missionaries going to and from the various islands, and leaving traces of themselves which appear in these carvings.

The BISHOP OF BALLARAT.—I am much indebted to those who have taken part in the discussion. With regard to the suggestion quoted from Mrs. Parker's work, I am thankful for it, but I have not read the book mentioned.

With regard to the rays round the heads, I was much interested in the reference made by the Chairman to similar rays surrounding the heads of Kings on Indian coins. I never presumed to say that they were necessarily of Christian significance.

Several speakers have concurred in what I said as to Australian degeneration. One gentleman drew attention to the type of face being very different from the aboriginal. One would expect that in pictorial representation they would reproduce the faces with which they were familiar; but that is not so, and it is a most puzzling thing. Remember, I have brought before you "problems" this afternoon, and have not undertaken to solve them. It has to be considered whether some of these sharp angles in the faces may not be the result of unskilful drawing. It is not so

easy to draw curves as sharp lines. The non-Akkadian character, if I may so call it, of the drawings does not seem to correspond (as was pointed out) with those of the Cushite races in lands north of the Persian Gulf; but I do not think that difference would prove that the Australians are not a Cushite race. I think they are, and that they belonged to the eastern tide of emigration of Cushites, and not the western, which presented different characteristics.

One speaker referred to a peculiar object discovered 20 feet below the surface at the foot of a tree, thought to be of Chinese workmanship of two or three hundred years ago. About 20 feet deep in the soil at Ballarat was discovered what you would imagine must have been put there long ago. It was imbedded in solid ground dug out for mining purposes, and what do you think it was? It was the head of a miner's pick of some sixty years before only. Sometimes objects work their way down into the ground, by what means it is hard to explain.

The Chairman's suggestion about the absence of the mouth is very interesting; and I think it quite possible that some of the drawings are Buddhistic. Probably they must be credited to different periods: but it is remarkable that we trace no further relics of Buddhistic teaching. If the absence of a mouth is symbolic of silence, what means the absence of a nose in the case of one of these figures?

As to the elevation of Australia, would not that rather point to less separation by sea from Asia than before? If it has been rising all these ages, surely there would be more islands, as bridges of passage across, than formerly. The interval of sea would be deeper than in days gone by, and easier, not more difficult, to cross. There seems some doubt as to whether Torres Straits have not been deepening.

I thank you for your kind reception of my paper, and for the interesting debate it has elicited.

The meeting was then adjourned.

FURTHER REPLY BY THE AUTHOR.

September 10th, 1897.

It may interest the hearers and readers of my paper to mention, that I have learned further particulars about the sculptures in the Vancouver Lake to which I refer in it: also about the Chinese figure found underground in Australia, mentioned by a member in

the discussion which followed. I now have in my possession excellent photographs of both.

The rock sculpture in Vancouver on closer examination does not exhibit at all clearly the "grooves and sevenbranched candlestick" of the Australian carving to which I compared it. In a paper read before the Natural History Society of British Columbia at Vancouver, May 17 of this year, by Mr. Joseph W. Mackay, of the Indian Department, the carving is explained as a memorial representation of a tree-tomb (hemlock or cedar), with indications of the platforms and scaffold used for the deposit of coffins thereon, and projections on which "totem" boards, banners, weapons and accoutrements were suspended. The paper also mentions as a practice of the Indians the carving of arrows on rocks where a battle had been fought. Perhaps a combination of this with the custom of tree-burial may supply the key to the grooves with arrows and sevenbranched tree-forms, in the Australian carving shown in my paper.

Professor Boas of the Smithsonian Institute, Washington, has given his opinion on the Vancouver carving. He thinks it identical in age and character with another in Sproak's Lake, and the work of an extinct race of Indians who inhabited the Great Central Lake more than a century ago.

The finding of the carving is described in a lecture by Mr. J. W. Laing, M.A. (Oxon.), F.R.A.S., delivered before the Natural History Society of British Columbia and members of the Provincial Legislature in Victoria (B.C.), April 9, 1897.

The Chinese image—carved in gypsum or "soap-stone"—referred to by a member in the discussion on my paper, was found not 20, but 4, feet below the surface, at the foot of a large Banyan tree, when removing it to form a road from Palmerston into the country, in the Northern Territory of South Australia. It is an image of the God of Longevity.

I may say that I have been much indebted for the above information to Rev. J. B. Stair, of St. Arnaud, Victoria, Australia who, I may mention, is bringing out a book on the early days of Samoa, throwing great light, from experience gained in residence there long ago, on the history, religion and customs of the Samoans.*

* These subjects have also been dealt with in the following papers read before the Victoria Institute:—"The Ethnology of the Pacific," with

Since my paper was read I have met with two documents which bear so directly on its topic, that I greatly regret not having seen them earlier, and feel bound to avail myself of an opportunity of commending them to hearers or readers of my paper who have become interested in the Australian cave-drawings.

One of the documents referred to is a paper read June 4th, 1896, before the Royal Society of Victoria, Australia, by Rev. John Mathews, M.A., B.D., on "An Aboriginal Rock Painting in the Victoria Ranges," in my diocese. It is a reprint from the *Transactions* of that Society, and probably may be had from Ford & Son, printers, Carlton, Melbourne. The painting was discovered in 1866, but looks as fresh to-day as when first seen. It was known to the local aborigines from childhood, but they can give no account of its authorship or date. It exhibits different features of aboriginal life, and illustrates the drawings described in my paper by showing the symbol of the conventional-shaped heart, the impression of the human hand, human figures with tapering extremities, and with parts severed from the trunk (apparently in this case by obliteration): while in a corner of the cave were found fragments of dark-red sandstone which had evidently been used in the drawings. One inexplicable figure bears a distinct resemblance to the extraordinary sack-like form, with rayed head and protuberances on one side, encircling an armless human body, discussed in my paper. Not far from the rock-face were found stones which had evidently been used as scaffolding for reaching the high levels of the drawing, and afterwards removed, which may explain how the loftier drawings mentioned in my paper were executed.

The other document is a paper by the same author, in which the ray-crowned bust, and the draped figure with inscription on the turban, discussed in my paper, are examined, and the theory broached that the former is the Hindu Siva, and the latter Siva's consort, Parvati (Kali, or Devi), portrayed by immigrants from Sumatra. This is supported by quotations from the *Bataksh-Nederduitsch Woordenboek* and *Les Manuscrits Lamponcs* of H. N.

a special chart of the distribution of the various races therein, by Rev. S. J. Whitmee, vol. xiv; "The Samoan Tradition of the Creation," with notes on the Islands, by the Rev. T. Powell, F.L.S., vol. xx; "The Aborigines of Australia, their ethnic position and relations," by J. Fraser, Esq., LL.D., F.R.S. (N.S.W.), vol. xxii.

Van der Tuuk. In the Lampong character the inscription reads "Daibaitah," the name of a deity of the Battas of Sumatra ("Dewattah" with the Baijus of Borneo) represented by a Trinity corresponding to Vishnu, Brahma, and Siva: the root of Daibaitah and its variants being the Sanskrit Deva (comp. Divus). The circlelets on the right hand of the robed figure are found in connection with Hindu representations of Devi, who is also shown holding a skull in her hand, seated on a serpent, and with a halo round the head, — features observable in the sack-like figure already referred to. The tassel-ornaments, and large spiked earring, are also found in Sumatra: while the figure of a crocodile is found under the roof-tree of Sumatran temples,—to which the strange monster shown in my paper, with two human figures, may correspond. The whole pamphlet of Mr. Mathews is of great interest; it is published in part I, vol. xxiii, of the *Journal of the Anthropological Institute*, which may be purchased at the offices of that Institute.

FURTHER COMMUNICATION RECEIVED.

The Rev. C. J. WOOD, B.A., D.D., of York, Penna, U.S.A., writes in 1898:—

The data afforded by Bishop Thornton are interesting and of extreme value to the anthropologist. The figures described in the paper appear to be of different dates and *motifs*. It is quite possible that figures 1 to 5 may be due to Hindu influence—not necessarily Buddhist. The nimbuses which appear in figures 1, 2, and 4 might be pre-Buddhistic. The following figures up to 9 express a more primitive thought. With regard to the absence of a mouth in several figures, this is significant. A review of the ceremonial masks, the masks of the sacred dance, as observed by primitive peoples the world over shows an intentional omission of the mouth in instances. The nose is seldom omitted; the eyes, I should say, never. This omission of the mouth in the sacred mask (which, by the way, always represented some divine power) had a distinct significance. It remains to be shown that that significance or symbolism is silence. More likely it means sexual purity, or else freedom from the necessity of eating. The same mouthless masks and figures will be found alike in North America and Melanesia. The nimbus, it may be added in conclusion, will be found in the picture writings of the Western Hemisphere.

ORDINARY MEETING.*

The Proceedings of the previous Meeting having been read and approved,

The following paper was read by the author :—

PRIMITIVE MAN: I. HIS TIMES AND HIS COMPANIONS. A Sketch by the Rev. J. MAGENS MELLO, M.A., F.G.S., &c.

IF the hidden secrets of the future, into which we so often seek to pry, fascinate our imagination, there is also a fascination, but little less great, in that dim past of the world's history, a few chapters of which we are just beginning to read, as little by little its blurred monuments and half-effaced inscriptions are disinterred, and scrutinized in the light of science.

Of these records of the past there are few of greater interest than those which relate to our own race, and to those early days when man first appeared as an actor upon the world's stage.

The history of those long ages when the earth was being gradually prepared for man's reception, the successive appearance and disappearance of innumerable forms of organized existence, the slow changes and the violent convulsions by which the earth has been fashioned, have a wonderful interest of their own, but after all, "Homo sum!" we exclaim, and it is *man's* history that most attracts us.

By slow degrees we have got to know something at any rate of the conditions, surroundings, habits, and possibly even

* The speeches made, and numerous communications received, in regard to the two divisions of this subject, have been most fully and carefully revised by the respective authors, and were submitted in a perfect state to the author, November, 1897, for his replies.

the physical appearance of our predecessors in North-Western Europe, and the geologist and archæologist, working hand in hand, have been able to reconstruct much of the early history of our race.

Vast changes had taken place in this part of the earth during the later stages of geological history; what we now term Europe, from having been an archipelago of large islands, became a continent with a central sea, but without those great alpine chains of mountains which now form so marked a feature of its surface. Then came the age, not so far removed, geologically speaking, from our own, when the Alps were elevated, and when the tropical climate, formerly prevailing, was by slow degrees becoming temperate; the central sea had given place to numerous lakes, whilst the margins of the continent were cut into by deep fiords. The vegetation of Europe, still partly tropical, was becoming more like that of to-day, but the mammalian fauna was still very different; the existing species had not made their appearance, whilst there were numerous genera now extinct. As time passed on the Tertiary period of the geologist was brought to a close, and its peculiar flora and fauna disappeared, the general temperature sank to a minimum, and what is known as the Glacial period prevailed over a large part of the northern hemisphere. It is difficult for us to realize that there was a time when all this fair and verdant country became submerged beneath the waves of an Arctic sea; when the highest mountain-tops alone stood out above the water as islands, against whose desolate shores the grinding ice-pack and tottering iceberg waged their wild conflict. Then came to pass another change, a gradual elevation of the land took place, these islands of ours rose again from the frozen sea, and we may picture to ourselves almost a new world. No watery channel then separated our land from the neighbouring continent; that which is now Ireland, equally with Great Britain, formed but the North-Western extremity of Europe, the shores of which extended far beyond their present bounds. Where is now the German Ocean was a wide valley, through which swept a majestic river, born far to the south amidst alpine glaciers, and of which our own small streams were but tributaries, and another great river ran through the valley which is now the English Channel, discharging its waters into the distant Atlantic.

In those early days the land stood far higher above the sea level than it does now, and the Arctic cold had not entirely

passed away; many a snow-capped summit might have been seen, whilst glaciers still crept down the upper valleys, in which, to this day, traces of their former presence are to be found.

Such was the condition of England, when, as far as present evidence goes, man made his first appearance here; but he did not originate here, and long before the early wanderers of our race entered this country, there must have been members of the human family in other lands.

But how can we trace this history of man? What are the proofs of his presence at a time of which no written history is in existence? What sort of man was he? What were his habits, how was he equipped for his life-struggle? Can we answer such questions? In a measure we can do so. The answer comes to us from the ancient gravel bed, the floor of the cavern, and from other surface deposits of the earth beneath our feet.

From the gravel pit, and from the cave floor, the works of an intelligent being have been dug, whilst others have been found scattered upon the surface of the soil—stone implements and weapons—in fact, the tools of man; and although in very few instances have human bones been found in conjunction with the oldest of these, it is universally admitted that in these relics we have clear evidence that men were living on the face of the earth at a time far beyond the confines of all written, traditional, or monumental history.

But when did man first appear? Was his advent pre-glacial or post-glacial; if pre-glacial, how far back must we look to discover his earliest remains? Can we assign any probable date to the epoch of his creation? These are some of the questions which we should like to be able to answer definitely, but we cannot do so; all that can as yet be positively said is, that the evidence, especially that derived from subsequent changes in physical geography and climate, proved to have taken place, tends to show that a very great interval, which must be reckoned in thousands, rather than in hundreds of years, intervenes between ourselves and the men whose sole relics are the rude stone weapons so abundant in these islands and on the adjoining continent. Calculations based on such uncertain data as are afforded by the growth of stalagmite or peat, or on the thickness of superficial deposits generally, or on the alterations in the level of streams, can afford us no certain chronological scale, nor can even the present rate of erosion, and consequent alteration of

the physical features of the land. Some of these, it is true, may, here and there, give some slight indications, but we dare not rely upon them; nature is not uniform enough in her operations, and there are many things which give us reason to suppose that during part of the period in question, there were forces at work, amongst others, a highly increased rainfall, which may have brought about changes far more rapidly than those which we now see taking place in the ordinary course of things around us. We cannot then venture to say how many thousands of years have elapsed since man first appeared on earth, nor even when he first set foot upon our own shores; but some of the above considerations may make us hesitate before adopting the extreme views held by some writers upon the antiquity of man.

That man did not originate in Western Europe is a fact to which we must not close our eyes, and however far back in time we may have to place his coming into Europe, we must remember that at a still earlier period he must have inhabited regions which were in all probability further to the East. Ethnology and philology seem to point most convincingly to this, and whatever may have been the halting-places of the various races which entered Europe, or whatever route individual families, Turanian, Aryan, and others may have taken, there do appear to be certain converging lines from each outlying group of mankind, tending to an Asiatic centre, whence, in successive waves and at different periods, the leading families of man were dispersed.

But how far back in time are we to go? Was man an inhabitant of the earth in the Tertiary period?

TERTIARY MAN?

It has been seriously maintained by certain geologists that traces of man's presence have been found, not only in Europe, but also in America, in Pliocene strata; whilst some have even ventured to think that they had obtained evidence of his appearance in Miocene times. But the so-called evidence of the existence of any intelligent being during even the Pliocene age, appears to me to be of a very questionable character. *A priori* it is surely highly improbable that man, who is admittedly the crown of the animal kingdom, should have been in existence at a time when not only not one of the existing species of mammalia was known, but when even most of the genera were

different: he would have been, as M. Lapparent well expresses it, "an anachronism." It is true that M. de Quatrefages urges that "theoretically man, who as regards his body is neither more nor less than a mammal, could have lived on the globe as soon as this could furnish subsistence for mammalian life; man has also certain physiological faculties of adaptation to his surroundings, as well as his superior intelligence, which might have enabled him to survive changes which were fatal to most of his contemporaries." But, after all, what we must do is to appeal to facts. If undoubted proofs of man's existence in the Tertiary period are forthcoming we must accept them, whatever may be the result, however much that result may clash with our old beliefs; but before doing this, let us make sure that the alleged proofs are indubitable.

What then is the nature of the so-called evidence brought forward? As long ago as 1863, M. Desnoyers discovered certain bones, amongst others one of the rhinoceros in Pliocene strata, at S. Prest, bearing incisions on their surface, which he concluded to have been of human origin. Other similar incised bones had been found at a still earlier date at Pouancy, by M. Delaunay, who pictures the primeval savage cutting his way into the putrid carcase of a stranded *Halitherium*, as the Australian aborigines are said to do to this day when a dead whale is found.

Other incised bones have been discovered by M. Capellini at Monte Aperto, in Italy. At S. Prest the Abbé Bourgeois found certain flints, supposed to have been the implements with which such incisions could have been made. Flints resembling more or less closely those known to be shaped by man, as well as others which have been calcined, have been brought from Thenay and elsewhere, from beds of Miocene age. At Otta, near Lisbon, M. Carlos Ribeiro, and M. Rames, at Puy-Courny, near Aurillac, profess to have discovered other flint implements of Miocene age, concerning which M. de Mortillet and M. Quatrefages said that, out of a large number sent to Paris, some bore undoubted traces of having been intentionally worked. A few years ago M. Cels brought forward a number of broken flints from the Eocene beds of S. Symphorien near Spiennes in Belgium, in which he thought marks of design were evident. Again, other supposed relics of Tertiary man have been produced from Castenedolo, near Brescia, by M. Serpi, and from California by Mr. Whitney, also from the Pampas

of the Argentine Republic by M. Ameghino. To discuss in detail all these alleged discoveries of man's presence during the Tertiary period, would occupy too great a space on the present occasion, but we may take note of one or two important facts bearing on the question.

With regard to the cut bones it has been shown by Professor McKenny Hughes, in a valuable paper brought before the Victoria Institute, and also by others, that these cuts could have been produced by natural causes, or by the sharp teeth of such animals as some of the Tertiary squaloids. M. de Mortillet even says that in some of these cuts the traces of the delicate serrations of their teeth can actually be seen. M. de Quatrefages, however, maintains that the incisions could not have been produced by any other agency than the hand of man, adducing, in support of his view, the opinion that the semicircular form of some of the cuts, and also their crossing and massing on the bone, shows that they could not be teeth marks, and he also asserts that whilst one side of the cut is smooth, the other is rough, an effect which he argues could only be produced by an obliquely applied cutting instrument. He observes in addition that the cuts appear on one side of the bone only, whereas, had a fish grasped the bone, marks should appear on both surfaces; but this is an error, the sharks in question have two sets of teeth, differing in character, one set sharp and delicate simply seizes the flesh, whilst the powerful teeth of the other jaw do the cutting. Another point to be noted is that the whales' remains bearing incisions were not found in littoral but in deep water deposits, in which not only sharks but sword-fish abounded.

With regard to the supposed worked flints, and also the calcined ones from Thenay and other localities, and those also from S. Symphorien, what must we say? It is true that numerous flints, which bear a resemblance, more or less great, to those which are clearly of human origin, have been found in these localities; but a careful examination of the conditions under which they occur has resulted, if not in absolutely discrediting the theory of their human origin, a theory still maintained by some persons, yet in rendering such an origin highly questionable. With regard to the supposed implements from the Eocene beds of S. Symphorien, apart from the extreme improbability of an intelligent being, whether man or M. de Mortillet's anthropithecus having existed at a period when most of the mammalia were

marsupials, we may point to the fact that the Eocene beds in question are marine, and contain the remains of an absolutely marine fauna.

M. Arcein has pointed out from personal observation that the Thenay flints come from a bed of water-worn and fractured flints, between which and themselves it is almost impossible to find any difference; whilst atmospheric, chemical, and thermal agencies, which can be shown to have been at work, are amply sufficient to account for various appearances of fracture, supposed artificial chipping, and also of calcination. M. Arcein has shown that alternations of heat and cold may bring about in a perfectly natural way the splitting of the flints, and in places where forest fires were kindled by lightning, calcination would be produced. Many travellers have also recorded the effects of the sun's heat upon flints, after they have been refrigerated by the dew of the early morning, and a similar result of change of temperature has been observed to take place after sunset in hot climates. Dr. Livingstone, the Marquis de Nadaillac, M. Lepsius, and others have stated that they have both seen and heard the flints splitting up into flakes under these circumstances, and similar phenomena have been noticed by M. Delvaux in Belgium. There is, however, one fact stated by M. Rames, with regard to the flints found by him at Puy-Courny, which requires explanation, and that is that the supposed implements are all made out of one particular variety of flint, whilst there are other kinds present in the same bed, bearing no such traces of fracture. This is a matter which ought to be considered, as it certainly would be somewhat strange if only one variety of flint out of several in the same place had been liable to accidental fracture, and M. Rames concludes from this that the selection must have been intentionally made by an intelligent being; but may it not be that the fractured flints were derived from the denudation of an older bed in which they originally occurred.

Much stress has been laid on the presence of what has been termed the bulb of percussion on a flint, as being a clear proof of human workmanship, but it is not necessarily so; such a bulb only proves that the flake has been produced by a single definite blow, but this might be given by a natural shock, the dashing or falling of one stone against another as readily as by the hand of man.

With regard also to chippings on one side only of a flint, another supposed evidence of artificial work, such might

occur naturally in the case of a flint so embedded in the soil as to leave one face only exposed to passing blows.

Bearing such facts as these in mind we may well be very cautious, and pause before at once accepting every example of a chipped flint as being the work of man; and in view of the fact which has been pointed out that the flints from the Maconnais and elsewhere, which have been brought forward as the tools of Tertiary man, occur in localities where hydrothermal and other agencies have been active, and where fractured flints abound, we may at least venture to wait for evidence that is not quite so open to question.

Such evidence we are told has been found in America.

Some supposed traces of Pliocene man discovered in the auriferous gravels of California have been accepted by some of the American geologists as clear proof that man existed there in Pliocene times; and not only so, but in such an advanced state of civilisation that his works were on a level with those of the most cultured neolithic inhabitants of Europe.

Stone pestles and mortars, three-legged and spouted skillets made of lava, stone weapons and other objects have been found, buried some hundreds of feet below the surface, in gravels in which occur bones of the mastodon and of other extinct animals. If it can be proved that the remains of man's workmanship were contemporary with the gravels, as urged by Professor Whitney, and also by Professor O. C. Marsh, then we must agree with them that "the existence of man in the Tertiary period seems now firmly established." But are we compelled to accept this conclusion? If so, we certainly have a most astonishing fact before us, viz., that at a period so remote, that in comparison with it the palæolithic cave-dweller of Europe is but of yesterday, there were men living in America in a comparatively high state of civilisation, and living there surrounded by genera of animals utterly different both generically, as well as specifically, from any which have lived there since the close of the Tertiary age. This question has been discussed before the Victoria Institute by Mr. Southall, and we may well agree with him that it is far more probable that the American geologists have misinterpreted the evidence than that man had attained so high a state of culture as that denoted by the objects found, even had he existed at so remote a period; and Mr. Southall and others have brought forward evidence which renders it most probable that the objects of human workmanship were

carried into the ancient gravels by the Indian miners of far later date than that of the formation of the gravels, these miners would have driven deep tunnels and sunk shafts in them, seeking, as we know they did in this way, in that and other districts for the precious metals. It may, in addition, be noted that Mr. Skertchley doubts the Pliocene age of the gravels of the Sierra Nevada, and considers them to be probably Pleistocene.

As to M. Ameghino's discoveries of human remains in the Pampas, in connection with the bones of an extinct fauna, it is observed that it is impossible to correlate that strange fauna with that of any known beds, and for all that is known as yet, it may just as well be of Pleistocene as of Pliocene age.

Here then we may leave the question as to man's existence during the Tertiary period: as far as present evidence goes, we can surely say this much, that that evidence is not clear enough yet to compel our belief. M. Cartailhac, in his work, *La France préhistorique*, 1889, says that he "has never adopted the views of M. de Mortillet and other friends respecting the bones of Monte Aperto, or the flints of Puy-Courny," and he also states that careful study of the sites where they were found, the discussion to which they gave rise, and various other considerations have, by degrees, caused him to abandon the favourable impression which he had at first formed regarding the flints of Thenay and Otta.

M. Reinach in his *La Préhistorique*, is also an opponent of the believers in Tertiary man. He asks, "Have we any certain traces of the existence of an intelligent being in the Tertiary period?" and he replies, "We think the answer must be No, in spite of the numerous alleged discoveries. Not one," he says, "is of such a nature as to carry conviction to an impartial mind." He agrees with M. Arcelin with regard to the much vaunted Thenay flints, and brings forward four objections to their authenticity: first, their occurrence in a bed of water-worn flints between which and themselves it is impossible to make a distinction; secondly, a calcined flint is unfitted for any purpose; thirdly, atmospheric, chemical, thermal, and geological agencies are sufficient to explain all the appearances of workmanship, splitting, and calcination; and lastly, he says, they are too small to have served any useful purpose. This last objection may, however, be passed over, as very diminutive worked flints have been found in India and elsewhere, whatever may have been the use to which they were put. M. de Mortillet has suggested that the

primitive savages would probably be so infested with vermin that they might have required such implements as scratchers, but it is far more likely that such minute tools would have been mounted in pieces of wood as saws and rasps. The Orinoco Indians made use of such rasps in the preparation of their manioc, inserting flint chips into flat boards.

PALÆOLITHIC MAN.

Let us pass on now to that more recent age termed by ourselves the Pleistocene, the Quaternary of the continental geologists.

We are now on surer ground; the fact of man's existence on the earth is no longer questionable; indubitable traces of his presence abound on every side in the alluvial deposits of our river systems, in the floors of caves, and in other recent accumulations. In the cave floor we find, if not his actual skeleton, which is seldom present, yet undoubted examples of his industry, tools, and weapons in great variety, and not only of stone, but made also out of other materials, such as bone or the antlers of deer; we also find the remains of his feasts, and the first essays of his artistic skill.

Together with such objects occur the remains of the various animals which were his contemporaries, many of which are now extinct species, or at any rate are foreign at the present time to the countries where their bones are found.

These are facts which were much questioned not so many years ago, but are now accepted by all competent judges of the evidence.

Man as he thus first appears before us in the Pleistocene age was in a very primitive state, one denoted, on account of the material from which most of his implements were made—a Stone age; stone and not one or other of the metals being in use, there has been no trace found of any metal in connection with the Palæolithic man of Pleistocene times.

There is no doubt that these men who fished in our rivers, hunted in our primeval forests, and from time to time dwelt in our caves, were utterly unacquainted with the use of metals; whether at the same epoch, in other lands, more highly cultured races were already metallurgists is another question. Some writers, as M. Lenormant, have held the opinion that such may have been the case, that certain members of the human family were from the remotest ages the

inventors and users of metals. But the Palæolithic man, that is, the man of the early Stone age, as he appears, at any rate in Europe, even if we may suppose him to have had ancestors who were metallurgists, was himself totally ignorant of the use of metal.

Now if we look over any typical collection of the implements of primitive man, derived from ancient gravels, and from caves, we are struck with the fact that such implements vary in character, not only in material, but, what is of much greater importance, in form, and in amount of differentiation, and such variation is found to correspond with difference of antiquity; the farther back we go in time, the ruder and less differentiated are the implements. We must not, however, conclude that every rudely-formed implement of a certain type which we may find, is necessarily one of the earliest age.

The mere shape of an implement, although having a certain value of its own, is not an absolute clue to its antiquity. To determine this we have to take note of the bed in which it was found, and under what circumstances it occurred there, also, when possible, what animal remains accompanied it. Type undoubtedly has a value not to be overlooked in the classification of implements, but we must not insist too rigidly upon it.

Bearing this in mind we may recognise the value of the classifications of Palæolithic times given by M. de Mortillet, and yet more recently by M. Cartailhac, in connection with the discoveries in France, which classifications will not, however, altogether hold good for other regions, such as our own, for instance; especially is this the case with regard to M. de Mortillet's Palæontological grouping; he divides the Pleistocene age into four groups, the earliest the Chelléen, with a warm and damp climate, and characterised by the presence of the Pliocene rhinoceros, *R. Merkiti*, the hippopotamus, and *Elephas antiquus*. Man then lived, making use of only very simple forms of implements, the pear-shaped hatchet, and rude scrapers, made from the stone of the locality.

The next stage is the Mousterien, when cold had increased, and glaciers extended lower down the valleys, and the Arctic mammalia, the mammoth, the woolly rhinoceros, musk ox, and other northern forms appeared. Man's implements were still rude in character, but there was greater differentiation in form. This stage was followed by the Solutréen, which was milder; horses were abundant, as well as reindeer and

mammoths, whilst in France the rhinoceros had disappeared. Man had then improved in skill, and had very carefully made flint implements and of many kinds, scrapers, lance or arrow-heads, delicately chipped on both faces; and towards the close of this stage appeared the first implements of bone. These were the characteristic forms of M. de Mortillet's last stage, the Magdalenien, when not only were such implements abundant, but were frequently sculptured; and engraved bones were also produced. The climate of this stage was cold, and reindeer were present in great numbers, but the mammoth had disappeared from France. This classification will not, however, as I have observed, altogether hold good as regards this country, as in our caves we have found both the mammoth and rhinoceros, as well as the southern hyænas and lions, &c., in conjunction with Magdalenien as well as Solutréen art. I should incline for ourselves to a classification approaching the more general one of M. Cartailhac, given in his *La France préhistorique*, which is as follows:—

GEOLOGICAL DIVISIONS.	PHYSICAL PHENOMENA.	FAUNA.	
Pleistocene or Quaternary	Upper... { Cold and dry Cavern period Extension of Glaciers ... }	{ Glutton ... Mammoth ... Rhin. tichorhinus Reindeer ... Horse ... Hyæna ... Lion ... Bears ... Bison ... }	Palæolithic { Magdalenien. Solutréen. Mousterien. S. Achenléen or Chelléen.
	Lower... { Mild and damp Extension of alluvial deposits }	{ Hippopotamus Elephas antiquus Rhinoceros leptorhinus ... Machairodus... }	

Turning our attention now a little more closely to the implements of man, we notice that the earliest are of a very rudimentary character; they are met with in such river gravels and other alluvial deposits as occur along the course of the Thames and the Ouse in this country, or the Somme in France, and types of a yet earlier date are found in the high-level drifts over the South of England; the chalk plateau of Kent has yielded a remarkable series to Mr. B. Harrison which have been described by Professor Prestwich who has also figured many of them in his papers. These, together with some in the lowest deposits of certain cave floors, are so rudely made that it requires a trained eye to recognise in

them the work of an intelligent hand, and not look upon them as mere chance products of nature, which, as we have observed, can with difficulty be distinguished from these.

At first then we meet with no highly finished implements; but as we rise in the scale of time, we observe a steady improvement in the forms of man's tools and weapons.

Alongside of the simpler forms, others, some of them very skilfully made, appear, and evidences of design for certain definite purposes multiply. The mere flake, which, like the school-boy's knife, might serve a variety of ends, is supplemented by the piercing tool, the drill, the lance, the arrow-head, whilst other implements, bone awls, needles, and harpoons, make their appearance.

Such is the kind of sequence we find when studying these early works of man. This sequence has been clearly proved by the results of careful exploration. Thus in the Creswell caves of Derbyshire, and in those of S. Martin d'Excideuil in France, a gradual but well-defined advance in the character of the implements, was noted in passing upwards through the deposits forming the cave floors; a similar advance has also been observed when examining cave floors of different degrees of antiquity, as those of the Dordogne, more specialised types occurring in the floors of the low level caves than in those of the older high level ones.

At first the local pebble, quartzite or flint, would be used, without any previous preparation, as a hammer; a few flakes struck off would adapt a stone for use as a rough chopper or tomahawk, whilst the flakes would be fashioned into scrapers for the preparation of skins. The elaborate and delicately chipped flint tools and weapons were of later introduction.

At what precise period bone, or the tines of antlers, were first used we know not, but it is reasonable to suppose that it would not be very long before man discovered the adaptability of such materials to various purposes.

We have already noticed that the appearance of the country, both here and in Europe generally, was very different in many respects during the Pleistocene age from what it now is. Dense forests and wild moorlands, and heaths, extensive swamps, as well as green pastures, characterised this country as well as the adjoining parts of the continent, to which we were then attached.

In those early days, during a great part of the time, it is probable that both the winters were far more severe, and the

summers hotter than those now experienced. We picture to ourselves snow-covered mountains, with their glaciers creeping down into the valleys, in which the snow would lie thick, as the winter advanced, whilst the rivers would be sealed up by ice.

It was a period in which man was contemporary with a number of animals no longer present in Europe, some of which, as the mammoth and woolly rhinoceros, are totally extinct, whilst others have retreated to other lands, the reindeer, the musk ox, the glutton and others, northwards, whilst hyænas and lions, hippopotami and various other species have sought a home far to the south in warmer climes.

When these animals finally disappeared from these districts is not easily determined. We know indeed pretty well the date of the extinction of some few species, as, for instance, of wolves from England, but that of others we can but guess. M. Schaafhausen has concluded that the mammoth was in existence at as late a date as 2000 B.C. or 3000 B.C., and if so it is not improbable that its companion, the woolly rhinoceros, may have survived to an equally late epoch. Other animals, such as the bison or aurochs, still live in the forests of Lithuania, and the reindeer, now no nearer than Lapland, was, it is reported, found in North-East Gaul in historic times. In the strange climate of the Pleistocene age might have been witnessed a remarkable intermingling of Northern and Southern mammalia, of animals now widely separated, but which were then living side by side, and which not only lived but bred in the countries where their remains have been left. Thus in the same cave floor we may find the bones of the hyæna and its cub, together with the gnawed bones of the reindeer and its fawn, we may also find those of the young, as well as of the old mammoth and rhinoceros; and with all these animals as well as with many others, such as bears, large felines, horses, gigantic elks, and other species, man was contemporary. His works are found in the closest proximity to theirs, and under circumstances which preclude all doubt as to their having been buried at the same period; in fact, they lived and died together.

The most striking proof of man's contemporaneity with the Pleistocene mammalia is derived from contemporary art. It may seem strange to speak of art in connection with the Palæolithic savage, yet it is the fact that he was an artist, and, considering the poor materials with which he had to

work, one of no mean ability. On fragments of bone or ivory, and on the antlers of deer, he has left behind him numerous most realistic sketches of some of the animals with which he was familiar, his pencil, or rather engraving tool, being doubtless a splinter of flint. Amongst these engravings we may see figures of the reindeer, the horse, the bear, the seal, and even the mammoth itself, all of them depicted with remarkable truth to nature, and with what Professor Boyd Dawkins justly terms "true artistic feeling," the mammoth being represented on its own ivory, the reindeer on its antler. In some instances the human form itself was drawn, thus "the man of the first ages has revealed himself by his works. Man associates himself by his relics with the extinct races, man finally reveals his own existence by the reproduction of his own likeness" (Marquis de Vibraye).

We may in the next place see whether it is possible to come to any conclusion as to the manner of life and the habits of the Palæolithic man, and so get some idea as to what race he belonged.

There can be little doubt that these men were nomads, wandering from place to place, and even from country to country, living the hand-to-mouth existence of hunters and fishermen. We imagine them as at first following the course of rivers, and in winter, when these were frozen over, fishing through holes in the ice, into which now and again the flint hammer or axe would be dropped. We see them penetrating into the bordering forests, where they would continually encounter the wild fauna of the period, and have not unfrequently to meet in deadly strife the formidable beasts of prey, which were then so numerous.

Man's only weapons in his struggle for existence would be such rude stone or bone implements as have been described, the axe or tomahawk, the lance, and at a somewhat later period, the bow and arrow.

But what do we know as to the racial affinities of these early inhabitants of the earth?

Implements of the S. Acheuléen type have been found in every quarter of the world, not only in England and in North-Western Europe, but also in Spain, in Italy, in Algeria and Egypt, in Syria and Arabia, and even in India and America. Were these men, whose industry was so similar in all lands, all of one race? We cannot tell; it is only when we come to the consideration of the later stages of the Palæolithic age that we are able to form an idea, at any rate

with regard to the cave dwellers of Europe, as to their probable connection with a race of man now in existence.

We have gathered from what has already been observed that the Palæolithic man was a hunter and a fisherman. He had not as yet learnt the art of taming any of the wild creatures around him, unless we may venture to suppose that some of the numerous reindeer were, as they are to-day amongst the Laplanders and Esquimaux, in a domesticated state, but apart from these, and in the absence of dogs, it is very doubtful whether they could have been tamed; none of those animals which we now term domestic appear in the cave deposits of Pleistocene age. But the man of those days made use of portions of the animals, such as the reindeer and the hare, which he killed, clothing himself, we may believe, in their skins, which he prepared with his flint knives and scrapers, and sewed together with the tendons of the animals, using such needles of bone as are so often found. It is possible also that horse-hair may have been used as thread, for in one of the Belgian caves, the Trou de Chaleux, a very large number of the caudal vertebræ of horses were found, the corresponding bones of the other animals being absent, a fact which seems to suggest that the tails of the horses were preserved for some special purpose; either the hair was used, or the tail itself, it has been suggested, may have been worn, as amongst certain American tribes as well as by the Kaffirs, as an ornament. We know also that the antlers of the reindeer, as well as other bones, were ground or cut into various shapes, such as lance heads and harpoons; some of these latter were remarkably well made, and very closely resemble in form those in use amongst the Esquimaux of to-day, as do also certain other implements, some of which indeed may have been symbols of tribal authority (*bâtons de commandement*), but some seem undoubtedly to have been similar to the arrow straighteners of the Esquimaux and of some of the Siberian tribes.

The Palæolithic cave dwellers were not altogether without ideas of personal adornment, fragments of red oxide of iron or ruddle being frequently found in the caves, and we may well suppose that this may have been used as amongst the American tribes mixed with grease as a paint. In the cave of La Biche-aux-roches, near Spy, in Belgium, a small hollow bone filled with ruddle was found: we may look upon this as the earliest paint-box in existence.

Ornaments of various kinds have been found, such as

pierced shells and teeth, as well as the vertebræ of fish, and fossils, together with fragments of jet and amber. Some of these objects testify to a certain amount of wandering amongst the primitive inhabitants of these countries, and possibly to the existence of some traffic. Some of the materials in use could only have been brought from a distance. Thus in the Belgian caves, flint implements occur of a sort which could only have come from Champagne or Touraine in France; and the amber and jet must have been brought from the coast, as well as marine shells; some Mediterranean species were found in the caves of the Dordogne.

That many of the tribes must have wandered far afield is also proved by the discovery of engravings on bone of the seal in the cave of Gourdan (Haute Garonne) and in other French localities.

The question has been discussed whether Palæolithic man was acquainted with the potter's art? It has generally been assumed that he was ignorant of it, or else if he practised it, it must have been in such a rudimentary stage that every vestige of it had perished. But in the cave of La Biche-aux-roches, previously mentioned, it is said that in an undisturbed bed containing Pleistocene remains, three fragments of hand-made and burnt pottery were found; if these were really, as is supposed, contemporaneous with the mammalian bones and Palæolithic implements discovered with them, then we must push back the art of the potter into an age in which it has been hitherto thought to have been unknown; but there is considerable uncertainty as to the exact circumstances under which this pottery was found; other examples of supposed Palæolithic pottery are equally doubtful in character.

We can form very little idea as to the moral condition of man in the Palæolithic age; some writers have supposed him to have been of a peaceful disposition; certain authorities have held that he practised cannibalism; but M. Cartailhac considers the evidence has been misinterpreted. He says, "I think I can again declare that Europe does not furnish us with a single proof of prehistoric cannibalism" (*Materiaux*, t. xix, 133).

We should like to know something of the social organisation of the early tribes, but unfortunately this cannot be discovered. Then again, had Palæolithic man any religious ideas? M. de Mortillet tells us that two things were characteristic of the Palæolithic cave dwellers, viz., that they did

not bury their dead, and therefore had no respect for them, and from this he assumes that they had no religion, for had they any, it would have led them, he concludes, to fear death or the dead, and so to practise funeral rites; but it appears to me that this is a very questionable conclusion on his part, besides which, although we may allow that as a rule the dead were left unburied, it is open to question whether this was the invariable practice. M. Cartailhac and also M. Reinach say that there have been found instances of Palæolithic burials, certain finds at Solutré, Laugerie basse, Cro-Magnon are cited as examples. It must, however, be noted that Professor Boyd Dawkins has thrown some doubt as to the age of some of these interments, and is sceptical as to the practice of burial during the early Stone age; but in the cave at Spy, previously spoken of, it is said two human skeletons, which had evidently been buried, were found in connection with the Pleistocene fauna, under conditions which absolutely precluded the hypothesis of later introduction. A good deal of stress has also been laid on the discovery of interred skeletons at Broussé-Roussé, near Mentone. One of these, it is said, was found in 1876 in one of the caves, at a depth of $6\frac{1}{2}$ metres, and it was urged that no Neolithic interment could have been made at such a depth. However, Professors W. Boyd Dawkins, McKenny Hughes, MM. de Mortillet and Cartailhac, all doubted its being of Palæolithic age. Still more recently, in 1884, another discovery was made in an adjoining cave by M. Julien, where beneath beds containing a large assemblage of characteristic Pleistocene remains, and implements of Magdalenien type, together with marine shells, a human skeleton was found apparently interred beneath a large stone block at a depth of over 8 metres. With this skeleton were found implements of Palæolithic type. Mr. Wilson together with MM. Julien and Bonfils, the discoverers, maintained that the position of this skeleton was such as to exclude "all idea of disturbance," so great was the depth at which it was found, and there being also that large mass of stone above it. In a long article in the *Revue des Questions Scientifiques*, 1886, the Abbé E. Vacandard argues strongly in favour of the Palæolithic age of this find, which was disputed by M. de Mortillet and others who have regarded it, as they did the previous ones, as Neolithic. As lately as the beginning of the present year, 1892, three other skeletons, one at least 7 feet in height, were found close to where the 1884 one was discovered,

necklaces of perforated teeth and of fish vertebræ, together with shell or bone ornaments, also some large flint implements, roughly chipped, thin and curved, were in the hands or close to the skeletons. Mr. A. Vaughan Jennings, who has described these finds (*Nat. Science*, No. 4), is inclined to look upon them as of Palæolithic age, but at the same time admits that they may well belong to the Neolithic age, or perhaps to a transition period. However these disputed questions may be settled, we may perhaps rightly assume that the cave men were nearly as careless of their dead as are the Esquimaux, who leave the bodies of their relatives unburied, the bones of man having been often seen mingled with those of the walrus, the seal, the dog, and other animals in their refuse heaps.

Now this oft-repeated reference to the Esquimaux leads us directly to the question, have these old Palæolithic hunters any living representatives? As we have seen, many of their implements, especially those of bone and of carved antler, as well as the engravings on some of these, very closely resemble the corresponding tools and weapons of the Esquimaux and of some allied tribes of the far North. When we also call to mind the habits of life, as revealed to us by the remains left in the caves, and consider what must have been the state of their dwellings, very charnel houses in fact, when we see few, if any, traces of formal burial of the dead amongst them, the only race of man presenting anything analogous to all this is that race almost lost amongst the Polar snows and ice. M. Dupont, the Marquis de Nadaillac, Professor Boyd Dawkins, and others have dwelt upon these analogies, which, as they justly observe, are too numerous to be merely accidental, and they conclude that there is an actual blood relationship between the Palæolithic man and those Northern tribes to which the Esquimaux belong. These men retreated with the reindeer. How and when that retreat was brought about, and the causes which led to it, are as yet involved in the greatest obscurity.

We find no intermingling of their remains with those of the succeeding age, as we do in the case of these latter with those of the age which followed it, a mingling witnessing to the pressure of invading tribes, and I cannot agree with M. Dupont, Dr. Verneau, and other writers, that there has been a direct derivation of the Neolithic civilisation, from that which preceded it; or that the two were at any time found side by side, as contemporaries, in these regions of the earth,

as valley and hill tribes respectively; the latter being by degrees exterminated, or absorbed, by their more civilised neighbours. Nor is it possible to agree with Dr. Karl Penka who in his *Origines Ariacæ* derives the Aryan race in part from the Palæolithic men of the Magdalenien or even earlier Canstadt types.

No, as far as actual evidence goes, the Palæolithic age of man, as the Pleistocene age of geology, seems to end abruptly. There is an intervening and mysterious blank, then we pass at once, without any apparent connection with the previous age, as far as man at any rate is concerned, into Neolithic times. We pass from the age when man hunted the reindeer, and contended with the mammoth and rhinoceros, the lion and the hyæna, into that in which a new race of men appear in this quarter of the world; men with new habits and manners of life; and when animals more familiar to us than some of those earlier forms replace many of those which were so numerous in the Pleistocene age; when the Arctic mammalia and their Southern contemporaries had vanished, and with them the last lingering tribes of Palæolithic man.

The CHAIRMAN (Professor E. HULL, LL.D., F.R.S.).—With regard to the valuable paper of the Rev. Mr. Mello; all must recognise that he has evidently drawn it up with great care, and with an earnest wish to place on record an exact, impartial statement, as to what is known of the interesting and important subject of the origin and early appearance of man on this globe. The discussion will be appropriately commenced by reading a communication which has been received.

The HON. SECRETARY then read as follows:—

Sir J. W. DAWSON, C.M.G., F.R.S., writes:—

The paper of Rev. J. M. Mello seems to me to be a very good summary of what we know of primitive man, from his remains in the caves and gravels. There are, however, some points on which I think it well to make a few remarks, but they are not intended to be of a critical character.

1. As a matter of classification; while I fully believe that we are living in the later part of the great Tertiary period, and that there is properly no such thing yet as a Quaternary period, I think the term Pleistocene should not be extended to the Post-Glacial Age. The close of the Glacial period—introducing great physical and climatal changes, many changes in mammalian life and man himself—should be regarded as the end of the Pleistocene, and the introduction of what some French geologists have called the *Anthropic* period, which I have elsewhere divided into Palanthropic, corresponding to the so-called Palæolithic age, and Neanthropic, corresponding to the later stone and metal ages.* These may be termed respectively the earlier and later stages of the Modern period as distinguished from the Pleistocene Tertiary.

2. I have more faith than Mr. Mello in our Geological Chronometers for the measurement of the date of the Glacial Period. The rate of recession of Niagara Falls, for example, proves conclusively that the close of the glacial age is removed not more, probably less, than 10,000 years from this nineteenth century. As is well known many other measures of denudation and deposition correspond with this.

3. Like Mr. Mello, I attach merely local value to the changes from rude and simple to more perfect and varied implements observed in the caverns of Europe. New settlers in any locality always have rude surroundings, even in our comparatively polished age, and it must always have been so; while it is well known that contemporary tribes in a rude condition may differ very much in this respect according to circumstances. A tribe situated in districts remote from those affording good flint for implements, and prevented from access to these perhaps by hostile neighbours, must have been inferior in their tools till they could obtain better material. Many other reasons might be adduced for assigning a merely local value to such differences.

4. At the same time several reasons, in connection with faunal

* *Modern Science in Bible Lands*, chap. iii. p. 110.

changes in the Post-glacial period, induce me to believe, with Cartailhac and Mr. Mello, that the early part of the Post-glacial or Palanthropic era was characterised by a milder climate than its later period; and I think this has much to do with the change in implements and weapons. The earliest men *probably* subsisted merely on natural fruits and other vegetable productions. To secure these in a mild climate they would require no implements except perhaps to dig for roots, or to crack nuts. If they migrated into a colder climate, or if the climate became more severe, they might be obliged to become hunters and fishermen, and would invent new implements and weapons, not because they had advanced in civilisation, but, as old Lamech has it in Genesis, "because of the ground which the Lord had cursed," and which would no longer yield food to them. At the same time they might contend with one another for the most sheltered and productive stations, and so war might farther stimulate that very questionable advance in civilisation which consists in the improvement of weapons of destruction. We have much to learn as to these matters; but we must, if we have any regard to physiology and to natural probability, start from the idea that the most primitive men were frugivorous and fitted for a mild climate. In this case we should expect that these most primitive men would leave behind them scarcely any weapons or implements except of the simplest kind, and that their apparent progress in the arts of war and the chase might in reality be evidence, up to a certain point at least, of increasing barbarism. Primitive as well as modern men present in these respects strange paradoxes. This subject I have discussed in my work, *Fossil Men*.

5. I fully agree with Mr. Mello that there is a decided physical break between the Palanthropic and Neanthropic ages, and am surprised that any geologist should doubt this. We have not only the remarkable change in the races of men and in their animal associates, but when we know that the whole geographical features of our continents have changed since the Palanthropic age, and that not only are our continents reduced in size since the continental Post-glacial period, but that there is evidence of re-elevation as well as subsidence, and this within a short period, say 10,000 years, less the historic period on the one hand, and the early Palanthropic period on the other, it seems impossible to doubt the greatness and suddenness of the physical break that divides the Anthropoc age into two distinct portions. If we suppose, for example, that

primitive man appeared in Europe shortly after the close of the glacial age, and resided there for say 2,000 or 3,000 years, and if on the other hand our view of historic peoples in the Mediterranean region extends back say 5,000 years, then within a space of less than 2,000 years there must have occurred continental depression and elevation of the most stupendous magnitude, and which must have affected in the most serious manner every form of land life in the Northern Hemisphere. All this may be held to be certainly known as geological fact; and it would be folly to overlook it in any discussions as to primitive man, or in any comparisons of the evidence afforded by his remains with that of early human history or tradition.

I am glad to observe that Mr. Mello refers to the admirable work of Dr. Prestwich in the Pleistocene and modern deposits of the south of England. This veteran worker brought out with great clearness the evidence of the recent date of the Glacial Period to which American facts bear so strong testimony. He also perhaps obtained some indications of that primitive state of humanity in which the invention of lethal weapons was less a necessity than in later times. He established for England, as for other parts of the northern hemisphere, that great submergence which separates the Palanthropic from the Neanthropic age, and constitutes a dominant fact in the history of early Man.*

The CHAIRMAN.—I am sure we are much indebted to Sir William Dawson for his communication. (Applause.)

I am happy to say that we have here this evening a number of men of science, some of whom are very distinguished geologists, and therefore I look forward with great confidence to an interesting discussion which will probably render any observations from myself unnecessary. We have here Professor Seeley, Mr. A. S. Woodward, Professor Blake, Mr. Allen Brown, but we by no means wish to exclude others who may desire to take part in the debate.

Professor H. G. SEELEY, F.R.S., etc.—It is with some diffidence that I speak upon this subject, which has been treated from so many points of view by the Rev. Mr. Mello. Mr. Mello's own researches would have justified him in dwelling in detail upon

* Raised Beaches and "Head" of the South of England, *Journal of Geological Society of London*, 1892. Also a paper in *Victoria Institute's Journal*, vol. xxvii, p. 263.

several of its aspects. Any little differences that may exist in interpreting facts will not hinder our endeavour to obtain the truth which we all strive for.

I would suggest to Mr. Mello that it is just possible that there may be evidence of greater antiquity for man than he has this evening suggested to us. I do not think that this, from a theoretical point of view, is of importance. We know nothing of the measure of antiquity in the terms of common historical expression, when we deal with geological terminology. Whether man dates back to the early Tertiary period, or is limited to the Pleistocene period, seems to me to be of small importance theoretically, but very important as an ascertained matter of fact. Mr. Mello alluded to the researches of Professor Prestwich, carried on with admirable perseverance over the central region of the North Downs. It has been my pleasure to go over some portion of that ground with that remarkable man, Mr. Benjamin Harrison, of Ightham, whose persistent researches carried on over the Kentish hills, enabled him to bring together the most surprising collection of Palæolithic implements from the hill gravels which was ever gathered—more than 1,200 specimens—every one carefully catalogued and noted as to the position of its occurrence, and as to the points in which it differs from others. Those specimens are all from what Professor Prestwich called the Hill Gravels, and he regarded that gravel as being pre-glacial. What that means is that man spread over this part of Kent (according to Professor Prestwich's view) before the great glaciation came on which covered the country northward with ice. We have long been accustomed to believe that these glaciers do not give any conclusive evidence of having penetrated far south of the Thames. Evidently there is no proof of the Boulder Clay having spread far south of the Thames or over the gravels which contain these flint implements. Hence we are compelled to follow them northward beneath the Boulder Clay, and that position shows that they are pre-glacial. This evidence is not conclusive upon the Kentish Hills, for those who require absolute demonstration of fact in local sections, but in the absence of boulder clay no such sections can exist. Nevertheless these beds of hill gravel have in their Palæolithic flints, evidence of early stages of human skill and art, developed through multitudinous modifications, the work of people who spread over the country before the hills were broken up and diversified to their present forms. The great valley at

the foot of the Escarpment of the chalk hills—and all the valleys which run at right angles to it northward, over the Chalk, have been excavated since the days in which this hill gravel was formed, and man lived and fashioned those implements, according to Professor Prestwich; and I must say, as taught by him and by Mr. Benjamin Harrison, it seems to me that there is good ground for adopting this conclusion. There is, therefore, an interesting possibility that Palæolithic man may date back to a period antecedent to the Boulder Clay. I know of no certain evidence of greater antiquity for man in this country.

There is one other matter that I would say a word upon, because it is of the nature of a generally accepted proposition, but not so completely proved as its general acceptance should require, and that is the meaning of the close correspondence between man of the cave and gravel ages, and the Esquimaux of the north. Palæolithic man in many ways had similar habits to some Esquimaux tribes. He carved pieces of ivory and bone in the same way as the Esquimaux. There are battle axes, and harpoons, fashioned in bone, which when put side by side show scarcely an appreciable difference between the work of pre-historic man of the Palæolithic age and that of the Esquimaux. I venture to suggest that there is something to be said in favour of the influence of climatic change in the development of this art, skill, and industry. It is quite possible that that correspondence may be the effect of climate in Europe during a period of intense cold, though it has led to the inference that man migrated northwards from Britain and Europe, and survives in the Esquimaux as representative of the Palæolithic period. The reason I ask you to pause before accepting this conclusion is that animals, with which man in the far north is associated at the present day, are found as fossils in gravel beds in our own country, mixed with a large number of animal types which are found living in the present day in Africa. The one group of animals is inferred to have migrated north, and the other is inferred to have migrated south. If man is supposed to have migrated north and to survive in the Esquimaux, we turn round to see if there are no Palæolithic men who migrated southward, who survive amongst the Africans; and if there be no evidence of incisive art amongst people of the North of Africa which might be compared to those forms of incisive art which you meet with amongst the Esquimaux. And I think there may be a certain possibility of comparison

between the magnificent evidence of Egyptian civilization in its incised stone work, and the early phases of carving which were prevalent amongst the Palæolithic people of Central France. Southwards, over Africa, as far south as Cape Colony, stones are carved with pictures of animals. The bushmen are reputed in prehistoric times, and in some cases in historic times, to have carved the rocks amongst which they lived. There is a curious analogy to this incised work, in the kind of carving, on a much smaller scale, which was executed by prehistoric man in Europe. If we adopt the hypothesis of man migrating northwards, there is the counter-hypothesis to be considered whether he did not also migrate southwards.

On the other hand, we may infer that as Palæolithic man developed skill as a hunter, he probably exterminated the animals of the gravels in Europe which are extinct. Then the genera which survive in the north have no necessary connection with those of the south which could be attributed to migration in opposite directions, since they have not been killed off in those areas. Those of the south may have been modified somewhat from the ancient European fossil types by the influence of climatic circumstances in Africa, since the gravels were deposited, just as Egyptian or Assyrian civilization varied with time from the oldest known type of Western Europe, but there is no proof known to me that the mammals of North Africa were not inhabitants of Africa when our gravels were formed.

Professor J. F. BLAKE, M.A., F.G.S., etc.—It is some time since I paid much attention to this subject, though I did so some few years ago.

Some of the points which Mr. Mello raised struck me as being very fairly put. The first question which I would say a word upon is with regard to the possible greater antiquity of man than he appears inclined to admit. I could never find that there was any very valid reason to believe him to be of the Miocene age. The flints and other things that represent him do not seem to prove it in my own mind; but I was always struck by the arguments brought forth by Charlesworth,* not mentioned by Mr. Mello, but never, I think, really overcome, that in the deposits of Suffolk you find bored teeth in which the bored hole has a

* An interesting discussion on these took place on the occasion of Mr. Charlesworth bringing the discovery of sharks' teeth, of which some were found bored, before a meeting of the Victoria Institute.

conical form on both sides, and is exactly the same kind of hole that is made by the South American Indians at the present time in sharks' teeth which are used as a kind of ornament or mounted in a stick as a saw. These holes are said to be done by boring animals, and in some cases they no doubt were so, but in other cases the holes have apparently been bored by sharp flints, and seem to me to differ from the boring of animals. This is, I think, very fair *primâ facie* evidence that man might have been here at that time. Then the bone which Professor Capellini describes always struck me as an important one. These flat cetacean bones have marks crossing each other. Now, if a shark got hold of a bone of that sort, all the scratches would be parallel to each other.* Furthermore, the scratches are semi-circular, and that is exactly the shape they would be if they were done by a carving instrument turning round a centre and the amount of curvature of these scratches is just about the amount that it would be necessary for a man, turning his hand round, to make; a large shark would probably make them of a different curvature, but here is exactly the same curvature that I should make if I took the bone and scraped it from the edge holding the knife in the hand, and the radius is about the proper length.

The CHAIRMAN.—But they had no knives.

Professor BLAKE.—No, but they had flint instruments. They would work them round and the centre would be about the middle of the hand. If the bone is scratched without that curvature, it seems to me to be very little evidence, as in the cases brought forward to show that animals might have done it, but looking first on the slanting side which is on the shorter radius, and secondly on the amount of curvature that a man would make on the bone, I think it is fair evidence of their being done by man. With regard to their being found in marine strata, it seems to me possible that man might have been able to live on the sea at that time; *i.e.*, in boats or something of that sort. In beds of about the same age in Italy there were found what appeared to be the remains of father, mother and children together, which showed a certain amount of family life in this early period. These appear to show that the men of that period may have got to sea. There is also a skull, found in British Columbia, which had curious pieces of it cut out such as we now call trepanning the skull.

* Professor T. McK. Hughes, F.R.S., has dealt very fully with this question, see *Transactions of Victoria Institute*, vol. xxiii, p. 209.

This was a Quaternary later skull and it has been accounted for on the supposition that these savage tribes had some sort of idea that when they were mentally afflicted, or when children had convulsions, there was an evil spirit in the brain, and they cut a hole for the spirit to escape by, and that has been taken, therefore, as an example of their belief in demons. That is a Frenchman's account of the matter, but whether it is accepted by Mr. Mello, or whether he thinks anything of it, I should be glad to hear.

Those are the only points that I can bring forward. We must all accept Mr. Mello's statements as being unbiased and carefully drawn up, and as giving us a good idea of the nature and antiquity of man, and I thank him very much for his paper.

Mr. J. ALLEN BROWN, F.G.S.—I ought not at this late hour to take up much of your time, and yet I feel it is impossible to pass by this very able and elaborate paper without a few remarks. First, let me observe that it is a very useful contribution to the subject, inasmuch as it refers to the papers of continental geologists and other works which are not generally known to English readers. The special remarks I wish to make to-night have no reference to the points raised by those who have already spoken. I would state briefly the effect which a long study of the Thames Valley and other valley deposits, which contained implements, has had upon me; and herein I find myself somewhat differing from many of those who have written upon the subject.

It has generally been understood that a great gap or hiatus lies between the Palæolithic people and those we call Neolithic; that opinion, I think, is now becoming untenable. I think further investigations will soon bring us to the conviction that man has occupied, *continuously*, parts of England and North-West Europe for a very considerable period and without break between the Palæolithic period and that of polished stone, a period which may be indicated as commencing with the epoch at which the rudest chipped flints, discovered by Mr. B. Harrison on the Chalk range or plateau in Kent overlooking the Thames Valley, were made, and continuing through the relics found in the valley drift, and into still more recent times, by the contents of such superficial deposits as rubble, head, etc., the result of the latest physical alterations in the surface of the land.

In all these changes there is evidence of the continuity of the

Palæolithic and Neolithic periods; there are two lines of evidence which it is necessary to consider as bearing upon it, both of which have been alluded to to-night: one is the form of the implements and the evolution of the so-called Neolithic instruments from older forms, and the concurring changes in the fauna. It appears to me that the forms of the implements constituted as true an index to the relative ages at which they were made, as fragments of pottery indicate the relative periods and the stage of art which prevailed when the potters lived. Those who are acquainted with the composition and ornamentation of pottery can fix the age to which it belongs, and those who are versed in the forms or types of stone implements can arrive at general conclusions as to the relative period at which they were fabricated. It is from this point of view, confirmed by such evidence as the remains of the contemporary fauna afford, that I have become convinced of the continuity of the Stone age, and of the occupation of Southern Britain from the earliest period of which we have any record to the present day.

The rudely chipped pebbles and nodules from the Chalk plateaux form the commencement of the series, the next stage of which (that of the valley drifts) affords evidence of increased specialization of form, and generally speaking of greater skill and knowledge, on the part of the flint workers. In these more specialized forms, indicating an increasing inventive faculty, a chapter of human history is presented to us of the deepest interest. When the investigation is continued into the more recent accumulations, we meet with implements which may be classified as Mesolithic, or intermediate between the Palæolithic and Neolithic, as at present defined. With these progressive modifications, in the form of stone weapons and tools, may be traced corresponding changes in the animal life which existed in these regions, where the fabricators lived, from the extinction of the old elephants and rhinoceroses, and the retreat of the reindeer and other animals, to the later disappearance of the *Bos urus* and bison on the verge of the historical period.

The caves of France and Belgium, as well as England, afford us very good testimony of the changes when taken together; take the case of Rents cavern, we find the remains of the cave bear, one of the oldest creatures in the most ancient deposit, and associated with them are nodular-formed implements of the rudest kind, intended for use in the hand; while, in the upper

cave accumulations, the implements found are of a higher order, and they are formed from flakes and not natural nodules, and these are associated with the remains of animals of later date, until in the most recent deposits the relics of the polished stone and bronze period, and domestic animals, are met with.

The most ancient men took up a naturally shaped stone and simply chipped it, as nearly as they could, into the form they required, and such flakes as they produced were made without method, and so they continued to work for a long period. By-and-bye somebody more clever than the rest found out that if he selected a suitable nodule and trimmed it so as to form a plane at the top, and then struck it vertically with a rounded hammer-stone, he could produce long slender flakes, which he could, by secondary work, convert into spear-heads, knives, borers, and other tools. There is evidence of such an advance in the later part of the Palæolithic period, though the older forms still continued in use. This method of working flint was in fact the same as that of the gun-flint maker of to-day. At the Palæolithic working-place which I discovered at Acton, I found a large number of implements almost all of which were formed from flakes. There may be some persons here who have tried to strike off a long flake, but let me say until you have watched a gun-flint maker at work, and adopted his method, you will not succeed in making one. It is very interesting to trace the development of human ingenuity from distant times, and to notice how man learnt in time to make long flakes and more specialized instruments.

In the Thames Valley we find evidence of all these stages of human progress, and there is a great deal of interest still attaching to flint implements and much to learn from them.

The CHAIRMAN.—I would only just make one remark, and say that putting aside other considerations, which, to me, have great weight, *i.e.*, the appearance of higher and higher races from the early Tertiary down to the human period, when man, admittedly the highest work of creation, came upon the scene, if there had been Pleistocene or Miocene man either in Europe or America, where the deposits alluded to are abundantly developed, and where those remains have been studied with the greatest care, we should have found, not an odd, suspicious-looking, and doubtful implement of art but we should have found hundreds or thousands of them, because these flint implements are imperishable in their nature; and that is one reason why they

are found so abundantly in deposits which have a distinctly human origin. If works of art had been made out of hard flint in the early Tertiary period, why should we not have found them in equally abundant numbers with those of the more modern Post-tertiary period? I will not ask for a reply this evening. I only ask Mr. Mello to make any observations he may think fit in reply to the observations made on his communication, although I suppose there is not much to reply to, as the paper is so generally approved.

The AUTHOR.—I am extremely obliged to you for the very kind way in which my paper has been received this evening, but it is so late that I do not like to say anything to detain you longer. I have been a good deal interested by much that has been said by those who have taken part in the discussion, and I think the point raised by Professor Seeley with regard to the probability of a southern, as well as a northern migration, is one that has not come to my notice. It is well worthy of consideration. I do not see any reason why man, if he went north, should not have sought something more of a genial climate in the African district or somewhere south.

With regard to the connection between man and the Esquimaux it is only an idea based on a certain amount of analogies, and it is probable, as Professor Seeley said, that man would under similar conditions develop similar habits and customs. At the same time, the points that seem to connect him more closely with the Esquimaux are the arts of graving and the ornamentation of bones and so on, which would scarcely, perhaps, develop from a man's surroundings. There seems, therefore, to be some connection between them to lead to a similar development of art.

As to what Professor Blake said, I have no technical acquaintance with bored teeth, and I am not prepared at present to say anything about them, as I have not seen specimens myself, nor do I remember, at the present moment, where any particular discussion is to be found on them. I know they have been discussed, and that some opinions have been brought forward to account for them and in a natural way.

With regard to incised bones, I do not know that we are driven to the conclusion that those bones must have all been incised by sharks, but by sword-fish also, and it has been suggested that it is not impossible that bones may, in those localities, have been driven over sharp flints, and sharp flints over the bones, and such

sharp flints have been found in beds where bones have been found. There are various ways in which those signs can be accounted for, and I do not accept them myself as the work of an intelligent being.

With regard to trepanning, I do not think that that has a bearing on the present paper. It is a subject I have alluded to in a paper, and I may some day have an opportunity of bringing it before you. I consider it touches the subject of Neolithic man, but that may be dwelt upon at a later period. It is undoubtedly interesting and of great importance in some respects.

With regard to Mr. Allen Brown's remarks, they have great value; but I must say I do not agree with him that there is no break between the Palæolithic and Neolithic periods. I do not say it is impossible that they ran into each other; but I cannot see at present that there is any sign of their overlapping such as the Neolithic and the Bronze age. I am sorry there is not time to dwell on a subject upon which much more might be said.

I quite agree with Professor Hull that we certainly should expect, had man existed in the tertiary period, to have found his remains in far greater numbers, whereas we have only such doubtful specimens.

The meeting was then adjourned.

COMMUNICATIONS RECEIVED IN REGARD TO THE PRECEDING PAPER. I.

Professor T. RUPERT JONES, F.R.S., writes:—

I am too heavily engaged to hope to be present to hear the Rev. J. M. Mello's very interesting and conscientious *résumé* of what is known about early man. The several evidences of man's existence in Europe during Pliocene (Tertiary) times certainly seem to still require to be substantiated. Mr. Becker, however, has carefully re-examined Prof. Whitney's evidences of early man in California, and sees no reason to suppose that the relics have been introduced subsequently to the formation of the gravels in which they are found; but he believes that they were certainly deposited with plant remains like those of Tertiary age, with a now extinct rhinoceros (*Rh. hesperius*) and a mastodon—that great lava-flows

covered the gravels in valleys—that glaciers from the sierra succeeded and wore down what had been hill-ranges between the old valleys, and in time left the hard lava-beds as ridges with the protected gravels beneath them. The only possible reduction of the time apparently necessary for the extinction and burial of the great Pliocene quadrupeds mentioned—for the lava-flows—and for the subsequent denudation of the lines of country not protected by lava, is the suggested continuance of Pliocene conditions of life to a late period on the borders of the Great Valley of California when it was a Pleistocene gulf, that is, while elsewhere Pleistocene conditions had come in force; and that glacial conditions followed there later than elsewhere. The great lapse of time required for the climatal changes, and the resulting alterations of the land, may well have equalled any calculable period for the changes in Western Europe connected with the appearance of man and the disappearance of the great quadrupeds—probably not much less than 20,000 years ago.

For my part I do not see the necessity for regarding the Pleistocene as very widely separated from the Pliocene times (speaking geologically), nor the existence of Neolithic man from that of his Palæolithic forerunners; and, although the majority of known Palæolithic implements are larger than the Neoliths, and somewhat differently prepared, I prefer to think that they do not indicate very different races of men.

The Rev. A. IRVING, D.S.C., B.A., F.G.S., writes:—

Having perused with much interest the excellent paper (in proof) by Mr. Mello, I am inclined to regard the question of the evidence of the presence of man upon this globe in Tertiary times as the most important point in it. Mr. Mello may be said to have effectually disposed of most of such alleged evidence as has been brought into court up to the present; but he finds, and candidly admits, an apparent difficulty in the statement “by M. Rames with regard to the flints found by him at Puy-Courny . . . that the supposed implements are all made out of one particular variety, whilst there are other kinds of flint in the same bed.” M. Rames, it appears, “concludes from this, that the selection must have been made intentionally by an intelligent being.”

With all due deference to the judgment of M. Rames, who has the advantage of having seen and handled the fragments in question, I may be allowed to urge that there are several considerations which appear to make such a conclusion altogether

unnecessary. If, as Mr. Mello suggests, "accidental fracture" were the only factor concerned, it might be so; but what has been urged by M. Arcelin (p. 239) from his own observations, as to the operation of other natural agencies, strengthened by the observations of Dr. Livingstone, the Marquis de Nadaillac, M. Lepsius, and others, shows that that is not the case. Besides the action of forest fires in splitting flints, we have to allow for the sun's heat; and it so happens that I have in my possession specimens of a variety of tabular flint, obtained by my former pupil, Captain H. G. Lyons, R.E., F.G.S. (now on the staff of the Egyptian Army at Wady Halfa), during a recent tour in the desert between the Nile and the Red Sea, which have undergone fracture *on the upper and exposed side only* (as the specimens lay on the desert sands), and that to such an extent that the whole surface is in several specimens converted into a series of saucer-like depressions, some of which contain a little mammilla-like elevation in the centre. Similar specimens were, I believe, given by Capt. Lyons to Professor Judd. If, as seems most probable, such forms were produced by the alternations of powerful heating during the day by the sun's radiation, and the rapid cooling which results at night-fall from the powerful terrestrial radiation, which takes place always under the clear sky of the desert, it is more than likely that cracks would be formed in this manner, and that little rough segments of spheres easily broken would in this way flake off. A true flint, it must be remembered, is more or less composed of colloid silica, and such silica (as my own observations recorded elsewhere show) does actually assume, in some cases, the character of a *glass*; the molecular structure of which lends itself readily to the formation of shrinkage-cracks. This is as true of a silica-glass formed by an aqueous process, as it is of a vitreous rock (like perlite) produced by what are commonly known as igneous agencies.

Again, it is a matter of observation, that when a crack has been once started, whether by a blow or by molecular action, iron under favourable conditions may be carried in solution into it by natural solvents, and that with subsequent desiccation, this iron may undergo oxidation into the peroxide by taking up atmospheric oxygen, with a corresponding increase of bulk. The molecular forces set up in this way must act as a powerful wedge to widen and extend even the closest fractures. I have in my possession a flint pebble from the Reading beds which shows this. Flints, too,

under certain conditions tend to undergo molecular change at the surface (to a depth sometimes of a quarter of an inch) inducing a kind of porcellanic texture, which, with inequality of expansion and contraction between it and the flinty interior for changes of temperature, is very likely to split off in places without the application of a mechanical blow. Lastly, the considerable variety of intimate molecular structure which flints display, and the varying proportions found in them of crystalline and colloid silica, not to mention the presence at times of mineral impurities in the flint itself, show how under the action of solvents (especially in old volcanic regions) conditions favourable to fracture may be induced.

I have dealt with the petrology of flints more fully in my little work on *Metamorphism of Rocks* (Longmans, 1889), and need not therefore treat the matter more at length here. Enough, I venture to think, has been said, to show that Mr. Mello's difficulty is more apparent than real; since it is at least as easy to account for the fact observed by M. Rames by a process of natural selection through the operation of known laws of nature among the varieties of flint, as by an "intentional selection made by an intelligent being."

Captain H. G. LYONS, R.E., F.G.S., writes :—

In this very interesting paper on Primitive Man the author includes Egypt as furnishing implements of the S. Acheuléen type, and no doubt rightly as in the instances given by General Pitt Rivers, Professor Zittel, Dr. Schweinfurth, etc., but at the same time there is a large quantity of flint implements which are certainly of a much later age. Surgeon-Major Archer collected a number of flakes and other implements from Wady Halfa near the Second Cataract, and these cannot, I think, belong to any very remote date. From the same district I have collected a considerable number of flakes, scrapers, portions of a dagger-shaped implement worked on both sides, diorite hatchets, etc., but all are from ancient Egyptian sites of temples or of their frontier fortresses. A single instance of a roughly chipped arrow-head occurred where no such ancient settlement could be traced, but not under conditions justifying the conclusion that it belonged to the "Stone age." Here certainly the amount of finish is no guide, and the roughest flakes and worked scrapers occur side by side with polished diorite hatchets.

Wady Halfa.

*FURTHER REPLY BY THE AUTHOR.**November, 1897.*

In reply to Professor Rupert Jones, I must say that I have not seen the account of Mr. Becker's re-examination of the supposed Californian evidence of man's existence in Pliocene times, but it still seems to me that it would be very difficult to prove that the objects found in the gravels in question might not have been introduced by Indian miners at a much later date than that of the formation of the gravels; the very nature of gravel beds would tend to obliterate any traces of such late introduction. I see also that in his Toronto address, Sir John Evans still adheres to his verdict of "not proven," with regard to Tertiary man. I can scarcely agree to the statement that the differences between the Palæolithic and Neolithic forms of implements are so slight as to be of little importance as affording a mark of distinction between the races who made them; the Neolithic type of axe or celt is very different to the earlier both in form and workmanship, but apart from the implements there are great differences manifested in connection with the habits and manner of life of these races, which appear to denote a marked change, which is not apparently bridged over, as having come in with the Neolithic inhabitants of these countries, and which shows that they were not the direct descendants of Palæolithic forefathers in this part of the world. Dr. Irving's observations upon the Puy-Courny flints are very interesting, and I am glad that he has been able to remove the difficulty that I felt respecting their origin.

In connection with Captain Lyons' remarks as to the Egyptian implements, we may note the discovery made a few years ago by Professor Flinders Petrie of flint implements of Palæolithic type found in Egypt and said to belong to the time of the XVIIIth Dynasty; might not these have been the work of an earlier age, found, and perhaps used, by the men of a later one?

SECOND DIVISION OF THE SUBJECT.

PRIMITIVE MAN: II. NEOLITHIC MAN. A Sketch
by the Rev. J. MAGENS MELLO, M.A., F.G.S., &c.

WHEN man first appeared in North Western and Central Europe, he was a contemporary of a large and remarkable fauna, the greater part of which is no longer in existence in these regions of the earth ; some of the animals of which it consisted, having become extinct, whilst others have emigrated to other lands. Amongst the animals with which man must have been familiar, were certainly two species of elephants, one of these being the mammoth ; also two species of rhinoceros were present in large numbers, one of which lived on to a comparatively late period in conjunction with the mammoth. During the earlier part of this age the hippopotamus was not unfrequently to be seen in the rivers, even as far to the north as Yorkshire ; the larger carnivora also, lions, leopards, hyænas, wolves, and bears haunted the forests ; whilst innumerable reindeer, horses, and bison, were preyed upon by them, and also furnished man with food and probably with clothing.

We call this age of the world's history the Pleistocene ; it is the latest of the great Geological ages, and as far as all sound evidence goes it was during this age that man first appeared.

The men of Pleistocene times were, as far as we can judge, not very far advanced in culture: in fact, their civilization was that of the savage tribes of Australia, and some other countries at the present day. The only implements and weapons which they possessed, appear to have been made out of stone, flint being the most common material; rude in the extreme were these at the beginning, but as time went on there are evidences of improvement and differentiation, the roughly chipped flint being replaced or supplemented by others elaborately and skilfully fashioned; these were themselves towards the close of the Pleistocene age in a large measure displaced by others made of bone, or of the antlers of the reindeer, some of these being carved into representations of animals, whilst engravings were at the same period made on various materials which show that these early men were endowed with artistic talent of a high character, and very remarkable powers of observation. It is to be specially noted that none of the stone implements were polished or ground, but simply broken and chipped into shape. No metal either, of any sort, seems to have been known to the men of those days in this part of the world. From the character of the implements chiefly in use the age has been called the Palæolithic or old stone age.

These Palæolithic men seem to have been nomads, hunters, and fishermen, who followed the courses of the rivers and streams, and penetrated the forests in pursuit of game, from time to time making their home in caves, or under sheltering rocks, where they have left behind them the traces of their former presence, buried, together with the bones of the animals, in the accumulations of gravel or soil which have formed during the long ages which have elapsed since they lived.

During the Pleistocene age, which must have been a greatly protracted one, the climate, at first temperate, became gradually colder, and with the increasing cold the arctic mammalia made their appearance; the prevailing conditions seem to have been severe winters, and correspondingly hot summers. During all this time man was passing through slow stages of culture, but never emerged from his wandering existence as a hunter and fisherman. He was possessed of no domestic animals, not even the dog; he was not acquainted with the art of making pottery, and he did not as a general rule bury his dead.

Now a time came when the conditions which prevailed

over this part of the world during Pleistocene times, underwent a great change. It is difficult to say precisely what was the immediate cause of the change, or what was its exact nature, but the result was that the old fauna had mostly disappeared, some of the animals became, as has been said, extinct; whilst others sought new homes, some in the colder regions of the north, others in the warmer climates of the south. But not only had the animals changed, but Palæolithic man himself also disappeared with them. It has been thought, as I have previously shown, that with the reindeer his retreat was northwards, and that amongst the Esquimaux and allied tribes, we may yet trace his descendants. However this may be, at the beginning of the age which is now to engage our attention, men of a different race, or races, and differing much in their culture and manner of life, made their appearance; and we find this part of the world occupied by certain races of men whose representatives may probably be found even now amongst the populations of Europe.

As we look into the history of this age we shall find that we have no longer to deal with mere wandering tribes of hunters, but with peoples who, if still to some extent nomadic, were pastoral, and partly settled in communities, who had also learnt to domesticate certain animals, such as the ox, sheep, goat, dog, and pig, as well as others; and who were also in possession of the rudiments of agricultural knowledge, and cultivated the cereals together with certain other plants, and some of which had advanced so far in civilization as to construct regular dwellings. These people also buried their dead sometimes in caves, but yet more often under cairns, in mounds, and in those remarkable erections known as Cromlechs.

These men were still in what we term the Stone age of human culture, they had no acquaintance whatever with metallurgy, but from the fact that they were no longer content with the mere roughly chipped tool or weapon of their predecessors, but often ground and polished their stone implements, the age during which they lived is called the Neolithic, or New Stone age, it has also been termed Pre-historic, but as this would apply equally well to both the Palæolithic and the Bronze age of later date, the term Neolithic seems to be the most characteristic. As far as present evidence goes there appears to be a remarkable break between the Palæolithic and the Neolithic age, there

does not appear to be any clear overlapping of the two, such as one would expect to find if the change was brought about simply by the invasion of the regions occupied by Palæolithic man, by other races. It almost looks at first as though the Pleistocene age and Palæolithic man, together with the wild fauna of the period had disappeared abruptly, and that there was an interval between their disappearance and the coming of their successors, which we cannot as yet bridge over.

Some continental writers it is true do not allow that there was any break, and hold that the Neolithic men came in amongst the Palæolithic cave dwellers as a conquering race, driving them before them, as later races have been driven by invaders, and either exterminating or absorbing them.

There must have been at the close of the Pleistocene age, a culmination of various terrestrial changes, and consequent changes in climatal conditions, which very deeply affected the fauna of Europe, the increased temperature would drive the arctic species northwards, and amongst these the reindeer, and if the men followed the reindeer, there may have been, as de Mortillet supposes, an interval during which man may have nearly disappeared from Central Europe. During this age various accumulations formed, some of which covered more or less deeply the traces of the pre-existing age. Then in course of time other races of man made their appearance, coming into Europe from the East, or as some suppose, at any rate with regard to one branch of these immigrants, from the North-east; and now we see new manners and customs, a new form of industry, and a new mode of life introduced. If any of the original inhabitants were left, they would be so merged in the overwhelming tide of new comers, as to have left no trace of their existence, unless it may be found, as some think, in certain physical characteristics which may from time to time be detected amongst the later populations, occasional reversions or atavism, reproducing some of the features of the old Palæolithic stock. But apart from this there is as yet little or nothing to link Palæolithic man with his Neolithic successor.

The climate of the period on which we are now entering, was pretty much that of the present day; the great cold had passed away, the glaciers had retreated far up the mountains, the rivers for the most part had shrunk to their present volume, and the only evidence now left of their former level and of their great work of denudation is to be found in the deposits of gravel and clay distributed on the flanks of the

valleys high above the channels which the rivers now occupy. Not only had a change come about in the fauna, but an equally great one is observed in the flora; as the climate became warmer, new plants made their appearance, a curious evidence of this change has been found in Denmark, where in those great mosses which are there called "skovmoses," the pine tree is seen to have preceded the oak, whilst the oak appeared before the birch and the beech, the alder, and the hazel.

Let us now turn to the men and see what traces they have left behind them of their presence in these countries, and what we can learn as to their manner of life; and also endeavour to discover to what existing race or races of mankind they may have belonged.

The Kjökkenmöddings.

At various points on the Danish coast are heaps of refuse, consisting largely of oyster and other shells, the bones of animals, and the flint implements of man; these accumulations are termed Kjökkenmöddings, literally kitchen-middens, they are beyond all doubt the remains left by the men who then dwelt on the shores of Denmark, and whose relics are also found in the great mosses of that country. These men appear to have been the earliest to enter Scandinavia, and although classed amongst the Neolithic populations, their culture was not so advanced as was that of the Neolithic men generally; no polished implements have been found amongst the shell heaps, nor any trace of agricultural knowledge, they were not a pastoral people, but lived entirely on the products of the chase or of the sea, and had no domestic animals save the dog, the marks of whose teeth are abundant on the bones present in the Kjökkenmöddings. Amongst the animals whose remains are found were the Urus, the great wild ox, which was familiar to the Palæolithic hunters, the red deer, the reindeer, which had not entirely disappeared from this part of Europe, the fox, the lynx, the wild cat, the goat, the wild boar, the wolf, the badger, the beaver, and the seal, and there were also certain birds, such as the wild swan, the goose, the duck, the grouse, and the penguin. Many bones of various species of fish, and enormous quantities of oyster shells, as well as other shells help to swell the heaps. The traces of man's presence are also abundant, such as unpolished but chipped stone implements, and many made out of bone or antler, such as needles, awls, fish-hooks, and combs; fragments of pottery are also met with.

Whether the dog was actually domesticated and used by these men in their hunting expeditions, we cannot know for certain, but that it was sometimes eaten is evident from the traces of cuts on the bones, they may, however, have been driven to use their ally for food in times of scarcity.

A somewhat curious difference between the mode in which these early inhabitants of Denmark ate their food and our own, has been revealed by the condition of the teeth found in some of the human jaws, the front teeth as well as the back were made use of in mastication, clear evidence in the worn and flattened crowns of the incisors shows that these were used as grinders as well as the molars, this peculiarity is said still to be found amongst the Greenlanders, and it also existed amongst the ancient Egyptians.

That they cooked their food is evident, as amongst the shell heaps remains of hearths with charcoal and calcined stones occur.

It is reasonable to expect that where men inhabited the sea coast similar habits of life should be prevalent, and therefore it is not surprising that ancient Kjökkenmöddings should be found in all parts of the world; examples are met with on the Swedish coast, in Cornwall, I have also seen traces of them in Glamorganshire and Carnarvonshire, others have been found in Ireland, on various parts of the French coast, in Portugal, and Sardinia. Shell heaps of a similar character containing the works of man occur also here and there on the shores of the United States, as well as in Brazil, and even in Japan and Australia.

In Portugal and also in Brazil the Kjökkenmöddings contain the skeletons of human bodies which had been interred, often, if not always, in the doubled-up position so characteristic of the Neolithic burials.

In discussing the shell heaps of Denmark and Portugal, and dwelling upon the fact that polished stone implements were apparently unknown as yet, and that no traces of domestic animals except the dog are found, and also that no agriculture was practised, Dr. Verneau concludes that the men who accumulated the heaps were really the remnants of the old Palæolithic race, and mark the transition between the Palæolithic men and their Neolithic successors.

I shall refer again to the question of the races present in Europe during the Neolithic age, when I have passed in review the principal evidences of their existence.

Caves.

Caves were still frequently made use of as dwellings, as well as for burial places, and in the upper part of the floors of many of those which contain remains of the Pleistocene age and of Palæolithic man, we find the bones of a more recent fauna, and also the implements and pottery of Neolithic times. Many of the French, Belgian, and British caves, as well as others in Italy, Spain, and elsewhere, are rich in remains of this age, but the most interesting relics of Neolithic man are found amongst dwelling places of a different character, and in tombs of a special type.

Houses and Forts.

We have observed that when Neolithic man made his appearance in Europe he brought with him domestic animals, and that he was also to some extent an agriculturist. This implies that his manner of life must have been of a more sedentary nature than that of his predecessors, and we have facts to prove that this was really the case ; that families or tribes gathered together in settled communities, and built houses, or huts, which they inhabited for a length of time. Sometimes fortified stations were formed on high ground within which circular pits dug in the soil and roofed over with wattled huts were the dwellings of these people. At Fisherton, near Salisbury, a number of such pits have been found containing the relics of their Neolithic occupants ; these prehistoric dwellings were bottle-shaped, having a depth of from seven to eight feet, with a narrow circular opening of about three feet at the surface, and widening at the bottom to from five to seven feet. Very similar dwellings occur in France as well as in many other localities. On the elevated plateaux of Chassey (Saône-et-Loire), also at Campigny (Seine-Inferieure) such pits are found, at the bottom of which were seen the hearth-stones with ashes in the centre, and also the remains of the food and the implements of their former inhabitants.

In some parts of Scotland, as in Caithness and Shetland, the remains of Neolithic habitations of a different character occur, these, which antiquaries term burghs, are built of rough stones and must have been of considerable strength, for some of them, or very similar ones, were occupied as fortified posts in the 13th century.

That intertribal war was no uncommon occurrence is evidenced by the fact that human bones still transfixed by flint arrow heads have been found in several localities in France, amongst others by M. Prunières in the Lozère.

On the chalk downs of the south of England may be traced the lines of old fortified stations which are proved to have been Neolithic by the presence of numerous stone weapons such as lance and arrow heads, and axes, and within them are also found the old pit dwellings previously described. Similar forts and camps are found in many other parts of this country, and also in Belgium and in France. In Belgium a notable example is that of Hastedon at Namur, it is situated on a flat-topped hill, and surrounded by a rampart of rough stones, within its area great quantities of flint weapons and implements as well as pottery have been found.

General Lane Fox has observed that these Neolithic forts were constructed with considerable military skill, so as to defend the rich pasturages, and afford shelter and protection against raiding attacks; their great number seems to show that the population must have been numerous, and was probably split up into rival and often hostile tribes.

Lake Dwellings.

Amongst the most remarkable remains of the Neolithic age are those of lake dwellings, which have been discovered in various places, more especially in Switzerland. In the shore deposits of many of the Swiss lakes, or still beneath the waters, have been found vast numbers of ancient wooden piles driven into the mud, and amongst these the relics of the men whose habitations were constructed on the piles, in a similar way to those which are still in use amongst the natives of New Guinea, South America, and of the Malay Archipelago. According to Herodotus such lake dwellings existed in his time in the lakes of Roumelia, and similar constructions were in use in Italy, Bavaria, France, Scotland, and Ireland, etc., during the Neolithic and the succeeding ages. Amongst the most noted for the abundance of the antiquities found in them, are the stations of Robenhausen on Lake Pfeffikon, Wangen on that of Constance, Moosseedorf, Concise, and S. Aubin on the Lake of Neuchâtel, and Meilen on the Lake of Zurich.

The labour involved in the erection of such villages must have been immense. At Wangen, for instance, it has been

calculated that no fewer than 40,000 piles must have been driven into the bed of the lake, and as many as 100,000 at Robenhausen, this latter station covered an area of at least 120,000 square feet. As means of felling the great number of trees required, the only implements the men could have had would have been the stone axe or wedge, and fire, then the piles had to be driven into the bed of the lake, sometimes at as great a distance from the shore as forty or even ninety yards, and if the bottom of the lake was rocky, the piles were held in position by great masses of stone being dropped between them. On such piles platforms were made, on which the huts were erected, and thanks to the fires which so frequently destroyed these pile-built villages, we are able to form a very good opinion as to how the huts were made, and what their appearance must have been; amongst the debris buried in the mud and ashes found at many of the lacustrine stations, flat masses of burnt clay occur, smooth on one side but bearing marks of interlaced branches on the other, leading us to the conclusion that the houses would have been made of tree trunks bound together by wattle-work, and lined with clay, the curved forms of the burnt clay which has been found also show us that the huts must have been circular, and with conical roofs.

These lake dwellings would in those days have afforded a fair amount of protection against human foes, as well as against the attacks of wild beasts. Canoes laboriously hewn and hollowed with the aid of fire, made of single trunks of trees, have been found which would very probably have helped the lake dwellers in their fishing expeditions. Similar vessels would have enabled the Neolithic people to cross the channel between this country and the continent from which England was now severed.

The lake stations are wonderfully rich in antiquities, and shed a very considerable amount of light upon the life and civilization of the Neolithic age. Metal was not yet in use, but a great variety of tools, implements, and weapons, were made out of different sorts of stone, and also out of bone, and antlers of deer; amongst these were arrows, javelins, harpoons, needles, fish-hooks, pins, hammers, picks, daggers, combs, spindle whorls, and numerous other objects, pestles, and mortars of granite, and whetstones. Then hand-made pottery of a coarse character was in use. As far as has been discovered the men of Palæolithic times were unacquainted with the potter's art. It is true, one or two

more or less doubtful instances of the occurrence of pottery amongst Palæolithic remains have been brought forward, but until further evidence has been found we may venture to credit Neolithic man with the honour of introducing pottery into Europe. The vases and urns which have been found are often very rude in character, and the clay of which they were made contains crushed stone, spar, or broken shells, the potter's wheel was not in use, and the baking was of a somewhat superficial kind. Some of the pottery was ornamented with lines and indentations, fingernail marks and cross hatchings.

Articles of personal adornment occur in large numbers amongst the piles, such as perforated shells and teeth; necklaces, bracelets, and head dresses were formed out of them, and have been found in connection with skeletons in some Neolithic interments. Bone, and also stone rings and bracelets have been discovered, both in the lakes and also amongst objects of this age in other localities. Beads of bone, shell, amber, jade, spar, jet, rock crystal, and even turquoise have been found, and also buttons.

Agriculture.

I have referred to the fact that the Neolithic men were to some extent agriculturists; this is proved by the remains of various plants, which, thanks to their carbonisation by fire, have been preserved in the mud of some of the lacustrine stations. Not only did these people eat such fruits as they could procure in a wild state, but they apparently cultivated the apple, and made efforts to improve it, they also used to cut the fruit in halves or quarters and dried it as a provision for winter. From the presence of great quantities of the seeds of the raspberry and blackberry which have been found, M. de Mortillet thinks that the Neolithic lake dwellers were actually in the habit of preparing from these fruits a fermented drink, if so, we find here the trace of the most ancient alcoholic liquor known. This need not surprise us as we find many of the existing uncivilized races in all parts of the world in possession of some form of intoxicating drink.

The cereals were known and cultivated. Three varieties of wheat were grown, one of these being the Egyptian (*Triticum turgidum*). Oats and rye were apparently unknown during the Stone ages, but millet and also two kinds of barley have been found, cakes or biscuits made of coarsely

ground flour were amongst the articles of food used by the lake dwellers. Flax was cultivated and spun into thread or twine, out of which coarse tissues were woven, which may have been used for clothing, but it is probable that the principal articles of dress were still made from the skins of animals.

Stone Implements.

To refer once more to the stone implements of this age, many of these were carefully ground and polished, admirable axes having been thus made, which as well as other stone tools and weapons, were fitted into handles made from antlers of deer, and also of wood. The stone axes or celts, as they are often called, were amongst the most common implements in use during the Stone age, and are found of different sizes, ranging from one or two inches in length up to as much as twelve or more. The stone axe was in fact, as Sir John Lubbock has well said, "pre-eminently *the* implement of antiquity, it was used in war and in the chase, as well as for domestic purposes." It is not therefore surprising that great numbers should have been found, not only in connection with the lake dwellings, but wherever man, not having metal at his command, was present, and it is a noteworthy fact, that such axes, almost identical in form, have been met with in almost every part of the world, not only in the so-called old world, but also in America, as well as amongst the inhabitants of the Oceanic Islands. Various kinds of stone, as I have said previously, were made use of for the manufacture of weapons and tools, but flint was that most commonly employed, wherever it could be got, and great pains were taken to secure a sufficient supply of this material. In various places, where beds containing flints were found, regular workings were sometimes undertaken, pits of considerable depth sunk, and levels driven through the chalk rock, whilst important manufactories of the implements were established round these mines. Amongst the best known of the Neolithic implement factories are those of Mur-de-Barrez (Aveyron) in France, that of Spiennes, near Mons, in Belgium, and others in this country, at Cisbury, and near Grays Thurrock in Essex, also at Grimes Graves near Brandon; in these old workings and around them, not only have flint implements in every stage of manufacture been found, but also the picks made from the antlers of stags, as well as massive celts and wedges, which had been evidently

used in the work of extracting the flint nodules. At Brandon little cups of chalk have been discovered, which, when filled with grease and supplied with a wick, were probably the lamps used by the prehistoric miners in these subterranean workings.

The implements made at these factories appear to have been very seldom polished on the spot, that part of the work being left to the purchasers; this is pretty evident, the polished specimens found are very few and far between, and are also often merely broken tools, at such great manufacturing centres as Spiennes or Cisbury. A yet earlier factory, which is thought to have been a centre of distribution during part of the Palæolithic age, as well as during the Neolithic, is found at Grand Pressigny in France. From this locality, not only implements, but the unworked flints themselves appear to have been exported far and wide, as tools and weapons made of the peculiar flint of Pressigny have been found in far distant places, not only in France, but also in Belgium, and doubtless an extensive trade in flint implements, as well as in other articles was carried on throughout the Neolithic period all over Europe.

In Denmark several factories of implements have been discovered, one of these was on an elevation or islet in the Vestermosen Bog in Laaland, this bog was in ancient times a lake, and on the islet were found an enormous number of flint implements similar to those met with in the Kjøkkenmøddings, flakes or knife-like forms and awls, scrapers and saws, more than one thousand arrow-heads, and hammers, also a great quantity of waste chips. The hearths and the broken bones of animals left by the makers of the implements, as well as worked stags' antlers, and bone tools and needles, also some remains of ottery, were found in the same locality.

In other places, implements of a still higher type have been found, thus in the Island of Anholt in the Kattegat, flint crescents, and triangular lance heads occurred. In the wood of Bakkebølle Fredskov near Vordingborg, a factory of polished implements was met with as well as of others.

Many of the finest of the Neolithic flint implements have been obtained from the tumuli of Denmark, in which, beside the remains of the dead, weapons of flint, most marvellously made, have been found, similar ones have also been discovered in some of the bogs, magnificent lance heads, and daggers of quadrangular section and zigzagged edges, which

have been chipped into shape with extraordinary skill, stone axes of most perfect and graceful form, some of which were pierced for the reception of the haft, are amongst the treasures of Neolithic workmanship, which are the admiration of all who have seen them.

Burial.

The tumuli or dolmens in which the Neolithic people buried their dead were constructed with great masses of rock, forming a funereal chamber or vault, which was then buried under a great amount of soil. As a general rule the bodies were interred in a crouching or doubled up position, sometimes many of them together in a single tumulus, and with the bodies numerous weapons and ornaments were buried.

Some have thought that the custom so generally prevalent during this age, of burying the dead in a doubled-up attitude, was symbolical, the body being returned to mother earth in the attitude of the unborn child in its mother's womb, an expression of a hope that from the womb of earth they should one day be born again. It is curious to note that the ancient Peruvians practised a similar mode of burial.

Burial in tumuli, dolmens, or cromlechs seems to have been practised in prehistoric times all over the world; varying in mode of construction and form, yet the idea is similar everywhere, some of these date back to the Stone age, others belong to the Bronze age, whilst some are as recent as to come within the range of history.*

In Denmark amongst the Chambered tumuli some of the funereal chambers are approached by a passage, formed out of blocks of stone, "Ganggraben" or "passage graves," these bear a striking resemblance to some of the dwellings constructed by various races, and it has been surmised that some of them may actually have been dwellings, but as sometimes the ordinary houses were used as burial places, amongst existing peoples, so may it have been during the Neolithic age. Professor Nilsson thought that the Danish "Ganggraben" were in fact "a copy or development or

* Many of the great stone circles met with in various parts of this country, as well as on the continent, have been considered to have been originally the burial places of important chiefs and used afterwards as temples, thus consecrated to the memory of the dead.

adaptation, of the dwelling house, that the ancient inhabitants of Scandinavia, unable to imagine a future altogether different from the present, or a world quite unlike our own, showed their respect and affection for the dead by burying the house with the owner, and the grave was literally the dwelling of the dead. When a great man died he was placed on his favourite seat, food and drink were arranged before him in earthenware vessels, and his weapons and ornaments placed by his side," and all buried together.

Religion.

I have alluded to the probability that the Neolithic burial customs denoted a belief in a future existence.

There can be little doubt that Neolithic man had some of the elements of religion, whatever may be said as to his Palæolithic predecessors. This elaborate burial of the dead in conjunction with his arms, ornaments, and domestic appliances seems surely to denote a certain amount of belief in a future existence after death. Occasionally what appear to be only models of some of the implements, such as axes or celts were buried with the corpse, such miniature weapons being sometimes made of jade or of amber, in some instances these have been found pierced as if for suspension, others intentionally broken in half have also been found.

In France sculptured figures of stone celts or hammers have been found on some of the stone blocks at the entrance of sepulchral chambers, such sculptures are not infrequent in Brittany, suggesting the thought that here, as amongst some of the ancient Eastern peoples, the axe was on account perhaps of its great utility an object of veneration.* Besides these figures there are others cut in the stone, such as spirals and various geometrical designs which may or may not have been symbolical.

M. Cartailhac and others have called attention to certain curious cup-shaped hollows evidently of artificial origin, and found in groups on rocks in Brittany and in the Pyrenees, and other parts of France, and also in Switzerland and in India, which have been objects of superstitious observances from time immemorial, whatever may have been their original significance.

* This we can well believe, as at a far later date we find that the Rajpoots in India were in the habit of worshipping their swords.

But of all the facts bearing upon the religious ideas of Neolithic man one of the most remarkable is the practice of trepanation, and the manner in which this very critical operation was performed shows that these early men were possessed of no slight amount of surgical skill. Trepanation was, as far as the evidence goes, frequently practised amongst them, and this apparently not as an operation after an accident to the head, but it was performed upon the living subject, sometimes even more than once, and most frequently on the young, even on children. This was certainly a most extraordinary practice, especially when we consider that the only surgical instrument available must have been the sharp flint flake.

The mode of operation seems to have been to scrape the skull gradually until an oval perforation was produced, a similar operation is we are told still carried out amongst some of the natives of the Pacific islands in a similar manner with a piece of glass; and Dr. Verneau says "with such skill that it is very seldom that it is not successful." That the skull was trepanned during life by the Neolithic men is evident, and also that it did not prove fatal, since the wounds and the edges of the perforated bone had healed.

Various surmises have been made as to the object of this strange custom. M. Broca supposed that in cases of epilepsy and such like diseases the skull was thus pierced in order to set free the evil spirit to whose presence such complaints were attributed; if this was the case then we have, as Dr. Verneau well says, another proof in this practice of belief in the supernatural, amongst the Neolithic races. He also mentions some other facts, viz., that whilst trepanation during life was performed by scraping down the bone, the skulls of the dead were also sometimes trepanned by sawing, a method which would have proved fatal to the living subject. The fragments of bone thus removed have been found and were sometimes placed inside other skulls than those from which they have been cut; they were also occasionally pierced with a hole and were probably regarded as amulets.

The conclusion to which we are brought is that trepanation was practised with a view to freeing the individual from evil spirits, and that probably persons who had been thus treated may have been regarded with superstitious veneration, and after death pieces were also cut from their

skulls to be worn as talismans or amulets. M. Sören Hansen rejects this latter view, and believes that those perforated skulls in which there is no sign of healing having commenced, are simply those of persons to whom the operations had proved immediately fatal, but however true this may be in some cases, it does not apply to those where, as we have seen, the hole in the skull was made with a saw, an implement that would probably have been never used on a living subject.* But there is yet another view of the matter suggested by M. Broca in presence of the fact that the individuals who had been trepanned were almost always the young, and therefore in such cases the operation may have been of a ceremonial character, a rite of initiation into some sacred caste. M. de Mortillet has traced a reflection of this prehistoric rite in the tonsure of the Roman priesthood. Anyway, whatever view we take there seems to be good reason to see in this Neolithic practice, as well as in other usages amongst the prehistoric races, some evidence that they were not quite devoid of religious ideas.

Neolithic Race.

Having thus reviewed some of the chief facts ascertained in connection with the Neolithic men, and having made ourselves acquainted with their manner of life, their varied ornaments, and dwellings, as well as their burial places and customs, we have in conclusion to make an effort to discover, if possible, who these Neolithic people were, and whether it is in our power to connect them in any way with the existing populations of Europe.

This part of the subject is involved in much difficulty, for we have little to guide us, save such anthropological data as have been furnished by the human skeletons and especially by the skulls in the burial places of this age, and also by such indications as may be furnished by some of the works of these men.

As far as can be gathered from the evidence before us, the Neolithic race was not simply the old Palæolithic race advanced to a higher state of civilization during the course of long ages; the facts which we have seen seem to show that after the disappearance of the Palæolithic men, together with

* M. de Mortillet, however, says that sometimes the flint saw was used on the living subject without fatal result.

the Pleistocene fauna, a new race of men entered Europe, and did so probably from the East. We have noticed incidentally amongst the various ornamental objects of the Neolithic age certain beads made out of turquoise, a material which was known to the ancients under the name of "Callais," the precious stone described by Pliny, and which in his time was derived from the Caucasus, and from even more Eastern localities than this; beads of this material have been found in tolerable abundance in the dolmens of Brittany, in Southern France, and also in Spain and Portugal; but no European source from which turquoise could have been obtained is known. Another stone which was frequently used during this age, and which occurs very sparingly in Europe is jade, and implements of this material, which is common in certain parts of Asia, are met with all over Europe, and were evidently much valued. Another thing which points towards the East is the oriental origin of the cereals, and also of some of the animals which were introduced by the Neolithic race, and which were domesticated by them. Amongst the animals was the dog, which M. de Mortillet is inclined to connect with the wild species still found in India. The goat he derives from the wild "*Capra egagrus*" an oriental species, whilst the sheep and the pig also find their representatives in oriental regions, the former being closely connected with the "*Musimon musimon*" or Moufflon sheep of Corsica, Sardinia, Cyprus, and Asia Minor, and probably also with the allied Tartar species the "*Musimon argali*." M. de Mortillet thinks the domestication of these animals, as well as of the horse, and the ox, originated in that region where all of them, together with others, were to be found assembled as they were not elsewhere, viz., the area comprised by Asia Minor, Armenia, and the district to the south of the Caucasus. It seems on the whole probable that migrations amongst the human family took place, as I have said, towards the beginning of Neolithic times, and it is also probable that more than one race took part in this movement, as there is evidence derived from the different types of skulls met with, that together with a Dolichocephalic or long-headed race there were numerous representatives, and especially towards the close of this age, of a round-headed or Brachycephalic race. It was thought many years ago now, by Dr. Thurnam that Britain was inhabited during the Neolithic age by a Dolichocephalic race which towards the

end was invaded by the Brachycephali, who were the first to introduce bronze into Europe. There is no doubt that in this country the long-headed race was the earlier of the two, but when we turn to France we find both races in close contact during Neolithic times, thus in the "Trou de L'homme Mort" near Vialle (Lozère) M. Prunières found a number of skulls belonging to a Dolichocephalic race with small features and of short stature, whilst in other caves in the same district as well as elsewhere, both types of skull have been met with, as well as some of an intermediate character, denoting a probable intermingling of the races. The oldest Neolithic skulls found in Spain are of the Dolichocephalic type, and recent discoveries have shown that there as well as in France and Britain the Brachycephali were the later comers. Can we identify any of these men with those of modern times?

A considerable number of eminent authorities, amongst which are Professors W. Boyd Dawkins, George Busk, Huxley, Dr. Thurnam, M. Broca and others have considered that the long-headed small race, with black hair, and dark eyes, found in Western Europe, and represented they say by the Basques of the North West of Spain, and South West France, as well as by a similar featured people met with in Brittany and in our islands, are directly connected by blood with the Neolithic Dolichocephalic race. M. Broca thought the Basques were identical in race with the Kabyles and Berbers of Northern Africa, the ancient Lybians being of the same stock, and to these have also been joined the Guanches of the Canary Isles, whose manner of life and civilization was said to be similar in very many respects to that of the Neolithic age. Dr. Verneau would however carry us further back, and holds that the Guanches were refugees belonging to the old Madeleine race of the Palæolithic age, which he calls the race of Cro-Magnon, although the Cro-Magnon skull has been shown to be Neolithic by M. de Mortillet who however looks upon the so called Cro-Magnon race as being directly descended from that of the Madeleine epoch.

But now we are met with various difficulties in connection with these race questions; there appears to me to be some confusion amongst the different authorities as to what are the true characteristics of some of these races. As we have seen, a number of authorities describe the Basques as a long-headed, small, and black-haired, black-eyed,

swarthy race ; and also tell us that the Lybian or Kabyle-Berber tribes and the Guanches of the Canaries were all of the same blood. This is the Cro-Magnon type of M. de Quatrefages, the Silurian of Professor Rolleston, the Berber or Iberian of others, and amongst their representatives these writers class the Welsh of Denbighshire, the Irish of Kerry and Galway, some Scotch, the Spanish Basques, the Corsicans, Sicilians, Berbers, and Guanches, and their pre-historic remains are found, we are told, in the long barrows, as well as in the Genista Cave (Gibraltar). Their physical characteristics being Dolichocephalic orthognathous, with an oval face and swarthy complexion, and dark curly hair. Their stature was short, averaging 5 feet 4 inches ; and their muscular development is described as feeble. The languages of this stock have been classed as Hamitic. But then we also find another short and dark people with black straight hair and dark eyes, but with distinctly Brachycephalic skulls (c. index 84). This is the race which M. de Quatrefages calls that of Furfooz or Grenelle, which is also Broca's Keltic, the Lapponoide of Prüner Bey, M. Rütimeyer's Dissentis type, also the Ligurian ; to this type I find attached by these authorities the short dark people of Central France, the Auvergnats, and Savoyards, and also the French Basques as well as the Lapps. Their language is said to be represented by the Basque. M. de Quatrefages' theory is that the Cro-Magnon race which, according to him, buried in caves, was overcome and incorporated by that of Furfooz or the Auvergnat race, which buried in cromlechs, and imposed their language upon the conquered tribes. These dark short Brachycephali are termed dark Kelts by Professor Sayce. Drs. Prüner Bey and Carter Blake both observed the peculiar formation of the skulls of this Furfooz or dark Keltic race, to use Professor Sayce's name, and they dwell upon the angular contours, and lozenge-like shape of the face, and the high cheek bones. Very different are these skulls from those of the Aryan stock with their oval contours, and both the above writers class these Brachycephali with the Mongol or Turanian ; they also, as well as Le Hon, consider them to have been represented by the Ligurian or Iberic race found in Hungary, the Tyrol, Liguria, and in the Pyrenees amongst the Basques, as well as in Finland and Lapland. Professor Sayce separates them, however, from the Euskarian or Basque, who were, he says, Dolichocephalic. Professor Boyd Dawkins, as we have seen, identifies the short dark Dolicho-

cephali of Neolithic age with the Basques on either side of the Pyrenees, and with these he and others have connected the Lybians, Kabyles and Berbers, as well as the Guanches. But we are now told by Professor Sayce that the Guanches, the Lybians, and Kabylo-Berbers belonged to a blond, tall, Dolichocephalic race, with fair golden hair, blue eyes, and a clear freckled skin like the fair Kelt, and also like the Riffs of Morocco. Professor Sayce identifies all these with the Amorite race of Old Testament history. The typical skulls of this race are met with in the Neolithic cromlechs, which we find ranging from North Africa through Western Spain and France to Great Britain and Scandinavia, and which are also met with in Saxony, Mecklenburg, in Circassia, and in the neighbourhood of the Dead Sea. It may be added that the Guanches have been described as "a tall, handsome race of men, with yellow hair reaching below their waists."

There appears then to be some amount of discrepancy and consequent confusion with respect to some of these races. With regard to the Basques there must be, according to the above views, at any rate, two different races represented by the peoples who now pass under this name, viz., the Cro-Magnon of de Quatrefages, Dolichocephalic and dark, and the Furfooz race of the same author, which was Brachycephalic.

The tall, blond Amorite race of Professor Sayce seems to be equivalent with de Quatrefages' Canstadtian, which is the Scandinavian of Dr. Penka, who identifies it with the primitive Aryans, the Robenhausian lake dwellers of de Mortillet. The theory of Dr. Penka and other authorities who support his views is that the blond Dolichocephalic Scandinavian race "spread southwards during the Neolithic age, imposing its yoke on other populations, carrying with it the dialects which developed into the Aryan tongues," and at a still earlier period the same race formed part at any rate of the older Palæolithic inhabitants of Western Europe, leaving as traces of their presence the well-known skulls of Engis and Canstadt. Dr. Penka attributes the blanching of the skin to the prolonged residence of the race in their Northern home, but were this the case, may we not ask how it is that the Esquimaux and other dwellers in the Arctic and Sub-Arctic Zone, have for unnumbered ages retained their dark complexion and hair? We have on a previous occasion found reason to connect this Northern race with the Palæolithic age. Dr. Penka has also made reference to the

animal remains found in the Kjökkenmöddings, the names of which he says are common to the Aryan languages of Europe, whilst the human skulls found in the prehistoric graves of Scandinavia are said to be identical in type with those of the existing inhabitants.

But there are, it seems to me, certain difficulties in admitting the identity of the Neolithic men, especially the lake dwellers of Switzerland, with the primitive Aryans; these, we are told, had not domesticated the horse, or the pig, nor had they become acquainted with the sheep; yet the remains of these animals are found amongst the lacustrine dwellings; both the pig and the sheep are common in all the Neolithic settlements, although the sheep occurs later in time, and does not appear to have been so abundant as the other animals; Professor Rüttimeyer thought that the pig was not domesticated in Switzerland till the Bronze age. Then there is another curious thing to be noted in this connection, which is that whilst there is abundant proof that the lake dwellers were acquainted with, and made use of flax, yet the old Aryans do not seem to have known it, whilst at the same time they were familiar with hemp from the very first, and hemp has not been met with amongst the Neolithic remains. Another important point for us to consider is that the Neolithic lake dwellers were certainly unacquainted with the metals, but it has been asserted that the primitive Aryans were familiar with some of the metals before their migrations, and they had learnt the art of metallurgy from a non-Aryan race before their separation. How is it, then, that they are found, as Dr. Penka tells us, in Central Europe in Neolithic times utterly ignorant of metals in any form? It appears to me to be more probable that the Aryans should have been the introducers of bronze into Europe than that they should have been at first ignorant of it, and learnt their metallurgy there as the Neolithic age drew to a close.

The general conclusion to which I am inclined is that at the beginning of the Neolithic age Europe was occupied by a dark non-Aryan race, or races, which gradually overspread it, the general course followed being from eastwards towards the west, and that both the fair-skinned races, the Dolichocephalic blond type, as well as the Brachycephalic redhaired Kymric, made their appearance at a somewhat later date. Professor Sayce, who says the tendency of modern research is to identify the Aryan type with the first of these, is

careful to point out that by this term Aryan is only meant the speakers of the parent speech, whilst the race itself may have been of a mixed character.

In conclusion I may notice a curious fact which tends to show that the darker races did, as a fact, precede the lighter in Europe, and that is the well-proved tendency of the blond type to die out. When two different races encounter one another and intermarry, one might be inclined to suppose that an intermediate type would be the result; but this is the case to a limited extent only, the real tendency is to perpetuate the stronger type of the two, and the final result is Atavism, or reversion to the older stock, which, through its long occupation of the soil, has become the stronger as a general rule. Now it has been observed that the fair races of Western and Southern Europe are slowly disappearing, whilst the dark stock is reasserting itself; so that the old Neolithic type, swarthy in complexion and short in stature, will, at some future no very distant date, have overcome the last vestiges of that blond type now present, although present in a minority, over a large part of Europe. This seems to show very clearly that the blond race was the later to make its appearance here, and their original home is not therefore to be looked for in Europe, at least in Western Europe. Whether the Aryan cradle was, as some now think, to be sought in North Eastern Europe is still an unsettled question; whilst a considerable number of facts may be adduced in favour of this view, there are various points which seem to oppose it, and there is a good deal yet to be said in maintenance of the older opinion that the blond Aryans, in common with the other races of mankind, had their original seat in Asia, and it seems to me this view would not be inconsistent with the idea that when the first separation of the human family into its different stocks took place, one portion may have entered North Eastern Europe where it would acquire its fixed characteristics and develop its own forms of speech, whilst at the same time it might, through long absence, forget various things once familiar in the Eastern home, such as certain animals and other objects, which would account for certain philological difficulties.

That metallurgy did not originate in Europe as an original invention of the indigenous Aryan peoples as they slowly emerged from the Neolithic conditions of life appears to be certain. The originators, or, I should rather say, the intro-

ducers of metallurgy amongst the Neolithic populations, whether these were Aryan or non-Aryan, were, as far as can be ascertained, that Brachycephalic race, the remains of which are now to be found in the round barrows, and which are also found mingled with those of the older Dolichocephalic men of Neolithic age. These Brachycephali came from the East, they are described as a tall reddish-haired race, with a freckled skin, prognathous features, and prominent cheek bones; Professor Sayce's Kymric and Belgic, in agreement with Professor Rolleston and M. Broca; it is the Sion race of Rüttimeyer, and, according to Drs. Thurnam and Prüner Bey, Turanian and Mongoloid. It was this race which probably introduced the Keltic languages into Europe, and with its advent the Neolithic history is brought to a close. The Neolithic races as time passed on, became more and more intermixed, the old civilization was supplanted by one of wider culture, and the stone of early times replaced by metal; the peoples and languages of Europe, as we now know them, were emerging from the dim twilight of prehistoric times.

The PRESIDENT (Sir G. G. STOKES, Bart., F.R.S.).—I will ask you to return thanks to the author of this very interesting paper. (Applause.) I believe there are a good many present who are desirous of taking part in the discussion.

Mr. A. SMITH-WOODWARD, F.G.S.—I am sure we have been greatly interested in all that Mr. Mello has said, especially as it is a great advantage to science to have some one to put together in an authentic manner the precise state of our knowledge of the subject. Unfortunately, the majority of those who take a general interest in science and are not able to refer to original works, have to trust, in many instances, to ordinary compilers who are able, perhaps, to make things a little more readable than those who go deeply into the scientific aspect of the subject. It is really astonishing how some of those works, which are intended to be a *resumé* of our present knowledge, are extreme exaggerations; and, indeed, when those exaggerations are once started, there is no way

of stopping them. We go from text-book to text-book until it seems hopeless to correct any error that may have gone forth. Only lately the papers and journals have been recording the discovery of the grizzly bear in the caverns of Malta. It is true that there have been found teeth and fragments of a lower jaw which certainly belonged to a bear, and a bear very like the grizzly bear; but as a matter of fact no one can tell what species of that animal it was. It is quite hopeless to say exactly what it was, and just because the scientific people who examined it made a suggestion that it was more like the grizzly bear than anything else, that goes forth as an ascertained fact, and no doubt it has been used by many who try to draw definite conclusions from such a result.

To turn, then, to the subject immediately before us. Of course the great question is whether the Palæolithic people, of whom Mr. Mello has spoken, have evolved, on the spot, into the Neolithic people, or whether the explanation of all the phenomena we see is, that the Neolithic races are the new horde which came from the East and displaced the earlier ones. So far as I understand from Mr. Allen Brown's results, he is inclined to think with certain continental authors—as Mr. Mello has said—that the Neolithic are derived by evolution on the spot, so to speak, from the Palæolithic, and that is borne out by a comparison of the implements. It is very difficult from the implements alone to be quite certain, but I believe (and perhaps Mr. Mello will explain) that even yet, notwithstanding all the intermediate gradations, there is found one fundamental difference between the stone implements of the Neolithic times and the Palæolithic. So far as I know, these axe-shaped implements of Neolithic times were all held by the narrow end placed in some kind of handle, whereas amongst the Palæolithic implements, the pointed end was invariably used, while the butt was held in the hand. Whether that difference in the two types of implements has been bridged over I do not know. Perhaps Mr. Mello will inform us. I have seen Danish, Russian, Swedish and American examples, but I have never seen anything to bridge over these types. Again, with regard to the state of finish of these implements; no doubt it is perfectly certain from discoveries in caves and other places that the more elaborate types belong, as a rule, to the later periods; but at the same time it ought to be remembered that extremely elaborate implements do not always indicate superiority of race.

One finds instances of that kind of thing among the modern savages. When Mr. Woodford came back from the Solomon Islands he said he was struck by the way in which the natives of one of those islands had arrived at a remarkable state of perfection in regard to their ornaments, implements and tools; and he found that this was not due to superiority of race, but was rather a kind of outburst of genius on the part of a single member of the race, that, in fact, the whole of the ornaments peculiar to that part of the islands were due to the superior powers of a single man.

Then in regard to domestic animals, with that subject I have a good deal more to do. In the accumulations I have examined there is no difficulty whatever in recognizing the remains of domestic animals. The skeletons were in a remarkable state of preservation and so numerous, and the skulls so good, that there could be no doubt; but I cannot help thinking that in many other instances there is yet room for doubt as to whether the people connected with the so-called Neolithic types really had domestic animals to the extent that is sometimes said, while the Palæolithic peoples had none whatever. For instance, take the case of the dog. It is almost impossible, unless the remains are extremely good, to distinguish large dogs from the ordinary varieties of wolf; and it is extremely difficult in those remains that are found in the refuse heaps in Denmark to be quite certain that these may not belong to some of the wild races of wolves that wandered about at night and nibbled these bones in the way they are nibbled. Again, it is impossible to say whether some of these canine remains in the Neolithic deposits are not the remains of domestic dogs. Lately, evidence of a very curious nature has been accumulating in regard to the Celtic short-horn, that small race of cattle which is said by many people to be peculiarly characteristic of the Neolithic time, and to have been brought into this part of the world by this supposed immigration of the Neolithic people. Several instances have come lately from the London district of doubtful remains of small oxen indistinguishable from the typical Neolithic short-horn; but only recently we have found the very first evidence that seems likely to prove conclusive, and that has been discovered by Dr. Leeson, of Twickenham, who has been watching large excavations in that neighbourhood. Under the true Thames gravel deposits, in a bed of loam containing the bison, the reindeer, and the horse, Dr. Leeson has found bones which he cannot dis-

tinguish from those of the short-horn. It is thus not unlikely that the supposed evidence of the Neolithic people having come from other quarters and brought these short-horned animals with them may break down. I should not like to say that any of these matters are settled, or that those who advocate local evolution are right. I merely mention some of these points to show that there is still a good deal of doubt on many matters that has to be cleared up. I think Mr. Mello has done very great service to those who investigate these subjects, by placing before this Society such an impartial and admirable *résumé* of what is known. (Applause.)

Rev. F. H. WOODS, B.D.—Any remarks I may make on this most interesting paper are rather with a view to information than criticism

1. With reference to the supposed gap between the Palæolithic and Neolithic culture and therefore race distinction, Montelius, a Swedish writer, shows, I think, very clearly that the "Kitchen-middens" must either be regarded as intermediate or as belonging to the Palæolithic age. Excepting the domestication of the dog, and the use of fish-hooks, and probably fishing boats (for there are remains of deep-sea fish) their state of culture agrees with Palæolithic man and differs from Neolithic man, who had all the important animals of the present day and practised agriculture. Again, the difference in the tools between the people of the "Kitchen-middens" and of the Dolmens is as marked as possible. The tools of the first were extremely rude; the latter showed the greatest delicacy of workmanship. If, therefore, we are to divide off sharply the two main divisions of the Stone age, we must put the dividing line between the people of the "Kitchen-middens" and the "Dolmens."

2. With reference to the religion of the Neolithic people, Montelius lays great stress on the "cup-shaped hollows," maintaining that they were certainly used for offerings either "to or for" the dead, and says that some of those in Sweden also are still used for offerings by the superstitious. As to the sitting posture, I should be inclined myself to suppose that was adapted as the most comfortable posture for the departed in a future state. Montelius suggests that the earthenware pots now only filled with earth, contained food for the use of the departed in another world.

3. As to the races of the Neolithic peoples. Montelius observes that in Sweden the dolichocephalic race very largely predominated

and thinks that the brachycephalic skulls belong to the Lapps who were gradually driven north, but continued even in the south of Sweden for a long period, even after the close of the Neolithic age.

4. I think there is an error on p. 273. I cannot lay my hand on Axel Blyth's able essay on the migrations of Flora founded upon his study of the peat-bogs (of Denmark?), but I am morally certain that Mr. Mello is wrong in classing the birch with the beech. In latitude the birch occupies an intermediate position between the mountain willows and the Scotch fir, and its belt is far above that of the oak, *e.g.*, the most northerly beech tree in Europe grows at a point in Alvesta a few miles north of the southern extremity of the Vetter Lake in Sweden. The oak grows in a stunted form on the Hardanger Fjord in Norway, where I have seen it frequently. The birch certainly grows abundantly about Trondjhem, and, if I remember right, much further north. I am almost certain that I have seen it within the Arctic circle. A few birch trees occur in Iceland, some near the northern extremity.

The PRESIDENT.—If no one else desires to speak I will call upon the author to reply.

The AUTHOR.—Before making my reply I must thank you for the extremely kind way in which my paper has been received. I regret that it has not been more criticised and that some discussion did not take place as to these contradictory races, which I must say are an extreme puzzle to myself, and I was not at all sure as to how I was to enter on this question of skulls and races, and upon which there are still such various opinions.

As to what has been said to-night, I am afraid there is not much that I can add. I might mention, in regard to the question that was asked as to the different shapes of the axes of the two periods, it has generally been considered that the Palæolithic axe, as one of the speakers said, has what I may call its *business* end at the point, but taking this Neolithic one, it has been said that the broad cutting end is characteristic of the Neolithic, whereas with the Palæolithic axe this broad end of the axe would be left in the rough, and the axe would be held in the hand in Palæolithic times, or it might be inserted in a holder and the sharp point used. With the Neolithic axe the narrow end would be inserted in a haft and the broad end used, but amongst the Spiennes implements there seems to be what might be thought to be a transition form,

and Mr. Allen Brown, in a paper that he kindly sent me the other day, points out what he considers a transition form between the Palæolithic and Neolithic types both at Spiennes and also at Cisbury; but I think it is the exception.

I do not think the break between the Palæolithic and the Neolithic ages can be bridged over simply by implements, because we find such a marvellous similarity in implements in the case of countries widely separated, as I have already pointed out. We have these celts, so similar, all over the world, and not only in the New World, but also the old world, and yet I suppose one would hardly say that the American forms were directly derived from those of Europe. Man seems to have hit on similar modes of fashioning his implements in almost all parts of the world.

As to the question of the break, although I am inclined to think that at present there is no clear evidence that there is a gradual passing of the Palæolithic into Neolithic civilization, yet, of course, it is very probable indeed that at some points in Europe, Neolithic man may have come into direct contact with the older Palæolithic races which I have assumed to have retreated, with the reindeer, to the north, and to be represented by the Esquimaux and other tribes of the present day. I might just give you a contrast as drawn up by Mons. de Mortillet between the Palæolithic and Neolithic ages. “End of (1) Pal.—Cold climate, dry, extremes of temperature; Neo.—Temperate and much more uniform climate. (2) Pal.—The mammoth, the last of the great extinct species, is present; Neo.—Mammoth extinct. (3) Pal.—The chamois, marmot and roe in the plains; Neo.—The marmot, etc., retreated to the mountains. (4) Pal.—The reindeer, saiga antelope, wapiti, glutton, grey bear, etc., found in mid-Europe; Neo.—These animals have retreated to the north. (5) Pal.—The hyena and large felines present; Neo.—These have disappeared. (6) Pal.—No domestic animals present; Neo.—Domestic animals abundant.” We have had the question raised this evening as to the find by Mr. Woodward of the Celtic short-horn. That was unknown to me, I did not know it had been found, and if so, I shall have to classify the short-horn amongst Palæolithic animals. “(7) Pal.—Man of one type; Neo.—Types of man various. (8) Pal.—Population nomadic; Neo.—Population settled.” It seems to me that that is an important distinction we find in the Neolithic age, that people were in fixed dwellings practising agriculture, whereas in Palæolithic times all seem to be nomads

and hunters without exception. “(9) Pal.—Men are hunters and fishermen—no agriculture; Neo.—Agriculture developed. (10) Pal.—Stone implements unpolished; Neo.—Many implements polished. (11) Pal.—No pottery; Neo.—Pottery in use.” Pottery is also found in the Kjekkenmøddings. “(12) Pal.—No monuments of the dead; Neo.—Cromlechs, etc. (13) Pal.—No formal burial or respect for the dead; Neo.—The dead are carefully buried.”

There is one other thing I did not allude to in my paper which Monsieur de Mortillet points out, viz. :—that in the Palæolithic age the artistic sentiment, towards the close of the Madeleine epoch, was highly developed. The Palæoliths were undoubtedly artists and artists of great feeling, whereas in the Neolithic times the artistic element appears to be absent from amongst the people. The question as to whether the bones found were bones of dogs or wolves is interesting, but I have not gone into it. Large dogs would be difficult to distinguish from wolves. I rather fancy, from what I have read, that the Kjekkenmøddings dogs are, most of them, too small to be mistaken for wolves; but I am not perfectly certain as to that. The question of the implements of the Kjekkenmøddings being unpolished I do not think bears much on the question as to their age, because the polishing of the Neolithic implements, although it is very characteristic of the state of human culture, is not essentially characteristic—for instance, you might find hundreds, I might say thousands, of unpolished specimens against a few polished; yet no one could possibly mistake implements of that type for palæolithic implements. Their forms are essentially Neolithic in character though unpolished. Polishing does not prove very much. With regard to the sitting or crouched posture in burial, of course what I stated as to its meaning is a mere speculation. It is a funny idea to put people in that position to be comfortable. If so, there is still a feeling that there is to be an after existence, and that they wanted a position in which they could feel happy, and it seems to show a kind of idea on the part of those who buried them that consciousness was not extinct and that there was a spiritual existence. An allusion has been made to the cup hollows. I might say that there is one of the Creswell caves—a particular cave called “The Pinhole,” in which is one of these cup hollows, where to the present day the inhabitants are in the habit of dropping pins with the superstitious idea of its bringing them luck.

A note has been handed up to me without a name to it. It is headed "from a visitor for the author to refer to if he sees fit." It refers to an interesting fact. This gentleman says—"Would it be interesting, in connection with the identification of races to mention that the inhabitants of Brandon in Suffolk (to which reference has been made) are supposed to be the direct descendants of primitive man, being a quite distinct race of people from the Saxon or Norman? They are short, swarthy, and black-haired, but of which type of skull I cannot say. Some few years ago the British Ethnological Society journeyed to Brandon and photographed a typical group of this people." Brandon is one of those places of extreme interest where the flint industry has been carried on from Palæolithic times down to the present day, and he goes on to say that they still make a vast number of gun-flints for the savage or semi-savage tribes of Africa. That is very interesting—that they have there that dark, swarthy race which was driven to the extreme west—so to find these people still pursuing their industry, as this gentleman has pointed out, is a matter of very great interest.

I fear I dare not touch on the Aryan question. It would take a very long time to enter at all into a discussion as to other races.

The meeting was then adjourned.

COMMUNICATIONS RECEIVED IN REGARD TO THE PRECEDING PAPER. II.

Sir J. W. DAWSON, C.M.G., F.R.S., writes:—

I thank you for sending me the Rev. Mr. Mello's paper on Neolithic man, which I have read with much interest, and which gives useful suggestions.

I naturally object to "Palæolithic" man being classed as Pleistocene after all I have written to prove the contrary. This may be a mere matter of classification, but it is misleading, unless the term Pleistocene be extended to include the modern, in which case we are still living in the Pleistocene period; of which, indeed, you have had some remains in a recent winter, in the *bordage* ice

on the Thames having sufficient development to transport gravel and stones, as it did when the mammoth lived in England.

I also doubt as to the continued use of the terms "Palæolithic" and "Neolithic," after it has been shown again and again that they have no value except in a very limited local sense. See Holmes's recent papers in *Science* and elsewhere, with reference to supposed American examples.

I also think it unwise to assume so many negative statements respecting Palæolithic men, on points respecting which we are still ignorant, but may know more hereafter.

I am glad that Mr. Mello recognises the break between the Palanthropic and Neanthropic ages, but surprised that, like most other anthropologists, he does not refer to the great physical changes which closed the Palanthropic age, and which were so long ago insisted on by Lyell. The idea also of Palanthropic man migrating northward "with the reindeer" is, I think, very improbable. He might do this to a limited extent in summer; but if he had half the intelligence of modern Esquimaux and North American Indians, he would wait till the winter cold drove the deer to the south, which it must have done down to very modern times.

These remarks relate to the introductory pages. As to the main subject of Paper II, I have nothing to say, except that the remarks on "Neolithic" races seem to me contradictory to many well-established facts; but they relate merely to racial classification, which at present, in this part of human history, has been reduced to a mere chaos, by the exclusive use of certain physical characters as grounds of classification, instead of the adoption of broad general views of all the characters of each race, mental, linguistic, and physical.

Professor E. HULL, LL.D., F.R.S., writes:—

I regret to be unable to be present to hear Mr. Mello's paper and to take part in the discussion. I would only venture to refer to the question regarding the change from the Palæolithic to the Neolithic age. If I mistake not Professor James Geikie offered an explanation which seems to me sufficient. The break in the continuity of the human race in Europe seems to have its counterpart in that of the physical conditions. Assuming Palæolithic man to have been contemporaneous with the epoch of the Lower Boulder Clay, or Till, and Neolithic man to have been contemporaneous with the Upper Boulder Clay, we have (as it

seems to me) a sufficient cause for the change of race in the great depression of the land areas of Northern and Western Europe which intervened between these two epochs. This depression amounts in some parts of the British Islands to 1,300 feet below the present sea-level, but in the south of England and the adjoining parts of the continent it amounted to several hundred feet. In Scotland the depression was over 510 feet, and in Norway it reached about 600 feet. The British Isles were converted into an archipelago of islets, and large tracts of the continental low ground must have been submerged a the period when the high-level gravels of the valley of the River Somme were being deposited. Attempts have recently been made to minimise, or even to deny, the great extent of the interglacial submergence, but as it seems to me with very little success. The evidence is too overwhelming—consisting of the presence of stratified shelly gravels at various levels above the sea. A general depression which caused a large tract of Northern and Western Europe and the British Isles to be converted into sea for a prolonged period may well have caused the breaking up and dispersion of the Palæolithic tribes—and their final extinction or absorption by the more civilized Neolithic races, which as the land rose from beneath the sea-bed spread themselves from the far east—and introduced a higher state of culture than that prevalent amongst the early race.*

Mr. J. POSTLETHWAITE, F.G.S., writes:—

I have read Mr. Mello's paper with much pleasure and profit. Here, in our lake country, we have evidences of the presence of both Palæolithic and Neolithic Man. Of the former, in the shape of rudely chipped stone weapons and implements, and of the latter, in weapons and implements elegantly formed and beautifully polished; also houses, forts, places of sepulture and places of worship. A small collection of both rude and polished weapons and implements may be seen in the Keswick Museum of Local Natural History, while others have found a home in private collections. These weapons and implements have not been manufactured from flint, but from the compact lavas of the volcanic series of Borrowdale, showing that the ancient artificers

* In my *Physical History of the British Isles*, Plate XIV, Fig. 1, I have endeavoured to represent the condition of the British Isles at the period of greatest submergence.

who formed them could adapt themselves to their surroundings, and make use of the most suitable materials at hand. The lavas of the volcanic series would probably be tougher and more durable than flint, but would not be capable of being ground to such a fine cutting edge, nor of receiving such a high polish.

So far as I know there are no traces of lake dwellings in our district, but there are numerous relics of stone built villages and forts on the mountains. Some of the so-called villages may be recognizable as such by experienced archæologists, but it requires the eye of faith to enable ordinary observers to see in them remains of human dwellings; others, however, are undoubtedly the ruins of stone-built houses that were clustered together within a walled enclosure. The sites of some of the fortified villages are exceedingly well chosen for defensive purposes, and where necessary the natural features have been supplemented by one or more deep trenches.

Stone tumuli, or cairns, and barrows, or mounds of earth, which have been used as places of burial, also occur; these ancient monuments and their contents have been described in detail by local archæologists. In the so-called Druid's Circle, near Keswick, and possibly one or two more, we have examples of pre-historic temples for the purpose of worship, although doubts have been expressed on this point. There is, in the Keswick Museum of Local Natural History, a rudely chipped stone club, which may have been used for the sacred purpose of slaying the animals offered in sacrifice. This club, which was found at the stone circle near Keswick, has been formed out of a fragment of St. John's quartz felsite, and consists of a handle about 9 inches long by 3 inches in diameter; at the end of this handle there is a bulb-shaped knob, about 5 inches in diameter, and a well directed blow from such a weapon would no doubt be sufficient to smash the skull of an ox. The fact that stone axes or celts have also been found in the same locality as the above mentioned club, the existence of an inner enclosure, within the stone circle, and the entire absence of evidence that the circle was ever used for the purpose of sepulture, prove, I think, that it was used for worship alone.

Mr. S. R. PATTISON, F.G.S., writes:—

Mr. Mello, as is usual with him, gives much more for us to learn than to object to. In the present timely, comprehensive, and quasi-judicial summary of the known facts of the earliest

British folklore, I venture to differ from his conclusions on one point only, viz., in regard to the totality of the break between the Palæolithic and the Neolithic periods. I have recently inspected in Picardy some of the stone tools and their localities, now so numerous there, and have paid some attention to the philosophic discoveries made and described by Prestwich, and have formed an opinion that the two periods are, *quasi man*, only one, and that there has been in the history of man's work a continuous progress. There can be no doubt of the prodigiousness of the physical events referred to, nor of their long continuance, but on the other hand, it is equally certain that the tools of the first period were fabricated by man, and that the tools of the second period are precisely similar to these. This similarity could not have been from instinct (although such tool-making appears to be nearly co-existent with the race), nor could it have arisen from imitation, for man imitates, but never exactly copies, and must therefore have arisen from the resumption, in the given locality, of the art which had elsewhere been carried on in the interval. It is not so difficult to believe that men retreated to other parts of the country, whilst the tremendous changes were going on here, or that some other inhabited spots in the same stage of occupation furnished suitable ground for emigration, as to suppose a totally different race taking up the manufacture, on precisely the same lines, in exactly the same places, and displaying the same fashions as their predecessors, I saw in Picardy, in the museums and collections there, fine specimens of intermediate forms of stone implements, and was thereby induced to minimize the difference as a chronological datum.

The effect of the break in the fauna and of the topography of a district, amongst a roving population without buildings or baggage does not, as it seems to me, require any anthropological division. It would appear from geological considerations that the era of the first flint implements was about contemporaneous with the rising of the land, so that long warning was given before the rupture of the chalk and the denudation which accompanied submergence.

REPLY BY THE AUTHOR.

November, 1897.

In reply to Sir J. W. Dawson's communication, I may say that the reason that has led me to adhere to the term Pleistocene, in connection with Palæolithic man, is because, even in Post-Glacial times, we find the great Pleistocene mammalia, such as the mammoth, tichorhine rhinoceros, and others, still in existence; whilst also it is yet a question whether man did not appear in these northern regions before the Glacial period set in; and it seems reasonable that we should class the earlier race amongst that Pleistocene fauna, with part of which, at any rate, he was contemporary. Those great physical changes which brought about the great alteration of conditions, both geographical and climatal, which preceded the appearance of the Neolithic race, seem to give us a convenient line of demarcation between the Pleistocene and the Recent age.

As to the complaint that I have not referred to those changes which closed the Palanthropic age, it will be seen by reference to page 272 of my paper, that I have briefly alluded to them, and I fully recognise their importance, since I look upon these as having brought the Pleistocene age to its close.

As to the Neolithic races, the many, and often conflicting opinions regarding them, render any very definite conclusion impossible as yet. I have only ventured to give an outline of some of the views that have been expressed, and the difficulties which these have suggested; endeavouring, as far as I could, to arrive at some sort of a general conclusion, as to the probable sequence of the different races, which inhabited Europe in prehistoric times; although I am deeply conscious that to do this satisfactorily requires far greater knowledge of racial distinctions and ethnology than I possess.

ORDINARY MEETING.*

D. HOWARD, ESQ., F.C.S., D.L., IN THE CHAIR.

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

MEMBER :—C. R. N. Mackie, Esq., Devonshire.

ASSOCIATES :—G. A. Gutch, Esq., C.E., London ; Mrs. S. C. Kemble, Wilts.

A paper entitled “Creation or Evolution” was read by Dr. Walter Kidd. [The discussion on this will shortly be complete.]

* 7th of 32nd Session (1897).

ORDINARY MEETING.*

COMMANDER G. P. HEATH, R.N., IN THE CHAIR.

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

ASSOCIATE :—J. R. Swanston, Esq., M.A., United States.

The following paper was then read by the author :—

*FURTHER INVESTIGATIONS REGARDING THE
SUBMERGED TERRACES AND RIVER VAL-
LEYS BORDERING THE BRITISH ISLES.*
By Professor EDWARD HULL, LL.D., F.R.S., and G.S.

(*With chart.*)

I. *Introductory.*—The researches of previous investigators have had the result of showing that the platform on which are planted the British Isles and adjoining parts of the European continent was formerly connected by land with Iceland through the Shetland and Faeröe Islands, and this again with Greenland. This former connection is placed beyond doubt by the character of the fauna and flora. Dr. Wallace includes Iceland in his Palæarctic region which embraces the British Isles and Europe,† and as Professor Newton has shown—all the land mammalia, with only three exceptions, are European. The exceptions are those of Arctic habitats—the polar bear, the Arctic fox, and a mouse (*Mus Islandicus*). Amongst the birds—the peculiar species—are allied to those of Europe and the Faeröes. The botany and ento-

* 2nd May, 1898. The importance of a full consideration of the points brought out in Dr. Hull's paper, has been held to require its early insertion in the Journal.

† *Geographical Distribution of Animals.*

mology of Iceland have been described in the Transactions of this Institute by the Rev. Dr. Walker, F.L.S.,* and his observations bear witness to the former land connection of Iceland with the British Isles. His remark that "the first thing that strikes a visitor from the latter country is not the number of Arctic species, but the great abundance of plants that are very rare and local in Britain, such as *Saxifraga cæspitosa*, *Lichnis alpina*, and *Erigeron alpinum*, etc." The disappearance of the former glacial conditions from the British Isles and their continuance in Iceland accounts for the remarkable abundance of the plants referred to.

The very ample survey of the insects given by Dr. Walker leads him to the following conclusions:—

1. The total absence of butterflies.
2. " " orthoptera.
3. Neuroptera only represented by *Phryganidæ*.
4. The most abundant tribes of insects in Iceland are moths and *Diptera*.

On the whole, the insect fauna, as well as the flora, of this island bear a remarkable affinity to those of Scotland.† As regards Greenland, while some of the forms are European, others are American, a few being purely Arctic, and Wallace includes it in his Nearctic province. At the same time about one-third of the vertebrates are European,‡ and indicate a former connection with that continent, though not to the close extent of that of Iceland.

Now, we must not forget that this community of fauna and flora is characteristic of existing genera and species, and indicates a very recent physical, or land, continuity. It may date back, perhaps, as far as Pliocene times, passing into Recent, but not earlier; and if this be so, we have to consider to what extent the bed of the Atlantic Ocean requires to be raised in order to establish such a land connection, or in other words the amount of recent submergence which it has undergone; we have also to determine the tract of the ocean over which the continuity of land surface formerly existed.

The remarkable results established by American naturalists regarding the submerged terraces and river valleys

* *Trans. Vict. Inst.*, vol. xxiv, p. 205.

† *Supra cit.*, p. 241.

‡ Wallace, *supra cit.*, vol. ii, p. 138.

adjoining the American continent and prolonged into the North Atlantic, which have already been communicated to the Institute by Mr. Warren Upham,* and more recently by myself, have induced me to take up the investigation of the sub-oceanic region adjoining the British Isles with the aid of the Admiralty charts of soundings, which afford most ample materials for such investigation. The results, which appear to me of remarkable interest, I now venture to place before the Institute; from which it will be found that all tend to confirm the view of a former but very recent elevation of the British and adjoining continental areas to the extent of several thousand feet as compared with the level of the ocean surface at the present day.

II. *Land connection with Iceland.*—An examination of the hydrographical charts shows that it would be necessary to raise the bed of the ocean to the extent of 1,320 feet (220 fathoms) in order to establish a land connection between the British Isles and Iceland. The actual amount of elevation was probably greater and may have reached about 6,000 feet. The evidence for this will be seen further on, and it corresponds very closely with the amount of elevation determined for the coast of North America by the observers already referred to.† Indeed all the evidence obtainable by soundings goes to show that the whole area of the North Atlantic has undergone stupendous changes of level in very recent times both as regards emergence and submergence.

III. *The British Platform.*—The submerged terrace on which the British Isles and adjoining portions of Europe are planted is generally known as “the 100-fathom platform.” It is often represented on hydrographical charts, such as those of the late Professor Sir Wyville Thomson, by the 100-fathom contour taken from the Admiralty Chart.‡ But this strict adherence to the 100-fathom contour is misleading as regards the great physical features of the submerged lands; and the same observation applies to the other contours. These features vary in elevation and depression according to geographical position; and it is only by a close

* *Trans. Vict. Inst.*, vol. xxix. See also Prof. J. W. Spencer on the “Reconstruction of the Antillæan Continent,” *Bull. Geol. Soc., America*, vol. vi.

† I have given a short preliminary notice of the results of my examination of the Admiralty charts in *Nature*, March 24th, 1898.

‡ *The Depths of the Sea*, Plates II, IV, V (1873).

observance of the changes of depth, as indicated by the soundings, that the features themselves can be recognised and portrayed.*

Throughout a distance of 500 miles from the vicinity of Rockall on the north to the entrance of the Bay of Biscay, the British platform terminates seaward along the margin of a grand escarpment of 7,000 to 8,000 feet in height; remarkable for the steep descent of its flanks, which in some cases are precipitous. The edge of this escarpment is quite sharp and well-defined by the sudden descent of the soundings; and at (or towards) its base it gives place to the abyssal plain with a very gentle descent towards the oceanic bottom. The general outline of the platform and escarpment will be understood from the diagrammatic sections. (Figs. 1, 2, 3 and 4.) Off the coast of Scotland the escarpment is known as the Vidal Bank.† Its upper margin here very closely coincides with the 100-fathom line; but on tracing the margin southwards it is found to gradually become deeper till opposite the entrance of the English Channel, it nearly coincides with the 180-200 fathom contours. The sections taken at intervals from off the Hebrides to the coast of France, at the entrance to Bay of Biscay, will illustrate this general statement. (See PLATE, Figs. 1, 2, 3, 4.)

No. 1. Drawn through Rockall to the Isle of Mull, illustrates the form of the sea-bed near the head of the great bay which here penetrates northwards into the plateau which stretches from Scotland by Rockall towards Iceland, on which the Faerøe Islands and Orkneys are also planted. The margin of the British platform is sharply defined by the 100-fathom contour at about 70 miles from Uinst, at which point the escarpment descends at a steep angle to the 1,000 fathom contour, where it gives place to the abyssal floor of the ocean, descending to a depth of about 1,350 fathoms or 8,100 feet. The total height of the escarpment is here 7,500 feet approximately.

No. 2. Represents the outline of the sea-bed west of County Donegal, at Slieve Liag, which rises in a bold headland of nearly 2,000 feet from the ocean. Here the margin of the British platform is still closely represented by the 100-120 fathom contour, and the escarpment descends to the 1,000 fathom line, from which the floor of the ocean

* The British platform is described by Professor Spencer, *Geological Magazine*, No. 403, p. 37 (1898).

† Admiralty chart.

gently descends to a depth of about 1,600 fathoms or 9,600 feet; the form and height of the escarpment are similar to those of Section VII, but somewhat steeper.

No. 3. This section is remarkable for two points; first, the width of the British platform, and the depth of its western margin below the ocean surface. It is drawn from the coast of Clare (where the cliffs of Mohir, formed of Carboniferous sandstone, rise 400 feet above the sea) along a series of soundings stretching due west for a distance of 280 miles. The platform is here about 200 miles across, and its western margin is indicated by the 200 fathom contour very nearly; that is twice the depth of the margin opposite Donegal and the Hebrides. The escarpment here, just west of the "Porcupine Bank," is very bold and lofty; descending abruptly from the 200 to the 1,500 contours, being a total descent of about 7,800 feet. Directly north of the Porcupine Bank, the escarpment is quite precipitous, as the two terminal contours (the upper and lower) are in close proximity. With this tremendous descent of over 7,000 feet, the escarpment stretches southward, till opposite the south of Ireland it sweeps round eastward, producing a wide bay about 200 miles across, and sloping upwards to the marginal line of 200 fathoms, at which point the old channel of the river Shannon seems to have descended to the ocean when this was emergent land. Opposite this bay the floor of the ocean descends to a depth of 2,500 fathoms (or 15,000 feet) within a distance of 200 miles.

No. 4. This section is drawn from the coast of Kerry in a south-westerly direction, and is continued eastward over Carantual, the highest mountain in Ireland, reaching a height of 3,400 feet above the sea. The platform is here only 60 miles across, and the descent from its margin is less precipitous than in the case of Sections 2 and 3. The depth of the margin is about 200 fathoms, and after the initial steep descent to about 1,500 fathoms, the ocean bed gently declines till, at a distance of 170 miles from the margin, it reaches a depth of 2,300 fathoms or 13,800 feet. This is the last of the sections I have drawn; but if another were taken in a south-westerly direction from Ushant, off the coast of France, it would show a platform of 80 miles in breadth, breaking off at the 200-fathom line in a sheer precipice of 5,000 feet just south of La Rochelle Bank, which is situated at the edge of the platform itself.

We have now reached the southern limit of the region

which I have on the present occasion proposed to myself for investigation, at the northern end of the Bay of Biscay, but I do not doubt that the features here described are continued still further south.* From what has been stated it will be seen that throughout a line of coast of 600 or 700 miles we have a remarkably uniform succession of features, consisting of a gently sloping submerged terrace, stretching out from the coast to a variable distance, but which, on reaching a depth of 100 to 200 fathoms, breaks off in what would be a grand escarpment of 7,000 to 8,000 feet, if viewed from the outer ocean. Such regularity of features through so great a distance cannot be regarded as accidental; it points to uniformity of cause and mode of production. It is to a terrestrial surface we must have recourse for the explanation of the physical conditions here described. We are familiar with examples of plateaux bounded by escarpments leading down into plains both in the British Islands and in other countries. We have a familiar example in the Cotteswold Hills of Gloucester and Somerset; in the range of the Jura; in the range overlooking the Delta of the Nile above the plains of Egypt. All these terraced escarpments have been formed on the surface of emergent lands; they are absolutely terrestrial, not sub-oceanic in their origin; and in ascribing a similar origin to those here under consideration, we are only drawing a logical deduction from the premises laid down. In a word, this grand terraced escarpment of the British Isles must have been formed during a period of emergence of the whole region to an extent of several thousand feet above the surface of the ocean, as it is at the present day, and of subsequent submergence, during which the Atlantic waves, driven by prevalent winds, have undermined the cliffs of rock. Professor James Geikie has recognised the generally abrupt descent of the continental plateau, but does not appear to have recognised that such features must have had a terrestrial origin.†

* This statement I have since verified by an examination of the Admiralty chart over the Bay of Biscay, which affords most interesting results, especially in the determination of the channels of the rivers Loire and Adour traversing the platform, and descending through deep cañons to the base of the great escarpment, and I hope, ere long, to have an opportunity of making these results public.—E. H. (April, 1898.)

† Address to Geographical Section, Brit. Assoc., 1892. *Proc. Roy. Geog. Soc.*, Sept. 1892, p. 639. The author however, clearly describes the

IV. *Submerged river channels.*—The views I have just expressed receive remarkable confirmation from the existence of old river channels, which may be traced on the Admiralty charts by the soundings. It will be evident that during the period when the British platform was in the condition of a land surface, the rivers descending from the adjoining land, as well as the rain which fell upon its own surface, must have had outlets to the ocean towards the west; and we are, therefore, led to inquire, are such outlets, in the form of river channels, to be recognised by the soundings? I am able to give a very decisive answer in the affirmative to this question. Notwithstanding that the submerged lands around the British Isles have for thousands of years been covered by water, more or less loaded with sediment, and during the later glacial stages, laden with icebergs and floes carrying and depositing stones and mud, two old river channels, at least, can be clearly traced, one draining the lands now occupied by the waters of the Irish Sea, and the other, by those of the English Channel. The courses of these old rivers are indicated by slightly irregular depressions in the soundings, varying in depth from 2 to 20 fathoms below the general levels adjoining, but they become remarkably accentuated on approaching the margin of the great escarpment, where they are converted into gorges or cañons bounded by precipitous walls of rock, and traceable down nearly to the base of the escarpment.*

V. *The English Channel River and the "Hurd Deep"* (Figs. 5 and 6).—The course of the river which drained the area of the English Channel can generally be traced by a curving line of depression from its source near the Straits of Dover to the margin of the great escarpment, where it cuts deeply into the rock in the form of a gorge or cañon. Owing, probably, to silting up by sediment the course is less evident than it would have been had no sediment been deposited. But at one part of its course its position is still clearly defined on the chart for a distance of 70 miles under the name of the "Hurd Deep." This is a nearly straight E. and W. gorge about 4 to 5 miles across, and at its deepest part 354 feet

mode of formation by marine action on emergent lands of such plateaux as the British platform, p. 644.

* In a recent paper read before the Geological Society Mr. T. Codrington has described various river valleys in the south and west of England and Wales in which the solid rock is found at various depths below the sea-level, the original channel being filled in with "glacial deposits," that of the Dart being 110 feet below low water mark.

below the general floor of the sea bed.* Here, we may suppose, the channel has been kept open and free from sediment, unlike the portions of the river valley above and below. The cause of this dissimilarity of conditions is not far to seek. On looking at the map it will be seen that the "Hurd Deep" lies in the narrowest part of the channel west of the Straits of Dover, between the Isle of Wight and Portland Bill on the north, and Cape de la Hague and Cape de Barfleur on the south. Above and below this strait the channel broadens out to about twice its breadth between these points; hence the tidal currents have here extraordinary force and swiftness, owing to which the sediment, deposited above and below, appears to have been prevented from settling down and filling up the gorge of the old river. The general outline, the direction, and position of this remarkable rift, all point to the "Hurd Deep" as a river channel which has been cut down into the solid rock, and is bounded by steep, or precipitous, cliffs resembling on a small scale the American cañons. The two submarine rivers here described must have exceeded in size any of our existing streams, and we may infer entered the ocean in a succession of grand cascades.†

VI. *Comparison with the American Submerged Platform.*—In my former paper‡ I described briefly the results arrived at by Professor Spencer and other American geologists regarding the "drowned" plains, escarpments, and river valleys lying outside the North American coast, and I showed that they consist (1) of the "Continental Shelf," stretching out into the Atlantic as far as the 100-fathom line, or thereabouts, where it breaks off along an escarpment, descending to a depth of 450 or 500 fathoms. This escarpment is then succeeded by a second and more extensive terrace, known as "the Blake Plateau," which in turn terminates along a second grand escarpment descending to the abyssal depths of the ocean.

* The deepest point shown by the soundings is 95 fms., while the bordering level of the sea-bed is 36 fms.

† Man was not present to view the scene presented by the British Isles at this time; but we may easily reproduce before our minds its grandeur as visible from the ocean at a distance of a few miles from the coast. In front would rise the lofty terraced cliffs, several thousand feet in height, and stretching away to the north and south in bold headlands and wide bays till lost to sight in the distance; while, planted on the nearly level terrace above, would be seen in the far distance the mountain heights of Britain or Ireland robed in a white mantle of snow.

‡ *On Another Possible Cause of the Glacial Epoch*, 1898. (Now preparing for publication.)

It will be observed that as compared with the British sub-coastal features there is a general resemblance, but with one important exception, namely, the absence of the representation of the "Blake Plateau." We may, without hesitation, recognise our British platform as the equivalent of the Continental shelf; but as I have already shown, this terminates along the margin of one great escarpment descending to depths of 8,000 or 9,000 feet. A solid escarpment of this kind indicates a slow continuous elevation, after the British platform had been planed down by wave action, and subsequent depression after a long lapse of time. On the coast of the American continent, however, there appears to have been an intermediate period representing a pause in the process of elevation and subsequent depression, during which the second shelf, or "Blake Plateau," was elaborated. In all cases, however, it must be remembered that the formation of these escarpments was mainly due to wave action, undermining the cliffs during prolonged pauses in the process of elevation or subsequent depression.

VII. *Geological Age of the Submerged Features.*—The formation of the British platform, like that of the American "Continental Shelf," may be referred back with confidence to the Mio-pliocene period, and that of the grand escarpment to the succeeding early Pleistocene or Glacial stage. This view is in harmony with analogy and what we know of the physical conditions of these periods. The Mio-pliocene stage was one of great terrestrial changes of land and sea over the European and adjoining areas; but the climatic conditions were warm and genial, with a foretaste of more rigorous conditions towards the close. An elevation of 100 to 200 fathoms round our coasts would have been insufficient to have brought on glacial conditions, although undoubtedly tending in that direction in our more mountainous districts; but a further elevation to the extent of several thousand feet would undoubtedly bring about such conditions; and we are, therefore, justified in inferring a close relationship between this latter rise of the land, with the adjoining oceanic bed, and the incoming of those Arctic conditions which resulted in covering, not only our mountain heights with perennial snow and glaciers, but also the adjoining plains.

Having already in my former paper treated the subject of the origin of the Glacial period at some length, it is unnecessary that I should dwell upon it here—or explain how the great rise of the land would necessarily result in bringing

about glacial conditions in the north temperate zone, especially when combined with alterations in the temperature of the Gulf Stream. On these points the reader is referred to my former communication, and I shall only add here, that the conclusions which I ventured to announce on the basis of the statements of previous authors have been fully verified by my own study of the Admiralty charts, which I have here communicated to the Institute.*

VIII. *The great rise and fall of the land, by what standard to be measured.*—The question of a rise and subsequent depression of the British and adjoining Continental areas, such as is here postulated—amounting to about 9,000 feet—may well cause not only surprise, but also some doubt in the minds of many; but their hesitation may find some relief from two or three considerations:—

(1) We have unquestionable evidence that late Tertiary strata of marine origin are found in the Alps and other regions at elevations of 10,000 feet, and over, above the sea.

(2) The probability that during the Glacial period large quantities of oceanic water were locked up in the form of snow and ice round the North Pole as supposed by the late Mr. A. Tylor,† and apparently concurred in by Dr. A. Wallace. Mr. Tylor estimated that the amount of water thus locked up would have lowered the surface of the ocean by 2,000 feet. On the other hand, a general lowering of the surface may have been brought about by depressions in the bed of the great oceans as suggested by Professor Suess.‡

(3) In trying to realize such great changes of level we must recollect that as regards the *standard of measurement*, namely, the diameter of the globe, they are really insignificant. Even a rise or fall of the surface, to the extent of 10,000 feet, will only amount to $\frac{1}{4184}$ th part of the diameter. We do not postulate a greater rise or fall than about 1,200—

* Professor T. McK. Hughes, in his interesting paper on *The Evidence of Later Movements of Elevation and Depression in the British Isles*, read before the Institute in 1879, postulates a rise of the land to the extent of several thousand feet and infers the climatic changes which would thence result. I hope he will now concur with me that such a rise has actually taken place.—E. H.

† *Trans. Nova Scotia Institute of Natural Science*, 1866.

‡ There are other ways, more or less speculative, by which the alteration of the general level of the ocean may have been brought about, and which the reader will find described in Professor J. Geikie's comprehensive address already referred to. *Loc. cit.*, p. 639.

1,500 fathoms (7,200–9,000 feet), but, as Professor J. Geikie shows in his Bathy-hypsometrical map of the world, there is a total range of 9,488 fathoms, or 56,932 feet, between the highest altitudes of the land and the lowest depths of the ocean.

IX. *General Conclusion.*—From what has been stated above it will be seen that the North Atlantic Ocean down to great depths along the European coast is characterised by physical features similar to those we observe on the land and due largely to similar causes, namely, marine and atmospheric erosion. I hope to be able to produce additional evidence of this conclusion when describing the sub-oceanic features of the Bay of Biscay.

POSTSCRIPT.

Mr. A. J. Jukes-Browne in his *Building of the British Isles*, 2nd Edit., 1892, has very clearly described some of the physical changes which the British Isles have undergone in later Tertiary and Post-Tertiary times, and, as represented in Plate xiii, has given a restoration of the drainage of the British Isles during the Newer Pliocene Period, showing two principal rivers entering the ocean—and draining the regions now occupied by the Irish Sea and English Channel. But it does not appear that he has recognised the channels and cañons, such as “the Hurd Deep,” as determinable from a study of the Admiralty charts, nor the great escarpment which it is the special purpose of this paper to elucidate. The chart of the Crag period originally drawn by Mr. R. A. C. Godwin-Austen (*Q.J.G.S.*, vol. xxii, p. 240) was the first attempt to restore the physical geography of the Pliocene period of these isles.

The CHAIRMAN (Commander G. P. HEATH, R.N.).—Professor Hull's very interesting paper is, I am sure, one upon which some would like to make remarks.

Professor R. ETHERIDGE, F.R.S., F.R.S.E., F.G.S., &c.—The important paper by Professor Hull can scarcely be discussed here; indeed, it would be hypercritical to do so. The conclusions in the entire paper are based upon facts selected from the hydrographical maps, published by the Admiralty, giving the soundings over, and westwards of, the British platform or 100-fathom line, ranging from the north-western coasts of Scotland and Ireland to the coast of Western France. Little or nothing had previously been done in the British area west of this 100-fathom or 600-foot line; but Professor Hull has extended observations through the analysis of the deeper soundings outside, or westwards of, the 100-fathom line or submerged terrace, to depths ranging from 250 to 1,500 or 2,000 fathoms. No one has hitherto applied these ocean soundings for the purpose of elucidating the past physical history of the old and now submerged land once extending far to the west, or into the now depths of the Atlantic ranging through the contours of 250, 500, 750, 1,000, to 1,500 fathoms. From the extensive series of soundings along our own coasts, and that of Western Europe, ranging from France to Spain, Professor Hull has selected the old and now depressed estuarine areas of certain rivers, notably those on the west coast of Ireland—the *Erne*, the *Shannon Channel*, the "*Irish Channel river*," the "*English Channel river*," and its once extensive cañon, with sections along or over the "*British Platform*" nearly 300 miles west of Ireland—to illustrate his views upon the great depression of the now submerged land beyond the known 100-fathom level or British platform, to depths varying, and ranging from 1,500, 4,500, 6,000 to 9,000 feet, ending in the abyssal plain of the Atlantic. Professor Hull, in his paper on "Another possible cause of the Glacial Epoch," read before the members of the Victoria Institute, refers to the views and labours of Mr. Warren Upham and Professor Spencer on the reconstruction of the antillian area, applying this to the *submarine* valleys of the western coast of Scotland, Ireland, England, and France to depths varying from 1,000 to 10,000 feet; the map and six sections prepared by Professor Hull most clearly illustrate these important discoveries or additions to our knowledge of this

outer or "grand submerged escarpment" which finally descends to the deeper oceanic or abyssal plain.

The courses of the rivers *Erne*, *Shannon*, and the "*Irish and English Channel rivers*" of Dr. Hull, on the south and west of Ireland, and between England and France, to the edge of the 1,500-fathom or 9,000 feet contour, convey to us, through this paper, facts hitherto unexpected. We are now able, through his analysis of the soundings west of the 100-fathom plateau, to restore the "drowned valleys" of Western Britain and Europe, and may prolong the deep soundings of the North British coasts across the North Atlantic to meet the line of soundings from North America in the region of 52° N. latitude, which rise northward to the Icelandic ridge north of Rockall.

Professor Hull's interpretation that the submerged, and now submarine, valleys were originally formed or fashioned through atmospheric denudation in the widest sense, prior to their submergence, is fully demonstrated in his paper, and by his accompanying map and sections, they are a clear exposition of the arguments therein adopted. The six bathymetrical sections, as would be expected, demonstrate the depths, or amount of depression shown through the contour lines. The two *cañon valleys* ("the *Irish Channel river*" and the "*English Channel river*" on the Continental platform) reach the outer deep-sea escarpment at the 250 and 270-fathom line, or 1,500 and 1,620 feet deep respectively. The *Shannon channel* descended to the 250-fathom line, or 1,500 feet; that of the river *Erne* to the 750-fathom, or 1,620 feet contour. We must congratulate Professor Hull on his affording us much new information relative to the hydro-geographical and probably hydro-geological research around the westerly extended submerged land extending from the coasts of North Scotland, Ireland, France, and on to Spain.

Mr. D. HOWARD, F.C.S., D.L., &c.—Judging from the shallower seas off the mouth of the Thames, and how powerful the silting-up process is there, the wonder is that the cañons should have remained as they are. The instances given in the paper show how rapidly the silting process may take place under favourable circumstances.

Professor J. LOGAN LOBLEY, F.G.S.—We must all feel indebted to Professor Hull for this important paper: it is not only a contribution to geological, but to geographical, knowledge.

Its chief value, geologically, is, perhaps, the aid it gives us in

interpreting the phenomena of the Glacial Period; for when we conceive the British Islands lifted 6,000 or 7,000 feet higher than at present, in reference to the present level of the sea, we can easily see how glacial conditions could take place.

I have always been in favour of this explanation of glacial phenomena rather than that given by Dr. Croll. But there may be other forces that have had to do with the production of great alterations of climate. We can easily conceive that a considerable elevation of land will lower the temperature very much below that of the latitudinal climate or region; but the depression of any area of little elevation will not raise the temperature above the latitudinal temperature of the region. We have had evidence brought to us very recently from Franz Josef Land of much warmer climatic conditions having occurred there in the Jurassic Period, for fossils show that the climate of that northern region was then similar to the climate of the British Isles.

In the paper I find it stated that it has been estimated that an amount of water, lowering the surface of the ocean to the extent of 2,000 feet, may have been locked up in the northern regions during the Glacial Period. I am afraid I cannot agree with that. I have estimated that, supposing the whole of the northern part of the globe north of the 50th parallel of latitude were covered with an ice-cap, that ice-cap would have to be 10,000 feet thick to lock up as much water as would lower the surface of the ocean 2,000 feet. I cannot conceive an ice-cap of 10,000 feet thick, for I do not see why ice should not have behaved in the Glacial Period as it is behaving now; and we find now that the ice comes off the coast of Greenland in icebergs constantly, and there is no reason why icebergs should not have come away from the northern land area into the sea and have melted and so restored, to some extent, the level of the sea. Therefore, I must be allowed to differ from that conclusion. It is not Professor Hull's conclusion, but is merely a theory that has been advanced. But generally it seems to be quite borne out that the glacial condition of the British Islands must have been largely dependent on a very considerable elevation of the land; and the way in which Professor Hull has marked out the contours of the surrounding sea bottom brings forward most cogent evidence in favour of that hypothesis.

REV. F. A. WALKER, D.D., F.L.S.—Looking back, with one's mind's eye to the features of the country as it must have presented

itself when, according to Professor Hull, Iceland, the Faeröe Islands, and the Orkneys constituted one long, narrow chain of land united with the British Isles, one cannot help comparing their present condition to a set of jewels of which the string has got broken.

I suppose it will be conceded that as the fauna are on a small scale as regards number of species in Scotland, more scanty in the Orkneys, fewer still in the Faeröes, and fewest of all in Iceland, the reverse is the case with regard to the altitude of the hills: the highest cliffs in Iceland are up to 3,000 feet, descend sheer down to the deep, and the highest mountains and rocks are just over 6,000 feet in altitude. Then you get several, I should judge, of 1,500 feet in the Faeröes and only one in the Orkneys of 1,556 feet (Ward Hill of Hoy), and that is by far the highest in the whole of that archipelago; and looking back to the period that Professor Hull describes, supposing the north of Iceland to be united by continuous land for a distance of 500 miles with Caithness, would that—the fact of continuous land—tend to produce an increased number of species or a series of fauna in the north? I doubt it; because, when you think of the large intervening distance of land—500 miles—and that insects would have to cross from richer and more varied vegetation and from trees of considerable size, one doubts whether they would do so, or migrate north; and there is another very satisfactory reason, viz.: that lime trees, thistles, nettles, turnips, and cabbages, are either not found at all in Iceland, or they exist in very infinitesimal quantities, and so several of our common species of butterflies would not be found there, or, reaching it, would not survive and multiply. You can have the food plant without the insect, but you cannot have the insect without the food plant. It may be true to some extent that, ever since pre-historic times, the climate has been deteriorating, because there are certain indications that there were more trees in Iceland in the middle ages, from the names of several places commencing with the prefix of *Reydir* *Sorbus edulis*, the wild crab apple, which the outlaw may often have munched in his wanderings; and so trees of considerable size may have flourished and served for the preservation of various kinds of insects. All along the course of many centuries the climate may have suffered owing to the recurrence of volcanic outbreaks and through the forests having been carelessly fired by the natives. No doubt Iceland has suffered in two or three ways

within the last century. In 1772 Messrs. Olassen and Povelsen noted oats and rye in small portions of the island, and the great outbreak of lava in 1784 destroyed the production of corn there ever since, and now no grain is produced north of the Faeröes because the lava set free the subterranean streams which inundated the meadows. You cannot find butterflies in Iceland because of the want of hollow trees or any shelter; while, on the other hand, certain *Noctuae* occur in numbers, as the caterpillars of these last go underground to change, and so rest secure from

“The dreadful pother o'er our heads”

of the winter storms and rain.

The CHAIRMAN.—Before conveying your thanks to Professor Hull, I would make one remark about these “deeps” to which he has alluded. It is very curious to observe how portions of the beds of these old channels continue deep, the remainder having entirely silted up. I know of several instances similar to that of the “Hurd Deep.” I believe they are to be accounted for by the fact that the tides still continue to flow in the direction of, and in a line with these deeps, as they did originally, thus keeping the channel open. Where the channel has silted up, the direction of the tides has changed, and, running across the old channel, has filled it up. This silting-up process is of course always going on, the rivers bringing their sediment into these shallow seas, which is deposited gradually, as the movement of the water slackens. Most of us probably have noticed the change of colour of the water, as soundings are reached at the entrance to the Channel, which is caused by the quantity of matter held in suspension by the tidal water. Professor Hull has, I am sure, taken great trouble in tracing these old river beds which evidently drained the two channels between Ireland and Scotland, and between England and France. We are much indebted to him, and, if you will allow me, I will convey to him your thanks for his interesting paper. (Cheers.)

The HON. SECRETARY (Captain F. PETRIE, F.G.S.).—The following communication has been received from Professor T. RUPERT JONES, F.R.S. :—

In praiseworthy furtherance of his researches as to the former geographical conditions of what is now the North-Atlantic region, Dr. E. Hull, applying the methods adopted by Dr. Spencer and other American observers, is led by careful consideration of the Admiralty charts, and with accurate reasoning on the relative depths

of the water as indicated by the soundings, to map out the margins of the British area before it became divided up into the existing islands. The conclusions arrived at are not only interesting, but add much to our knowledge of geographical evolution, as brought about by natural causes during immense periods of time.

The 100-fathom line, running parallel with the present coasts, has been the chief datum which former observers have taken for their hydro-geographic workings; but, as he points out, that line is not everywhere coincident with the margin of the old plateau from which our islands now rise; for, especially in one tract west of Ireland, this "British Platform," as it is called, extends further out for 280 miles; and, again, to the north and north-west it forms part of the great Icelandic plateau, stretching to Greenland and North America.

Between the Hebrides and Rockall a deep gulf (of 2,000 fathoms) extends northward to about 50° N. latitude, opening out southward, at about 55° N. latitude, into the open ocean. The cliffs must have been successive steps of enormous escarpments, of rapid descent, except at the head of the gulf just mentioned, and of a smaller gulf cutting into the "British Platform" south-west of Ireland. The old Shannon entered the head of this bay, and the "Porcupine Bank" was the most elevated part of that portion of the platform which was cut off by the western gulf.

The river which brought the Seine and other streams down the valley, since changed into the English Channel, had deep cañons in its course (indicated by deeper local soundings); and, like the old Irish-Channel river and the Erne, higher up on the Irish coast, must have fallen into the sea with grand waterfalls, if seen from the ocean. The Shannon, however, opening into the shallow head waters of the above-mentioned bay south-east of the "Porcupine Bank," emptied itself less precipitately.

The distribution of animals and plants supports the conclusions arrived at by the author, as well as the relative periods at which the fauna and flora were distributed, and afterwards interfered with by the elevation of the land to the height of 7,000 feet. This change of level, as indicated in the author's former memoir, lately read before this Institute, brought about the greatest intensity of cold in the so-called Glacial Period. This has, fortunately for us, been modified, chiefly by the subsidence of the land to its present height.

The features of the ancient coast-line of this region are compared with those of the North American area, as defined by Dr. Spencer and others.

Reference is made to observations by others on the possible down-sinking of ocean-waters and the uprising of lands; and the author reminds us that we need not be surprised at the great movements in Pliocene times, for the present difference between the highest land and the lowest sea-bed is not quite 60,000 feet,

and a rise or fall of 10,000 feet would amount to only $\frac{1}{4194}$ th part of the earth's diameter.

The CHAIRMAN.—I will now ask Professor Hull to reply to the remarks made upon his paper.

The AUTHOR.—I need not say that I am exceedingly gratified at the manner in which this communication has been received, and particularly by the comments thereon of Prof. Etheridge; from his position as one of the most eminent geologists in the British Isles, or, perhaps, the world, and as former President of the Geological Society, observations from him must have considerable weight, and what he has stated satisfies me that I have not pursued a mare's nest—in fact, I am indebted to him for having extended my observations to the Bay of Biscay. I had, incidentally, a conversation with him some time ago upon the subject, and he then expressed his desire that I should carry on my observations to the Bay of Biscay, and they proved so exceedingly interesting that I feel grateful to him for the suggestion he then made. I wish also to add my sense of the value of Professor Rupert Jones' letter, showing how clearly he has comprehended the sub-oceanic conditions considered in my paper.

Mr. Howard has introduced a very interesting point about the silting up of rivers, which of course is quite confirmed. I am also gratified by Professor Logan Loble's statement and concurrence in my conclusions. As he has said, the statement in my paper as to the locking up of the ocean waters by permanent ice in the Glacial Period, as accounting for the lowering of the surface of the ocean, requires to be taken with a very large grain of salt. It is not my own.

Dr. Walker has given us some additional views about Iceland, and I agree with him that the further north we go from the European area the more likely is it that the fauna and flora would decrease in number and variety.

I must say that Dr. Walker's observations on Iceland,* published some years ago in the *Transactions* of this Institute, form one of the most valuable papers I have ever read; and it will well repay the perusal of any member of the Institute interested in the subject.

I am obliged to the Chairman for his suggestions as to the

* "The Botany and Entomology of Iceland," *Journal of Transactions*, vol. xxiv.

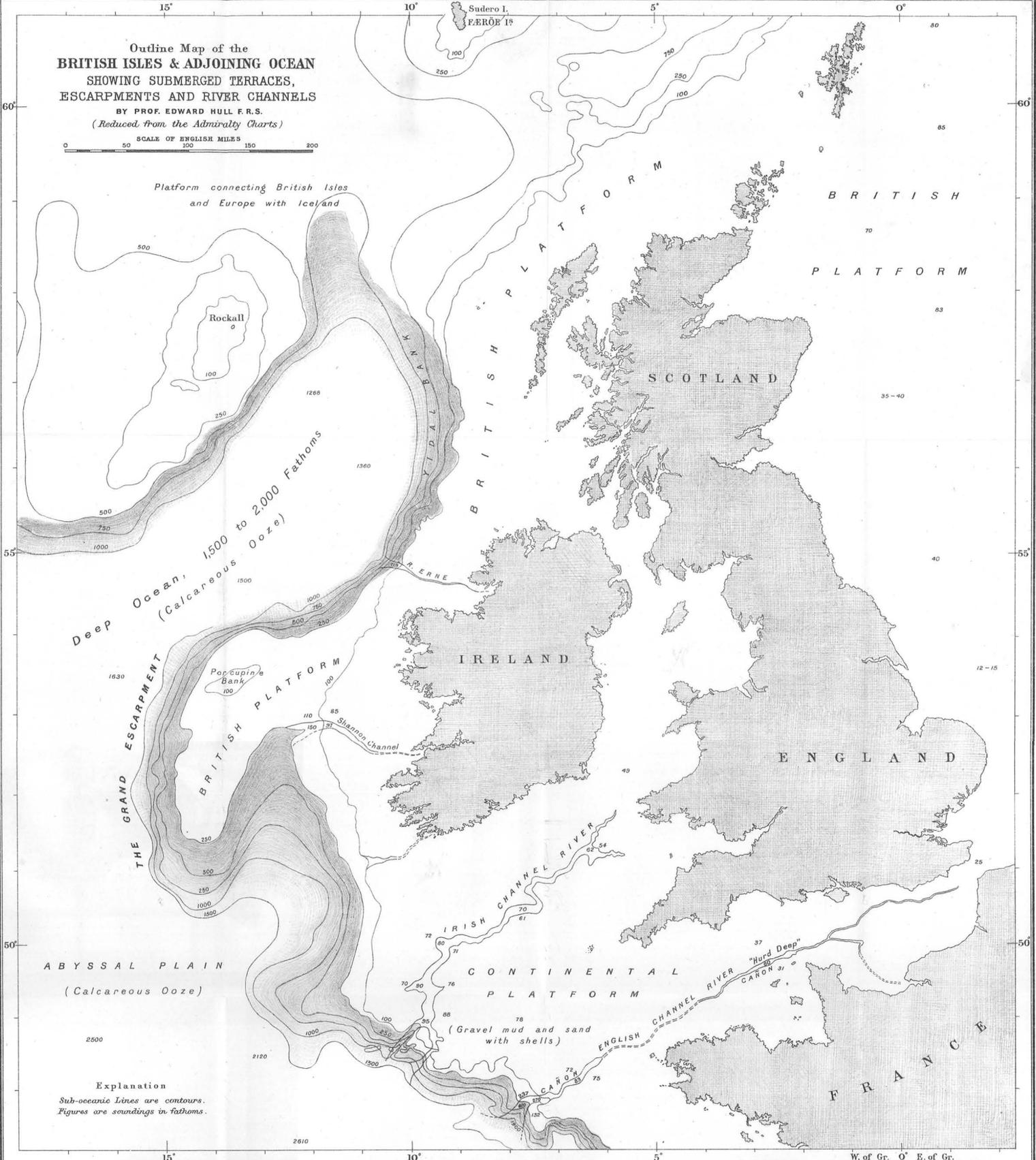
deposits in the "Hurd Deep." It is true the "Hurd Deep" does lie in the line of the current, and therefore, on the ground he states, it would be protected against the deposition of the mud. We all know the tremendous tidal currents that rush up and down this channel, that rise and fall something like 60 feet, I think, on the coast of France, and the rush of waters on the banks is tremendous and a great danger to navigation. Therefore, when there is such a rush of water along the channel of this "Hurd Deep," lying as it does in the line of the tidal stream, it is natural that the sediment should not have had opportunity to subside and thus fill up the old river channel.

The meeting was then adjourned.

*COMMUNICATIONS RECEIVED IN REGARD TO THE
PRECEDING PAPER.*

The Cavaliere W. P. Jervis, director of the Royal Industrial Museum of Turin, writes July 13, 1898:—I have been familiar with the whole of the European bathometrical observations for twelve years and have often spoken of them, but I never understood the enigma until Professor Hull threw light on the matter, and now I feel the importance of those facts which I had all along looked upon as a mere curiosity.

[Cavaliere Jervis has contributed some matter towards a further consideration of the subject, and a communication has also been received from a valued member, Mr. H. P. Malet, who dissents from Professor Hull's view. These communications can only be adequately dealt with later on.]



N^o 1. Section through Rockall to I. of Mull. Scotland.
Distance about 300 miles.
Numbers in fathoms.



N^o 2. Section off Coast of Donegal, Ireland.



N^o 3. Section off Coast of Co. Clare Ireland.



N^o 4. Section off Coast of Kerry, Ireland.



N^o 5. Section through the "Hurd Deep" Channel.



N^o 6. Section through the "Hurd Deep" Channel.



Sections to show how the old River Channel ("Hurd Deep") cuts into the Platform.
Bathymetrical Sections; to illustrate Prof. Hull's Paper on the Submerged Terraces &c.

Stanford's Geog. Estab.