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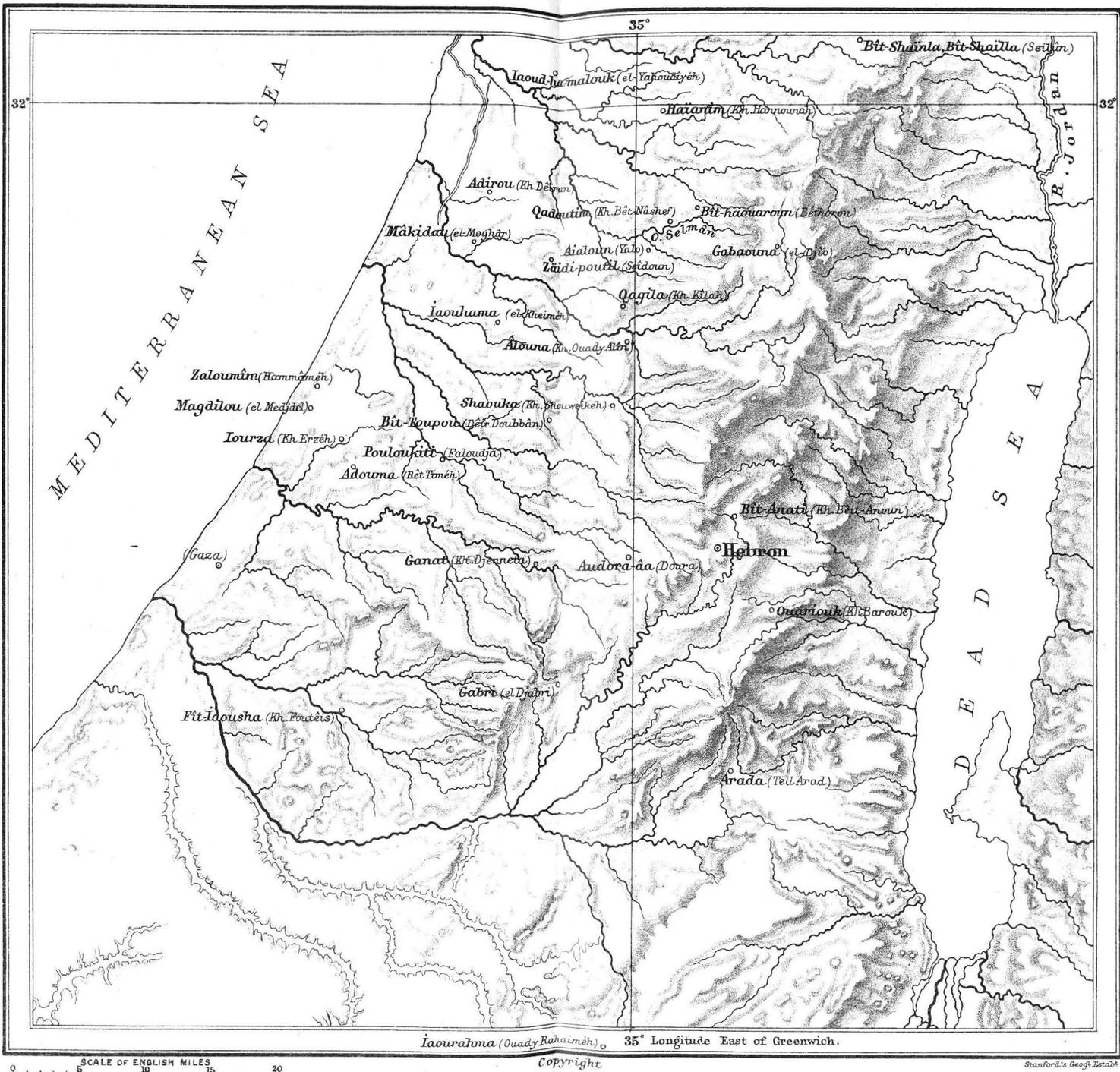
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JOURNAL OF THE TRANSACTIONS  
OF  
THE VICTORIA INSTITUTE.

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VOL. XXVII.



MAP TO ACCOMPANY A PAPER, ON THE LIST OF SHESHONQ, PREPARED BY M. MASPERO FOR THE VICTORIA INSTITUTE.

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

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

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VOL. XXVII.



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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.

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THE Twenty-Seventh Volume of the *Journal of the Transactions* of the VICTORIA INSTITUTE is now issued. It is a record of the various important questions 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 work of the Institute in the present day," by the Right Hon. LORD HALSBURY, P.C., F.R.S., Vice-President; remarks by Sir HENRY BARKLY, G.C.M.G., K.C.B., F.R.S., Sir F. YOUNG, K.C.M.G., Sir J. FAYRER, M.D., K.C.S.I., F.R.S., Sir G. BUCHANAN, F.R.S., Professor E. HULL, LL.D., F.R.S., and others, are appended. "The principles of rank among animals," by Professor HENRY WEBSTER PARKER, M.D., &c., of the United States, in writing on which he, as an anatomist, briefly points out certain arguments for considering that man is "the only primate." A brief note "On the recession of Niagara Falls," by Mr. WARREN UPHAM, Assistant State Geologist. "How the waters of the ocean became salt," by Professor E. HULL, LL.D., F.R.S.; a letter from Professor TYNDALL, F.R.S.,

(the late), who saw an early proof of the paper, commences a discussion taken part in by Professor JOSEPH PRESTWICH, D.C.L., F.R.S., Mr. DAVID HOWARD, F.C.S., &c., and others. "The List of Shishak," by Monsieur G. MASPERO, being the third paper contributed by him towards the identification of ancient sites in Palestine (a map specially prepared by the author accompanies his paper); among those taking part in the discussion were Professor E. HULL, LL.D., F.R.S., Mr. F. J. BLISS, and Major CONDER, R.E., who has himself taken up the same field of enquiry, and considers that "M. MASPERO'S valuable paper throws light on a list which was previously very obscure." "An inquiry into the formation of Habit in Man," by ALFRED T. SCHOFIELD, Esq., M.D., M.R.C.S.; the discussion on which was taken part in by Dr. ALEX. HILL, M.A., Master of Downing College, Cambridge, Surgeon-General GORDON, C.B., Professor H. W. PARKER, M.D., Dr. GERARD SMITH, &c. "On the Alleged Scepticism of Kant," by W. L. COURTNEY, M.A., LL.D.; in considering which the Venerable Archdeacon W. M. SINCLAIR, D.D., the Venerable Archdeacon R. THORNTON, D.D., Professor J. H. BERNARD, D.D., Dr. T. CHAPLIN, Professor DUNS, F.R.S.E., the Rev. J. J. LIAS, M.A., and several others, took part. "On the Comparison of Asiatic Languages," by Major C. R. CONDER, R.E., D.C.L., LL.D., M.R.A.S.; Professor J. LEGGE, D.D. (of Oxford University), Mr. T. G. PINCHES, of the Oriental Department of the British Museum, the Rev. S. W. KOELLE, M.A., Ph.D., the Rev. KENNETH S. MACDONALD, M.A., D.D., and others joined in the discussion.

"A possible cause for the origin of the Tradition of the Flood," by JOSEPH PRESTWICH, D.C.L., F.R.S., F.G.S., formerly Professor of Geology in the University of Oxford; in which he treats the subject from a purely scientific standpoint: describing a mass of geological phenomena, at home

and abroad, which have long been carefully studied by him, he gives the reasons for considering that they are only to be explained on the hypothesis of a "submergence of vast extent," "an inundation of continental dimensions." A considerable number of geologists were present when the paper was read, the discussion dealt with the scientific issues presented in the paper, and was contributed to by Sir J. WILLIAM DAWSON, C.M.G., F.R.S., Sir H. HOWORTH, K.C.I.E., M.P., F.R.S., Dr. H. WOODWARD, F.R.S. (President of the Geological Society) Admiral H. D. GRANT, C.B., R.N., Professor T. McK. HUGHES, M.A., F.R.S., Professor E. HULL, LL.D., F.R.S., Professor T. RUPERT JONES, F.R.S., Mr. J. ALLEN BROWN, F.G.S., the Rev. J. M. MELLO, M.A., F.G.S., Mr. WARREN UPHAM, Assistant State Geologist, and others. Sir J. W. DAWSON, in his remarks on the paper, expresses the "hope that the subject will now be followed up on both sides of the Atlantic, and will ultimately afford a sure link of connection between the geological record and the oldest historical documents of our species."

To all who have taken a part in the work done the best thanks of the Members and Associates are due; by their aid the Transactions of the Institute possess a unique value, for on each subject dealt with, these present the opinions, not of one author, but of many of those whose studies have lain in the direction of the matter taken up.

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

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

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ANNUAL GENERAL MEETING,  
HELD AT THE HOUSE OF THE SOCIETY OF ARTS,  
MONDAY, AUGUST 1, 1892.

Sir JOSEPH FAYRER, M.D., K.C.S.I., F.R.S., *Vice-President.*

IN THE CHAIR.

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

*Progress of the Institute.*

In presenting the TWENTY-SIXTH ANNUAL REPORT, the Council is able to record the continued steady progress of the Institute both at home and abroad; this a subject for special congratulation, considering the severe losses the Institute has sustained in the extraordinary number of deaths among its active Members,\* as well as those adverse influences which have affected every class and interest, not only at home but in several of the colonies.

The increasing interest taken in the Institute's welfare both

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\* 103 during the influenza epidemic.

by its supporters and the public generally, and the many former Members who have this year rejoined its ranks, have tended to strengthen the hands of the Council in conducting its work. In this they have been further encouraged by the munificence of one of the Members, his Excellency Dr. R. H. Gunning, who has presented the Institute with a sum of £500, under the following conditions:—

“The interest or income thereof to be held in trust always, for the purpose of endowing a prize, to be awarded triennially, in recognition of services rendered to the object of the said Society.”

Last summer and autumn meetings of the Council were held to consider the importance of securing an increased active interest in the Institute, especially among the leaders of thought in the Universities; and also to consult as to the most desirable and useful subjects to be taken up during the coming Session, so as more fully to carry out the great objects which the Institute was founded to accomplish. The beneficial results of these special meetings has been evidenced during the present Session, which has been one of the most successful.

Arrangements have also been perfected for enabling country, colonial, and foreign Members and Associates to take a part in considering the subjects brought before the Institute: all those interested in the various subjects can now, by intimating their wish beforehand, receive proof copies of the papers to be read, and can send in any comments they may see fit; these comments are brought before the Council with a view to being included in the discussion, which is published after each paper in the Journal. The value of the Journal is thereby enhanced to all, and made to include much that has not been brought before those attending the meetings.

The Library of Reference is becoming larger; but a Library Fund is desirable, in order to secure certain valuable books of reference which are constantly needed.

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

**President.**

Sir George Gabriel Stokes, Bart., LL.D., Sc.D.,  
*Past President of the Royal Society.*

**Vice-Presidents.**

The Rt. Hon. Lord Halsbury, Lord High Chancellor.  
 Sir H. Barkly, G.C.M.G., K.C.B., F.R.S.  
 Sir Joseph Fayrer, K.C.S.I., F.R.S.  
 W. Forsyth, Esq., Q.C., LL.D.  
 Alexander McArthur, Esq., M.P.  
 Rev. Preb. Robinson Thornton, D.D.  
 W. H. Hudleston, Esq., M.A., F.R.S., *President of the Geological Society.*

**Trustees.**

D. Howard, Esq., D.L., F.C.S.  
 Rev. Preb. H. Wace, D.D.  
 W. N. West, Esq., F.R.G.S., F.R.Hist.Soc.

Hon. Auditors—J. Allen, Esq.; J. E. Wakefield, Esq.

**Council.**

Hon. Treas.—W. N. West, Esq., F.R.G.S., F.R.Hist.S.

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

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>*E. J. Morshead, Esq., H.M.C.S. (<i>For. Cor.</i>)</li> <li>William Vanzer, Esq., F.R.M.S.</li> <li>S. D. Waddy, Esq., Q.C., M.P.</li> <li>Rev. Principal Rigg, D.D.</li> <li>H. Cadman Jones, Esq., M.A.</li> <li>Rev. W. Arthur.</li> <li>Rev. Principal J. Angus, M.A., D.D.</li> <li>J. Bateman, Esq., F.R.S., F.L.S.</li> <li>*D. Howard, Esq., D.L., F.C.S.</li> <li>Professor H. A. Nicholson, M.D., F.R.S.E.</li> <li>Bisset Hawkins, Esq., M.D., F.R.S.</li> <li>The Bishop of Wakefield.</li> <li>Rev. F. W. Tremlett, D.C.L.</li> <li>Surg.-Gen. Gordon, M.D., C.B. Q.H.P.</li> </ul> | <ul style="list-style-type: none"> <li>His Excellency Dr. R. H. Gunning, F.R.S.E.</li> <li>*Rev. Preb. H. Wace, D.D.</li> <li>Rev. J. J. Lias, M.A.</li> <li>*Gen. G. S. Halliowes (<i>Cor. Sec.</i>).</li> <li>Rev. A. I. McCaul, M.A.</li> <li>Capt. Creak, R.N., F.R.S., &amp;c.</li> <li>Rev. F. A. Walker, D.D., F.L.S.</li> <li>T. Chaplin, Esq., M.D.</li> <li>Admiral H. D. Grant, C.B.</li> <li>Rev. Canon Girdlestone, M.A.</li> <li>Professor E. Hull, LL.D., F.R.S.</li> <li>Lt.-Col. Freeman, M.A.</li> <li>Sir G. Buchanan, M.D., F.R.S.</li> </ul> |
|---|---|

\* *Ex officio.*

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

Sir W. Bowman, M.D., F.R.S., *A.*; Rev. Canon W. Carus, M.A., *M.*; Rev. J. Cohen, M.A., *A.*; Sir John Coode, K.C.M.G., *M.*; Sir J. Porter Cory, Bart., M.P., *A.*; E. Crewdson, Esq., *A.*; Rev. President Darling, D.D., *A.*; Rt. Hon. W. W. L., Earl of Dartmouth, *M.*; Rev. J. Donaldson, *A.*; Rev. H. S. Eckersley, *A.*; Rev. C. J. Garrard, *A.*; Surgeon-General J. Goodall, M.R.C.S.E., *M.*; Rev. C. J. Goodhart, M.A., *A.*; W. J. Gunning, Esq., *A.*; G. C. Harrison, Esq., *F.L.M.*; J. Thornhill Harrison, Esq., *M.*; Rev. D. Honeyman, D.C.L., F.R.S.E., *A.*; Rev. J. Hudson, M.A., *A.*; Gen. C. W. Hutchinson, R.E., *A.*; Rev. E. P. Ingersoll, *A.*; D. Mackintosh, Esq. (*cor. mem.*); the Rt. Rev. Bishop Philpott, D.D., *A.*; Rev. T. Robinson, D.D., *A.*; Rev. President T. E. Rooke, D.D., *M.*; Rev. W. Sathianadahn, D.D., *A.*; H. J. Sanderson, Esq., M.D., *A.*; Rev. E. H. Smart, *A.*; W. J. Smellie, Esq., *A.*; W. Castle Smith, Esq., *F.L.M.*; J. Staikart, Esq., *F.M.*; Rt. Rev. M. Thomas, D.D., Bishop of Goulburn, *A.*; Rev. G. Turner, LL.D.; Mrs. Voile, *A.*; C. S. Wilkinson, Esq., F.G.S., Pres. Rl. Soc., N.S.W., *M.*; Rev. B. C. Young, *A.*

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

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

	Life		Annual	
	Members.	Associates.	Members.	Associates.
Numbers on June 19, 1891	.... 59	43	365	804
Deduct Deaths	.... —	—	10	25
„ Retirements, changes, &c.	.... —	—	3	11
	59	43	— 13	— 36
			352	768
Joined to June 20, 1892....	.... 4	1	18	67
	63	44	370	835
	107		1205	
Total	....	....	1311	
Hon. Correspondents number 124.			....	1435.

### Finance.

The Treasurer's Balance-sheet for the year ending December 31, 1891, duly audited, shows a balance credit of £233 10s. 5d., after the payment of all liabilities, with the exception of one printer's bill, since received, of £170 6s. The amount invested in 2½ per Cent. Consols is £1,365 18s. 9d.

The Council desires to urge the great advantage it would be were Members to remit their Subscriptions during the first half of the year, as a large proportion already do. Were this the rule with all, the whole machinery of the Institute would work with an ease that would greatly add to its success. Forms for the payment of the Subscriptions through a banker are used by a large number, and may always be had.

The arrears of subscriptions are as follow :—

	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Members ....	3	3	11	0	1	3	0	6	10
Associates ....	7	1	3	7	10	15	6	5	15
	10	4	14	7	11	18	6	11	25

### MEETINGS.

MONDAY, DECEMBER 7, 1891.—“Islâm: its origin, its strength, and its weakness.” By Rev. W. ST. CLAIR TISDALL, M.A.

MONDAY, JANUARY 4, 1892.—“From Reflex Action to Volition.” By Dr. ALEX. HILL, Master of Downing Coll., Cambridge. With remarks by SIR JOSEPH FAYRER, K.C.S.I., F.R.S., and others.

- MONDAY, JANUARY 18.—(*Paper postponed by reason of the death of H.R.H. The Duke of Clarence and Avondale.*)
- MONDAY, FEBRUARY 1.—“The weak side of Natural Selection.” By J. W. SLATER, F.C.S., F.E.S. “A Brief Note on the effects of a recent Submarine Volcano.” By Colonel MACKOWEN and Captain F. PETRIE, F.G.S.
- MONDAY, FEBRUARY 15.—“Miracles and Science.” By Rev. J. J. LIAS, M.A.
- MONDAY, MARCH 7.—“Serpent Worship and the Venomous Snakes of India.” By Sir JOSEPH FAYRER, K.C.S.I., M.D., F.R.S.
- MONDAY, MARCH 21.—“Traditions and Traces of Eden in Heathen Mythology.” By J. S. PHENÉ, LL.D.
- MONDAY, APRIL 4.—“On the Philosophical Value of the Argument from Design.” By Professor J. H. BERNARD, D.D., of Trinity College, Dublin.
- MONDAY, APRIL 11.—(*Instead of 18th—Easter Monday.*)—“On the Glacial Period and the Earth-movement Hypothesis.” By Professor JAMES GEIKIE, LL.D., D.C.L., F.R.S., &c.
- MONDAY, MAY 2.—“On the Past and Present Water Supply of Jerusalem and of Palestine.” By Colonel Sir CHARLES WILSON, R.E., K.C.B. K.C.M.G., D.C.L., LL.D., F.R.S.
- MONDAY, MAY 16.—“On Primitive Man.” By Rev. J. MAGENS MELLO, M.A., with a supplementary Paper by Sir J. WILLIAM DAWSON, C.M.G., F.R.S., &c.
- MONDAY, JUNE 20.—“On the Reality of Knowledge.” By JOSEPH JOHN MURPHY, Esq.—A Note on some results of Egyptian Exploration during the past season. By Count RIAMO DE HULST.
- MONDAY, AUGUST 1.—*Annual Meeting at the House of the Society of Arts.*—Address by The Right Honourable LORD HALSBURY, Lord High Chancellor.

So successful a Session as the present has probably not been held during any year since the Institute was founded. The meetings have been specially well attended. The improvements carried out by the Council in the introduction of the electric light and the abolition of the use of gas in the lecture room have added to the comfort of the Members.

#### *Publications.*

The Twenty-Fifth Volume of the Transactions is now about to be published; there has been a slight delay in its issue on account of the illness of some whose writings it includes. It contains, among other important papers, one of much research on *Islâm*, in the discussion of which many who had long studied the subject took part. This paper will probably be found as generally useful as the one on Buddhism which attracted so much attention.

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 several localities (often corresponding with the Institute in regard to 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—Many home, foreign, and colonial public libraries and institutions are regular purchasers of 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 at variance. The Journal of the Institute has been spoken of as specially suited as a corrective to such erroneous views.

### *The Special Fund.*

This fund has been founded to advance the influence of the Institute, and to forward the circulation of

THE PEOPLE'S EDITION:—This 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 pamphlets often contain the objections and criticisms brought forward in discussing the subjects, as many home and foreign correspondents have urged the value of including these. They are published in neat covers, and are sold at a nominal price (sixpence) by the Institute's organisation of bookseller agents, and single copies are supplied *gratuitously* or at cost price, at the office, to all individual lecturers against infidelity,

including those of the London City Mission, the Christian Evidence Society, and similar bodies.

*Conclusion.*

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

G. G. STOKES,

*President.*

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**SPECIAL FUND IN 1892.**

*People's Edition.*

	£	s.	d.
Harries, G., Esq. ....	20	0	0
Hawkins, Bisset, Esq., M.D., F.R.S. ....	5	0	0
Dent, H. C., Esq., C.E., F.L.S. ....	1	1	0
Harrison, Miss Grace ....	0	10	0
	<hr/>		
	£26	11	0
	<hr/>		

The following Balance Sheet was then read:—

# ANNUAL BALANCE-SHEET, from 1st January to 31st December, 1891.

RECEIPTS.		£	s.	d.	£	s.	d.	EXPENDITURE.		£	s.	d.
Balance	.. ..				28	9	10					
Subscriptions:—												
4 Life Members	.. ..	84	0	0				Printing	.. ..	182	13	10
1 Life Associate	.. ..	10	10	0				Postage, &c.	.. ..	111	12	9
1 Life Associate (10s. due)	.. ..	10	0	0				Binding	.. ..	29	6	11
Unpaid L. Sub. balance	.. ..	3	6	3				Reporting	.. ..	23	6	6
					107	16	3	Stationery	.. ..	29	3	3
								Advertising	.. ..	31	17	8
1 Member, 1885	.. ..	2	2	0				Expenses of Meetings	.. ..	40	15	6
1 " 1886	.. ..	2	2	0				Travelling Expenses	.. ..	14	12	10
1 " 1887	.. ..	2	2	0				Translations	.. ..	5	0	0
2 Members, 1888	.. ..	4	4	0				Salaries for Year	.. ..	81	16	3
2 " 1889	.. ..	4	4	0				Balance of rent of former apartments	.. ..	10	19	3
9 " 1890	.. ..	18	18	0				Rent to Christmas, 1891	.. ..	180	0	0
207 " 1891	.. ..	434	14	0				Law Charges, (House Agreement, and Transfer of Stock to new Trustees)	.. ..	23	6	0
4 " 1892	.. ..	8	8	0				Auditor	.. ..	10	10	0
1 " 1893	.. ..	2	2	0				Housekeeper	.. ..	1	8	8
19 Entrance Fees	.. ..	19	19	0				Coals, Gas, and Oil	.. ..	7	15	1
1 Associate, 1887	.. ..	1	1	0				Insurance	.. ..	0	12	0
4 Associates, 1888	.. ..	4	4	0				Sundry Office Expenses	.. ..	5	3	4
11 " 1889	.. ..	11	11	0				Library, Books, Repairs, &c., and Moving Management	.. ..	46	3	11
38 " 1890	.. ..	39	18	0				Banker's Charges	.. ..	1	12	9
483 " 1891	.. ..	507	3	0				Balance, Cr...	.. ..	*233	10	5
25 " 1892	.. ..	26	5	0								
2 " 1893	.. ..	2	2	0								
					1,090	19	0					
Div. on £1,365 18s. 9d. 2½ p.c. Consols, 3 quarters (one delayed through a Trustee's death)	.. ..				27	9	3					
Donations to Special Fund	.. ..				26	11	0					
Sale of Journals, &c.	.. ..				60	1	7					
Legacy from the late J. Jardine, Esq., M.A., LL.D.	.. ..				45	0	0					
					£1,386	6	11					
										£1,386	6	11

We have examined the Balance-Sheet with the Books and Vouchers, and find a Balance in hand of £233 10s. 5d.

JOHN ALLEN,  
J. E. WAKEFIELD, } *Auditors.*

\* Less £173 due to the printer.

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

[The HONORARY SECRETARY (Captain FRANCIS PETRIE, F.G.S.) in reading the Report specially called attention to the presentation of £500 to the Institute by one of the members of the Council, His Excellency Dr. Gunning, who desired that the interest of this sum should be devoted to furthering the Institute's work; to the improved arrangements for enabling colonial and foreign members to contribute papers or take part in considering the subjects brought forward; to the increased disposition that was manifested by members residing abroad to translate and publish the Institute's papers and discussions for the benefit of those in their neighbourhood, and quoted the remarks made at the last Annual Meeting by the Archdeacon of Mid-China in regard to such work. He concluded by referring to the loss of 103 members by death, during the late epidemic, a loss involving only too many of the Institute's most valued and loyal adherents, whose places could best be filled by existing members introducing new supporters.]

The CHAIRMAN.—I have been called upon to take the Chair in the unavoidable absence of the President, who greatly regrets that a prior engagement has deprived him of the pleasure of presiding at our Annual Meeting.

Before the first resolution is moved I wish to say one or two words. I am quite sure that you have all listened with satisfaction and with pleasure to the Report that has been read. It is very gratifying to find that in spite of the heavy mortality among its members during the late epidemic the progress of the Victoria Institute is so satisfactory, that its sphere of influence is widening and extending into different quarters of the globe, and that its proceedings have given pleasure and instruction to a large number of people.

It seems to me that the purpose for which this Institute was founded is one at which scarcely anyone could cavil. It is quite true that a very large number of educated people of the present day admit that there can be no conflict between Science and Revelation properly understood, but there are an enormous number of persons who are not in that happy position. There are people, for instance, who confound dogmatic theology with religion, and who do not appreciate what science really is. There are those who are neither capable of understanding the one nor of comprehending the other, and so I presume those mistakes and those inaccuracies which have always existed, still exist, and will continue to exist;

but it is the aim and object of this Society to endeavour to do away with these defects. This Institute is not antagonistic to science—if it were I should not remain in it for an hour—and the very fact that so many of its members are men of science, and that our President is a leading man of science, is sufficient to prove this. It has no prejudices, but it seeks to know the truth, the real truth; and it has no desire to place itself in conflict with religious thought. Its aim is to remove those difficulties which still exist among so many, for Science and Religion cannot really be in conflict if they be studied in a proper spirit; but if there be dogmatic assertions on the one side and self-sufficiency and obstinacy on the other, it is quite impossible that they can ever be held in accord. To bring about a right understanding is one of the aims of this Society, and I am very glad to find that its work has been so satisfactory, and that many Papers in the Transactions that have gone abroad have been translated into foreign languages. Our work has done much good, and I think every one must wish well to the Victoria Institute, and desire that its progress may continue to be as gratifying as in the past. I will now call on Sir Henry Barkly to move the adoption of the Report.

Sir H. BARKLY, K.C.B., G.C.M.G., F.R.S.—Sir Joseph Fayrer, my lord, ladies and gentlemen: I rise to move the adoption of the Report, but as you have heard its contents already sufficiently in detail, I will not detain you by making further allusion to it, as I am sure you will agree with me that all concerned in the production of so satisfactory a Report, are entitled to your thanks. I will therefore move, without further preface,—“That the Report be received, and the thanks of the Members and Associates presented to the Council, Honorary Officers, and Auditors for their efficient conduct of the business of the Victoria Institute during the year.”

Professor HULL, LL.D., F.R.S.—I have great satisfaction in being permitted to second the adoption of the resolution which has been moved by Sir Henry Barkly. I think, however, we should be wanting in our duty if we did not say a little more in reference to the services of the Honorary Officers of this Institute. I will therefore say, in the first place, how greatly the Institute is indebted for its present position and usefulness to our President, Sir George Gabriel Stokes, because I know he takes a very great interest in its progress and work, and that he has been here to take part in

the deliberations of the Council and to preside at the meetings on occasions when other public duties have had their claims upon him; and I think any one who knows the work of this Institute will agree with me that we are also indebted to the labours of our Hon. Secretary—(applause)—Captain Petrie. We owe him a debt of gratitude not only for the time and energy he has given to the Institute, but for the manner in which he has carried out the Council's wishes, his unfailing urbanity, his strict attention to the duties and *minutiae* of the work, which occupies his whole time, and I happen to know by accident that sometimes when we are comfortably resting in our beds he is at work at the desk carrying on the correspondence. Therefore I think we should be doing violence to our feelings if the resolution did not contain the names of our President and Hon. Secretary (applause). The resolution was passed.

The Ven. Archdeacon THORNTON, D.D.—I am afraid I cannot claim to be anything more than a Member of the Council and a Vice-President, at the same time I am quite open to express the thankfulness of the Officers and Council and all connected with this Institute for the confidence that is reposed in them. The Council have always endeavoured and will always endeavour, I am sure, to keep in mind the motto of the Society. The motto of the Society is this—not printed or impressed upon a seal, but the motto that regulates its proceedings—that between Scripture rightly interpreted and the facts of science rightly understood and deductions rightly drawn, there cannot possibly be any conflict, and that wherever there is any apparent conflict it must be the consequence of misinterpretation of Scripture or of scientific facts. There is another Society which deals rather with the interpretation of Scripture but this Institute has nothing to do with the interpretation of Scripture or dogmatic suggestions; the line it takes is to examine scientifically, including history, the scientific and technical objections brought against the Book which we revere, and that Book is always kept in mind, and always will be—so we hope to be the means of clearing away many of the difficulties that have interfered with people's acceptance of Scripture; and likewise, we steer clear of religious controversy. I am quite sure that this has always been our aim and desire, and we shall be encouraged in this work by the vote of thanks that has been so kindly accorded to us to-day, and I beg to return thanks for it.

The HON. SECRETARY (Captain PETRIE, F.G.S.).—Sir Joseph FAYRER, my Lord, ladies and gentlemen: In thanking Professor Hull for the very kind remarks that he has made in regard to myself, I feel they are more than I deserve; it is to the Council that so much is due. As one of the earliest of the founders of the Institute I can say this—that with such a Council it would be perfectly easy for anybody to conduct the affairs of this Institute.

The Right Honourable LORD HALSBURY, LORD HIGH CHANCELLOR (Vice-President), then delivered the following ADDRESS:—

**A** DISTINGUISHED President of this Society once said that to gauge thoroughly the amount of evidence on which an asserted scientific conclusion rests, one ought to be well acquainted with the branch of science to which it relates, but that still one might get a fair general notion of the evidence by an amount of reading by no means prohibitive or by conversing with those who have made that branch a special study.

I should think the Council of this Institute must have been moved by some such reflection in requesting me to deliver the Annual Address. I certainly am not entitled to mount the platform as a teacher but rather as the average auditor and student to say something of our work and our methods.

Not altogether unfamiliar with the process of considering the weight of evidence, and taught by some experience to listen to both sides, I may, perhaps, be qualified to give an opinion on the value of a particular argument, though I do not of course pretend to have formed no opinion upon the great question, the investigation and support of which forms, I believe, the charter of this Institute.

According to our methods the investigation must be both thorough and independent. Other avocations have hitherto prevented me from taking much part in the discussions myself, but I have had the advantage of reading what wise and learned men have written and said upon the various subjects which have been brought under review, and I observe that they have been thoroughly dissected, argued, and freely discussed. It is one of the supreme advantages

of such a method that no refuge can be found for confused thought, in words of learned length or what, perhaps, I may call the slang of the Schools. The critic is present and ready for the fray, and hesitates not to probe the dark speech to the bottom, and at all events, to get at what is intended to be conveyed by words however long and by circumlocution however intricate.

Such a word, for instance, as *supernatural* has not been suffered to escape searching scrutiny, and it has been justly asked how, until Nature has been forced to disclose all that is comprehended in the natural world, the word supernatural can have any real meaning.

That words are the counters of wise men and the money of fools is a terse if not a very accurate apothegm, representing, however, a very important truth, I mean not very accurate in its assumed antithesis, since it treats money as of a value intrinsically apart from what it represents, but adopting for the sake of the truth involved the economic error of the illustration, it will lead one to weigh the words which are in vogue in the philosophical discussions of our time and see whether we have a new thing or a new word.

Now it has lately become the fashion to deal with every subject and with every aspect of every subject as though nothing were absolutely true or absolutely false, a system whereby definite and accurate thought is repudiated, and every error, however monstrous, every dreamy imagination treated not as a blunder, but in the pseudo-philosophic slang *subjectively* true. It is said that mental phenomena are not the less real because the subject of the conceptions have no real representatives in the external world, and this is true if it means no more than that the blunderer believes in his blunder.

As long as such words as subjective and objective are recognised as the  $x$  and  $y$  of an algebraic problem, and to have no meaning in themselves, they may be accepted as convenient words for the purpose for which the calculator designs them, but unfortunately their use has become such as to mislead.

There *is* such a thing as truth and falsehood, irrespective of what people think or say.

There are diseases which create delusions, delusions let us say about colour and the victim of a malady sees everything yellow. Are the things yellow because he sees them thus?

The victim of delirium tremens sees frogs and toads and creeping things innumerable. Are there any there?

A man comes to the margin of a river and in the mist he thinks he sees a bridge.

To adopt the *patois* of fraud against which I am protesting, he plants, or strives to plant, his objective legs on his subjective bridge. He may well ask in the language of some of the boys' puzzles—where is the bridge?

Or take the still more homely illustration, you give a boy a sum to do—he does it wrong and, dropping philosophic language, he makes a blunder in his arithmetic. Suppose he answers his indignant tutor with the excuse that subjectively the wrong addition was to his mental conception subjectively true, would not the objective birch rod suggest totally different subjective conceptions? Now let us weigh some of our words.

That there are degrees of proof from demonstration to a slight balance of probability will not justify the phrase proved, and one is perpetually to be on guard against the allegation that a thing is proved because there is some evidence in favour of it. I will not proceed, though I might, with a whole catalogue of words which the modern sophist uses either in a double sense or with a meaning which involves as an assumption the thing to be proved.

Among many advantages, and they are many, which have been introduced by the facility with which printed matter may be circulated there is the corresponding disadvantage that error is circulated with as much facility as truth, and error is ignorance not knowledge. The great Roman poet denounced with bitter indignation the poetasters of his time who were degrading the literature of his country, and in our time we have the printing press which Juvenal had not.

Each period has of course its popular madness or popular folly, and at one time the torrent of trash which each age in turn produces in full measure is turned in different directions. Della Crusca poetry, however, has vanished, but Lamarck-*ins* Darwin-*ettes* abound in our time; public taste has taken a form which induces each publication to contribute its own little addition to the literature of unbelief, and if we hear nothing of the Grove of Mars or Vulcan's Cave we have "evolution" enough to swallow up all the tragedies and elegies which disturbed the Roman sage.

But side by side all this, with an incongruity which is not without example in the tide of human error, we have seen

in a proportionate degree the most marvellous credulity upon the subject of spiritual manifestations. Many who, if they do not reject absolutely, treat with a polite indifference the teachings of eternal truth, will, nevertheless, sit round a table and listen to the rappings or creakings with a half belief if not more in the inspired character of mahogany.

The Hebrew Prophet held up to scorn the ignorant idolater who from the same tree could cut a piece of wood and apply it to domestic use and of the rest make a God to worship, but the Table-turner improves upon his Hebrew original, he finds an oracle in the table from which he eats his dinner; it is true that the table has lately gone out of fashion, but have we not Mahatma and paper messages sent by no known mortal agency and manufactured by no known paper-maker?

Since the famous protest of 1865, to which hundreds of scientific and learned men, learned in every field of human thought, put their signatures, we have not heard so much of all scientific men having given up the Bible, but a great assumption to that effect is made to run through all that class of literature to which I have been referring.

Now this Institute sanctions discussion and enquiry not upon subjects strictly theological but on all subjects in respect of which knowledge can be obtained, and shirking none which might seem to touch the regions of religious belief.

In relation to such a belief history, language, physical metaphysical research—the records of the past, and the reasons which make it probable that there is a future for man beyond the passing shadow of human life. These subjects have been treated with courage and have been among those brought before your audiences; but the main usefulness of such discussions must be found in answering objections not as affording affirmative proof, while rejecting no region of enquiry which can throw light on any part of creation.

A story is told of Heraclitus, whose fame was so great that certain persons came to see so great a man. They came, and as it happened, found him warming himself in a kitchen. The meanness of the place occasioned them to stop, upon which the Philosopher accosted them: "Enter (said he) boldly for here, too, there are Gods."

Harris, in his *Hermes*, adds: "That as there is no part of nature too mean for the Divine presence, so there is no kind

of subject having its foundation in nature that is below the dignity of a philosophical inquiry."

Now our knowledge is necessarily derived through the instruments the Creator has given us—our hearing, sight, touch, are but instruments for conveying to "something somewhere" a consciousness of external objects. The memory, whatever it is, and wherever it resides, is but an instrument which stores up our previous conception, and that combination of faculties which we call the reason, and which does more than mere memory in bringing our minds to a conclusion, is but an instrument; each and all of these faculties in turn are liable to error, the lens may be defective and throw the rays of light at a wrong angle, and the nerves of hearing and touch may be insensible, and send no message at all to the inner consciousness, or may be so partially defective as to send one which is altogether erroneous. The reasoning faculty may be so completely out of order that even when there is no error in the memory of facts previously stored up, the true conclusion is not deduced. These are errors necessarily incident to the investigation of truth by creatures dependent on instruments for the aggregate of ascertained facts which we call knowledge, but what relation have the faculties of creatures so endowed with an eternal and omniscient and almighty Being who sees not by the eye, hears not by the ear, who from all eternity has been the same, to whom the past, present, and future are one and the same, these words only suggest relations of time to the children of the hour, but are unmeaning as applicable to one who is the same yesterday, to-day, and for ever, the great I AM, throughout that eternity which is part of His essential attribute as the Creator, the Everlasting God, and of whom one of old asked "canst thou by searching find out God?"

One is not very likely in these days to undervalue the services to knowledge in its widest sense of the researches of scientific men. One is indeed wonderstruck at the variety and width of those researches. It is absolutely bewildering to think of the silent but effective additions to knowledge which are being made from day to day by men who silently and often without reward, except the satisfaction which successful scientific research affords for its own sake, and which reveal to us unknown wonders in creation.

Major-General Dryson, for example, discovered in a region where all was supposed to be known, the Poles describing

two circles in their daily rotation. But here is a remark made by one no mean authority upon such a subject that the highest acquirement ever made by the most exalted genius of man has only been to trace a part and a very small part of that order which the Deity has established in His works.

When we endeavour to subject the Divine Revelation to our methods of physical research we are met at once by the obstacle that we are endeavouring to penetrate into a region to which our faculties are not appropriate. He who made the eye shall He not see? He who planted the ear shall He not hear? He who has given man his faculties to acquire a limited and narrowly circumscribed area of knowledge shall He be comprehended by the creature He has made in the vastness of His infinite perfection? It is no original observation that it is not given to us to comprehend all the order of the universe, and if we try to pry into the courses of that order we perceive the operation of powers which lie far beyond the reach of our limited faculties. Those who have made the furthest advances in true science will be the first to confess how limited those faculties are and how small a part we can comprehend of the ways of the Almighty Creator. They will be the first to acknowledge that the highest acquirement of human wisdom is to advance to that line which is its legitimate boundary, and there, contemplating the wondrous field which lies beyond it, to bend in humble adoration before a wisdom which it cannot fathom and a power which it cannot comprehend.

Professor Faraday, whose wisdom and learning as a student of natural science none will doubt, while distinguishing between faith the hope set before us, said in earthly matters he believed with St. Paul that the invisible things of Him from the creation of the World are clearly seen, being understood by the things that are made, even His Eternal Power and Godhead.

I have never seen, he adds, anything incompatible between those things of man which can be known by the Spirit of Man, which is within him, and those higher things concerning his future which he cannot know by that spirit alone.

It is only necessary to take even the heathen much more the Christian conception of the Deity to recognize the profane absurdity of attempting to measure, to analyse, or examine Divine attributes by human instruments. Let me take the heathen first.

It was a heathen philosopher who said, "So that when you have shut your doors and darkened your room remember never to say that you are alone, but God is within and your genius is within and what need have they of light to see what you are doing."

Lactantius attributes to Seneca almost the identical thought when he says that it is an admirable sentiment with which Seneca concludes his exhortation. "Withal God," says he, "is great, I know not what, an incomprehensible power. It is to Him that we live and to Him that we must approve ourselves; what does it avail us that our businesses are hidden from Men when our Souls lie open to God?"

Now let us have the Christian sage.

"I mean then," said one now taken to his rest, "by the Supreme Being, one who is self-dependent and the only Being who is such; moreover that He is without beginning or eternal; that in consequence He has lived a whole eternity by Himself, and hence that He is all-sufficient—sufficient for His own blessedness, and all-blessed, and ever blessed. Further, I mean a Being who, having these prerogatives, has the supreme good; or rather is the supreme good, or has all the attributes of good in infinite intenseness; all wisdom, all truth, all justice, all love, all holiness, all beautifulness; who is omnipotent, omniscient, omnipresent, ineffably one, absolutely perfect; and such that what we do not know, and cannot even imagine of Him is far more wonderful than what we do or can. I mean, moreover, that He created all things out of nothing, and preserves them every moment, and could destroy them as easily as He made them; and that in consequence He is separated from them by an abyss, and is incommunicable in all His attributes. And further, He has stamped upon all things in the hour of their creation their respective nature, and has given them their work and mission, and their length of days, greater or less, in their appointed place. I mean, too, that He is ever present with His works, one by one, and confronts everything He has made by His particular and most loving providence, and manifests Himself to each according to its needs, and has on rational beings imprinted the moral law, and given them power to obey it, imposing on them the duty of worship and service, searching and scanning them through and through with His omniscient eye, and putting before them a present trial and a judgment to come."

Equally in the heathen as in the Christian utterances we

see involved the eternity, the omniscience, the omnipresence of the Divine Being.

What relation has the scalpel or the microscope to such conceptions, or what experimental research is here applicable? Surely the very thought is as philosophically inappropriate as it is profane in its bare suggestion.

We have been boldly assured within the last year or two that we have all lost our faith.

I do not know what mandate Mr. Porter received, and who are supposed to be represented by "all," but I do not believe that it is true.

The Rock of that faith has received an assurance which will not let us doubt that that faith will long survive the cavils of each succeeding wave of unbelief.

Not for the first time in the history of Christendom heresies have for a time seemed to prevail.

A period of great intellectual activity will naturally give rise to many varieties of thought, the *nimia subtilitas* of some intellects may again, as they did in the earlier ages of the Church, refine very plain statement into meaningless mysticism, but now, as then, we may look for help where help may be found.

The darkness of one period may be but the precursor of a brighter dawn to succeed.

These oscillations will probably continue to the end.

Then, and not till then, will the darkness be dissipated, and when the true and everlasting light shall shine, we shall know even as we are known. Here and now we see, and can only see in a glass darkly or in a riddle, but then face to face.

Sir FREDERICK YOUNG, K.C.M.G.—Sir Joseph Fayrer, my Lord, ladies and gentlemen: A duty has been imposed upon me very unexpectedly, but still I accept it with the greatest possible pleasure. It is to move that a vote of “thanks be presented to the Lord High Chancellor (Lord Halsbury) for the Annual Address now delivered and to those who have read Papers during the Session.” I am sure I only interpret the feelings of every one present when I say that I have listened to that most beautiful and eloquent Address, which we have just heard with the most profound delight (applause). I think his Lordship has dealt with the subjects it contains in the most delightful and charming way, and we must all have felt the force of what he has so admirably put before us. (Applause.) I have the greatest possible pleasure in proposing the vote of thanks. (Applause.)

Sir G. BUCHANAN, M.D., F.R.S.—Sir Joseph Fayrer, my Lord, ladies and gentlemen: It is my privilege to second the resolution that has been submitted to you; I have very little to add to what has been said except to remark that if there is anything remaining in the way of a survival of that hostility between science and religion of which we have heard—a hostility that existed when people did not understand what religion and what science were—the proceedings of this Society during the past Session have done very much indeed to remove it, and certainly I need scarce say that our concluding meeting has helped to bring about a clearer idea of what the relations of science and religion are, and how they necessarily converge towards the one element—truth. I beg to second this resolution.

The CHAIRMAN.—It has been moved and seconded that a cordial vote of thanks be given to the Lord High Chancellor for his most philosophic, interesting, and valuable Address. I think I need hardly ask whether I have your permission to convey that vote of thanks. [The vote was carried by acclamation.]

LORD HALSBURY (the LORD HIGH CHANCELLOR).—I am most heartily obliged to you for your vote of thanks. (Applause.)

General R. F. COPLAND-CRAWFORD, R.A., F.G.S., F.R.G.S.—Sir Joseph Fayrer, my Lord, ladies and gentlemen: I have great pleasure in proposing a vote of thanks to our Chairman, Sir Joseph Fayrer. He is one who is distinguished in the annals of the history of India. He has brought scientific research to bear on the most beneficent desire for the promotion of the happiness

and culture of its people, and he has come back to give to us in the West the benefit of his experience in the East, and we are glad to have him presiding at this meeting, where we are honoured by the presence of the Lord Chancellor, who has given us such an Address—so happily delivered. (Applause.) I have only one word more to say. As an original founder of this Institute, I miss a great number of those who were connected with it. I have most pleasing and doubly interesting recollections of and associations with them; but I am thankful that there is left to us one to whom reference has been so rightly and so generously made—I refer to Captain Petrie. (Applause.) I recollect the heart he threw into our work and the way in which he devoted himself to it from the very commencement.

I beg to move “a vote of thanks to Sir Joseph Fayrer for presiding on this occasion,” and I am sure you will all agree with me that his services, both in the past and this day, entitle him to our grateful thanks.

Surgeon-General C. A. GORDON, C.B.—I beg to second, with all my heart, the vote of thanks which has been proposed by General Crawford. I am sure you will all agree with me that the pertinent and vigorous remarks of Sir Joseph Fayrer, leading up as they did to the excellent Address just delivered, were exceedingly valuable. We are all indebted to him not only for his most warm and sympathetic feeling in regard to the work of this Institute, but for having come home from India to give us the benefit of his presence and knowledge in England. [The vote was unanimously accorded.]

The CHAIRMAN.—My Lord Chancellor, ladies and gentlemen: I suppose a gift that comes quite unexpectedly is not the less acceptable on that account—indeed, perhaps it is more so. I had no more conception when I called upon the gallant General to speak, that he was going to allude to me than I had of any other improbable or impossible thing that could or could not happen. I thought this motion had reference to the President of the Institute, in whose absence I am promoted for the time being to the dignity of President; but still it is very gratifying to me in that it has evoked the kindly feeling of so many. Of the distinguished General we are all very proud, and I am very much gratified by the manner in which the resolution has been moved and seconded. I am much obliged to you for giving me your thanks, but I feel

that all our thanks are due to the learned Lord Chancellor. I never listened to anything with greater pleasure or gratification, and I sincerely hope that every word of the Address will appear in the Proceedings of the Society, so that thousands of others may learn and profit by it as we have done. (Applause.)

[The Members, Associates, and their guests then adjourned to the Museum, where refreshments were served.]

## ORDINARY MEETING.\*

PROF. 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 :—

MEMBERS :—The Rt. Rev. A. Clifford, D.D., Bishop Designate of Lucknow ; C. F. Dowsett, Esq., London ; R. H. Fremlin, Esq., Kent.

LIFE ASSOCIATES :—W. Bodkin, Esq., M.D., Essex ; Rev. G. H. Butt, B.A., Camb., Lincolnshire.

ASSOCIATES :—The Rt. Rev. the Bishop of Down and Connor, Ireland ; General the Rt. Hon. Sir John Clayton Cowell, P.C., K.C.B., Master of the Queen's Household ; the Rev. T. S. Bacon, D.D., United States ; H. W. Bush, Esq., Kent ; the Rev. C. D. Bradlee, D.D., Ph.D., United States ; Major-General A. W. Drayson, F.R.A.S., &c., Hants ; C. H. S. Davis, Esq., M.D., Ph.D., United States ; R. M. Eyton, Salop ; Major H. J. Elverson, 2nd Queen's Regiment ; A. H. Harris, Esq., China ; Principal A. H. Hildesley, M.A., Punjab, India ; Rev. J. Moulson, M.A., Oxon, Punjab, India ; Rev. F. G. Le P. McClintock, A.B., Ireland ; A. Mueller, Esq., M.D., Ch.D., Australia ; Rev. J. M. P. Otts, D.D., LL.D., United States ; Rev. J. M. H. du Pontet de la Harpe, M.A., B.D., London ; Martyn J. Smith, Esq., Worcester ; C. A. Sherring, Esq., B.C.S., India ; L. W. Thrupp, Esq., B.A., London ; Rev. H. M. Walter, M.A., Oxon, Berks ; Rev. R. H. Weakley, Egypt ; Rev. H. F. Wright, M.A., Oxon, India ; Rev. T. Wood, F.E.S., Herts.

The following Paper was then read by the Rev. R. F. McLeod, in the Author's unavoidable absence :—

### *PRINCIPLES OF RANK AMONG ANIMALS.* By Professor HENRY WEBSTER PARKER, United States.

**A** SYNOPSIS of recognised principles of rank in the animal kingdom is a desideratum. No separate head is made of these principles as applied to organs, *e.g.*, those of locomotion, reproduction, circulation, etc., with one exception—brain, for reasons connected with the last two heads. The outline here given is made to bear incidentally on man's position in nature, but without reference to his physical origin.

1. A rise above vegetal characters is a rise in grade. Plants have a general plan of structure, similar parts radiating from an axis. Several grand divisions of the animal kingdom would conform to this plan ; and some of the organisms are plant-like in appearance, in budding, and otherwise. Moreover, plants have digestion, circulation, respiration, and reproduction ; hence these functions (which, indeed, are all that some animals seem to possess, besides

sensation) are known as vegetal, and are so recognised even in popular language, as when we say that a person of inactive mind "simply vegetates." But the same might be said of every animal below man, because its distinctively animal endowments, nerve and muscle (or their equivalents), are subordinated to nutrition and reproduction, whereas in completely developed man all functions are subordinated to mind. Thus he stands alone.

2. Fundamental plan, in animals above radiate structure, is a criterion of rank chiefly as it has to do with the presence or absence of an internal skeleton. The nervous system will be referred to later. Vertebrates are, as a branch, superior to invertebrates in the profound modification of the whole structure and its powers by an endoskeleton. For this reason the splendid wing of a *Morpho* butterfly falls below the fin-like wing of a penguin. In respect to man, in him alone the vertebrate plan rises to its high ideal—the spinal column indeed a column, lifting his large brain and liberating and supporting the fore limbs for all the uses of that brain. Thus he stands high and apart.

3. Type may be mentioned next, not in the above sense of plan, but as referring to forms that embody the most characteristic features of their group, whether or not they are more highly endowed in every point. Not the raptorial dragonfly, nor Hercules beetle, nor the sylph-like butterfly, but the bee and ant lead their sub-order, because they best realise its ideal, namely, in compactness, mouth-parts, activity, remarkable instincts, and other points. Teliosts are inferior to sharks and ganoids in some respects, but are the most fishy of fish. The singing birds are now placed first in their class because they are the ideal birds, though not the most splendid, nor so kingly as the raptors that once usurped their place.

Of departures from type, something will be said under another head. A remark comes in here that, if man be claimed as the typical "primate" in a group with anthropoids, their departure from his ideal type sets him apart more than any identity of parts can bring him near in kind. That their so-called families, including lemurs, have as great or even greater visible differences among themselves does not bridge the chasm between him and the gorilla and chimpanzee, on this zoological principle of rank. They, too, are a type, and of something very different from him. Ordinal values are not always equal, nor the same in every class, but it may

be noted that among birds the order Grallatores, for example, is of a pronounced type, but depends on nakedness of leg and proportion of parts; "it does not appear susceptible," says the leading American ornithologist (Dr. Coues), "of further, or any very exact definition." Indeed, he speaks of the great primary division of birds into Aerial, Terrestrial, and Aquatic, as "a broad generalization upon the sum total of all the exhibitions that recent birds make in their modes of life"; the three sub-classes are "insusceptible of definition by characters of more than the slightest morphological importance." Why, then, the effort to abolish the classificatory gulf between man and the apes, unless it be a fashion and preconception that will not take all the facts and principles into view? He may even agree with them "bone for bone and muscle for muscle," but his plan of life, use of organs, and ideal of type, are as diverse as a thrush from an auk, to say the least. It does not hinder, but rather helps the argument, that savages live a brute life. The naturalist must take the best representatives of a species and as they are, howsoever they reached their degree of physical or other perfection. Origin is a matter aside, and no theory of it, unless it be weak, requires a confusion of distinctions. It may be added, incidentally, that the *ideal*, as in typical bird, fish or insect, is recognized in classification just as much as thirty or a hundred years ago.

4. Variety and development of tissues and organs are plainly among the prime criteria of rank. Differentiation is a great law of progress,—with the qualification here that, if the total individual, man or honey-bee, is specialized for the sake of the community, "the individual withers and the world is more and more." As it concerns man's place in nature, his great mass of brain is measurable, and his delicacy of feature and hand, adapted to human functions, is observable. There has been an effort to refer his superiority almost wholly to the acquirement of articulate speech. But, taking natural science on its own ground, there must be in the organic as in the inorganic a vast amount of structure beyond the reach of microscope; and, taking materialism on its own ground, there must be some great differences of occult organization to account for non-attainment by the anthropoids of that mighty instrument of progress, language proper, and the rationality it implies. The crypto-anatomy, if matter be all, must have peculiarities of more importance than likeness in the gross or the micro-anatomy. If matter

be all, of course the difference is all *there*, in matter, though it be beyond discovery.

5. Opposed to variety, should be mentioned in particular a degrading repetition of like parts of structure. Bilateral symmetry is not included here, for it has its own utilitarian and æsthetic reasons; nor is such specialization included as the number of mammalian digits. The radiate arrangement in plants and the lower animals has been noticed. In the higher organisms the centipedes are low land-arthropods; fish, with very many vertebræ and digits, among vertebrates; serpents, for similar reason, among reptiles. The principle is familiar as illustrated in repetitious rhetoric, and in the superiority of free styles of architecture over those with a formal multiplication of like parts. The principle has a limited but important application to man in his relation to creatures physically nearest him; namely, the old distinction between bimanous and quadrumanous, which no new classification can efface. Here, however, it is not so much a matter of elemental structure as of a great range of function in the human hand, and also of plan of life, which in man is non-arboreal.

6. A special point may be made of prolonged repetitious structure posteriorly. A dragon-fly, with its gauzy wings, swift flight, and falcon habits, would seem more noble than a beetle, but its lengthened abdominal segments and other reasons reduce it to near the foot of its sub-class. As the principle bears on man's zoological place, it may be noticed that, as a group, the quadrumana are tailed, long-tailed; and if the highest have essentially the human coccyx, it is equally true that some of the lower monkeys have other striking, though no more important, correspondencies to man, *e.g.*, in the special arrangement and length of hair on crown, jaw, and chin. There are all degrees of caudal development, distributed variously from the human embryo down throughout vertebrates, including the adult frog in which the tail wholly disappears; so that the phrase "tailless anthropoid" may express a literal, but is not a logical conclusion.

7. A connected criterion of importance is James D. Dana's, termed by him cephalization; it is head domination in the animal structure. Species rise in grade as the anterior part of the body is relatively more developed; the head is more compacted, the jaws less projecting; there is, it may be, an elevation of the forward extremity: and the fore limbs render more service to the head. Professor Dana illustrates the last

point by the greater numerical proportion of limbs set off from head-service to locomotion, from man down to crustaceans. In the same way there is a descent of grade from the vertical face of man, first by a leap to the prognathous anthropoids, then through the typical short-jawed carnivores and the long-jawed herbivores, reaching an extreme in whales and the hairy ant-eaters. It is obvious that man stands alone in perfect cephalization.

8. Rank has a relation to food. The limbs of the true flesh-eaters must assist the jaws in securing and holding prey, notably in the typical feline family. Further, the nervous system and active muscles must be more developed, for the capture of prey. Moreover, animal food is more stimulating, more concentrated; there is none of the constant low work of feeding on vegetation, nor a corresponding predominance of the digestive system and work, consumptive of energy. Fruits, except the pulpy, are also concentrated food, but in a less degree. The quadrumana are frugivorous, and they use their fore-hands in eating; but so do squirrels, more deftly, and sitting erect. Man as omnivorous, is quite apart from the creatures next below him. At first glance he might seem to sink to a parallelism with omnivorous rats and swine; but he rises above all in the scale, not only as the "cooking animal," but as one with a sovereign mind to intellectualize all flavours and savours, while his body royally appropriates all edible good.

9. Comparative hugeness of size, an accompaniment usually of huge eating, has been remarked as a sign of low grade, with more or less exception; it is rather a frequent concomitant than strictly a criterion. The Paradoxical frog of South America in its larval stage is five times the size of the adult; and some marked decrease is not uncommon in passing from the lower larval condition. The enormous monsters of the prime were not high in the scale; and the bulkiest creature of the deep, now, is a degraded mammal. The giants of tradition were gross. Even the huge crystal is coarse and impure. In art the Herculean human figure is represented with no great cephalic development. Man's compactness and delicacy of organization agree with his mental supremacy, and remove him far from that ogre of big bony ridges and all-crushing muscle, the highest ape.

10. Rate of growth comes in here, both prenatal and postnatal, and as connected with the amount of parental skill and care required. Ill weeds grow apace; solid wood

is long in maturing; and choice fruits and flowers demand patient culture. The noblest animals are born the most helpless, and are long in developing, for they have much to develop. Further, the parental instinct correlated with this dependent condition implies some superiority in the species. Lacépède devised a curious scale of eight ranks for birds: first, those that build no nests; next, those that build rudely; and so on until, finally, those that form a community-roof. Charles Lucien Bonaparte divided birds into two series—Altrices, that feed their young; and Præcoces, that feed themselves from the first. Man, as compared with even the creatures nearest to him, certainly is unique in long postnatal development, physical and mental.

11. A principle of great importance is drawn from metamorphosis in general and embryology in particular, namely, that what is a transition stage in one organism is the last and permanent one in another, which, not progressing, is ranked lower. The fact is found in various branches and classes, and, among batrachians, is familiar to all. Incidentally here, it is enough to say that the metamorphosis of the higher anthropoids is well known to be from a more human-like conformation in the young to less in the adult. Yet the adult, considered in the light of marked type, is not a retrograde form, but the ideal caricature (in the gorilla the utmost exaggeration of the horribly brutal) to which the simians tend. The adult properly represents the species, which is thus the very antithesis of man, who tends to the precisely opposite pole—the symmetrical, the admirable, the intellectual, the godlike. All things considered, the term “anthropoid” is, even on zoological principles, a crudeness and a jest.

12. Retrograde metamorphosis proper, along with any degeneration, strikingly illustrated in the life-history of barnacles and the worm-like entomostracans, mostly accompanies a parasitic or sedentary condition of the adult. Among men, it seems to have followed unfavourable conditions, or else some unknown process of variation. The difference between the comparatively brutal features of some degenerate human races and the noble beauty of other races, especially as embodied in the more perfect individuals, only goes to show how high is the ideal physical man above whatever is beastly.

13. Inferior features of structure are sometimes present in animals of otherwise superior grade, and so depreciate rank;

and *vice versa*. The great kangaroo distances in speed a greyhound, but in its brain, larynx, sacrum, etc., partakes of the reptilian. The inferior character may be admirable in itself; biconcave vertebræ have their advantage, but are characteristic of fish, and therefore are a low mark in some batrachians and reptiles, and a cretaceous bird. On the other hand a patrician element may exalt a plebeian animal, as notably, the bill and eyes of a cuttle-fish. The teeth of the hoofed Anoplotheria were in some respects nearer to the human than those of the higher apes, but man is no less apart from all.

14. Intermediate, mixed, and generalized organisms may be here grouped under one head of remark, not referring, as in the preceding paragraph, to pronounced types with one or more seemingly borrowed features. They rank high or low according as they approximate to a class (or order) above or below that which is on the whole their own—the extinct reptilian birds being an obvious example of low grade. The term “generalized type” should be confined to forms that, without any very specialized features (as regarded in the light of now existing animals) were or are as if *fusions* of characters now more developed and distinctly separated; such, for example, were the first herbivores, and such now, on a low plane, the worms; as but little specialized they stand below their more distinguished kindred. Man, as alone specialized to the highest conceivable ends, is not of the same order with simians, nor, in this light, of the same kingdom except as its king.

15. The absence or abortion of an element of structure belonging to a group is, with exceptions, a sign of inferiority—exceptions such as the reduced number of digits for advanced function, *e.g.*, speed in the horse. Whales are low-caste mammals, not only as fish-like, but as lacking some normal parts of their class—less lacking in seals. Aquatic mammals have been classed by some as Mutilates, as if mutilated.\* In respect to man this principle has no application, so far as it concerns internal structure. But, there is the important absence of a superficial feature com-

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\* Aquatic plants are generally inferior to those of the land, not needing rigid supporting tissues, nor conditioned for floral display. So in respect to aquatic animals, the buoyancy of water and the ready engulfing of swimming prey or floating food, render unnecessary a high organization for locomotion and prehension.

mon to mammals (with partial exceptions), namely, a protective covering of hair, which is even a part of the general definition of the class. As this absence is related to man's proper life, both as an inventive being and as one susceptible of a noble shame,—related also to his distinctive beauty,—it becomes a sign of superiority that removes him far from other animals.

16. Brain has its place among other organs in estimating grade, increasing in size and the cerebrum becoming relatively larger, from fish upward. Size and complexity of the brain are now regarded as having relation to all the activities of its possessor, physical as well as mental; so that any half-way approximation of the simian to the human brain in the size and convolutions is not necessarily an approximation either in amount or kind of intelligence. The vast difference is admitted. For the rest, among invertebrates, the supra-oesophageal ganglion is but one among others apparently similar, until, in the ascending scale, it is modified in direct visible relation to organs of special sense.

17. Instinct hardly comes into zoological rank, except it be in the case of the higher insects. Its striking manifestations are distributed with little reference to structural grade, and therefore, it may be added, with as little relation to any capacity for "experience." There is good reason to subscribe to Herbert Spencer's view, that instincts fall among reflex processes; and this, notwithstanding that its results often far surpass the ordinary ones of reason proper in man, which is quite another process from anything demonstrable in animals below him, as proved both by experiment and philosophy. The attempts of late years to confuse all well established distinctions on this subject, by resolving something into nothing of its own definable kind are among the curiosities of literature. It is just as true as ever that man stands alone as rational, however many instincts may be attributed to him, and however many of his acts are on the animal plane of sense association and its connected automatic impulses.

18. Mind is as truly an attribute of animals as flesh and bone,—at least in all that have a brain proper there is an animal mind; but it is remarkable that it has never come into classification, except in respect to man; and now it is not considered "zoological" to take it into account even in his case. There are good reasons that may justify the general exclusion; namely, below man it is a distinctively animal mind, animal "intelligence," so termed, or even

animal "reason," if it is well to use that word in two very different senses; and, though differing in degrees according to animal conditions and amount of various endowments, it is really the same in all,—quite other than reason proper with its implied abstractions and generalizations in every man. Moreover, it is difficult, if not impossible to substantiate even a general rise in this kind of "intelligence" in the animal scale upward (though this is loosely asserted), for quite as remarkable instances of animal "reasoning" are given in one grade or group as another, and among the lowest. Besides, it is difficult, if not impossible to separate an instance, a fact of this kind, from our anthropomorphic interpretation of it, and still more difficult, if not impossible, as the writer has shown elsewhere,\* to separate such assumed reasoning from the certainly predominating, pervading and diversified instincts, and from sense associations with their impulses, which may be mistaken often for reasoning in man himself, and no less often in domestic animals possessing them as both original and in some way abundantly acquired. One thing is certain that no better instances of mind are observed in quadrumana than in dogs and elephants; and thus man is removed as far from his nearest zoological neighbours as from the more remote. The invisible gulf is right at his side in museum arrangement. It is a museum matter to locate him by his skeleton only. It is neither logical nor zoological to put him among the group of "Primates" as now formed, but rather to acknowledge his unique position as shown by *every* principle of rank in zoological classification.

It hardly need be said that no one principle or character determines an animal's place, or that of a group; all must be taken into account so far as applicable. And this, too, enforces our lesson. Man must be taken for all that he is, in all his characters and relations.

In concluding, it needs to be emphasized that there should be a marked distinction between the anatomical and the zoological classification of man. Books and papers on zoology do not fail to take into their scope the various phenomena of animal life; only when they come to classify man do they exclude everything but his anatomy. Birds and bees have been mentioned. The six pairs of minute muscles in the syrinx of singing birds (in place of these as

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\* *Spirit of Beauty*, 12mo., New York. 1888.

diminished or massed in Clamatores, or reduced to fewer pairs in lower groups) would not be thought of as entitling their possessors to the first place but for the power of song connected with the more complicated apparatus. The social instincts of the Hymenoptera are among the characters that determine grade. Certainly, the naturalist who is strictly naturalistic should look upon all developments of man as having weight in a natural system—human architecture as no less to be considered than honey-comb, human music no less than avian, human society no less than that of an ant-hill; he should place man apart according to the totality of his peculiar manifestations. The strained likeness to the ape's habits is shown in trying to make something of the brute's bed, sleeping position, and use of sticks and stones; how lucky it would have been if monkey or ape had made such constructive use of material as the tailor-bird, the bower-bird, the turret-building species of tarantula, or the case-building caddis worm! The materialist, *a fortiori*, cannot consistently shut out the human mind and its developments, since in his view these are animal wholly.

Concerning man, this paper has said nothing of soul, of spirit. Yet even here the tables may be turned. Aside from any idea of spiritual substance or immortal essence, the spiritual, as a writer has explained, is the moral, in all its height and breadth. If, then, there are in animals the germs of everything human, as now claimed apparently half in earnest and half in jest,—if monkeys have an "indefinite morality," and dogs a religion, and a scientific book can query whether ants are "moral and accountable,"—why, in considering man's place in nature, exclude his crowning glory as the only creature with full-orbed moral perception and responsibility, as far from apes as from dogs or even ants. The truth is that in everything except the "Primate" classification, the new science takes into account every slightest thing that is, and a vast deal that has no existence.

Man, it has been well said, begins a new series. He stands alone, erect, godlike, not so much in the pyramid of life as on its summit. And as every lofty summit of earth is overhung by shining clouds, as if the soul of the hills had risen high above, so to the vision of reasonable faith there is another series of life, the spiritual, the glorified, of which man is the beginning.

The CHAIRMAN (Professor E. HULL, LL.D., F.R.S.)—I am sure you will all wish to accord a vote of thanks to the Author of this Paper (applause) and to its reader (hear, hear).

Captain F. PETRIE, F.G.S., the Hon. Secretary.—We had hoped for the presence of the United States Minister Plenipotentiary\* this evening, but a letter of regret just received from the Legation announces his departure for America. With regard to the Paper just read, a letter mentions that “Professor James D. Dana, LL.D., F.R.S., has signified his approval of the Author’s description of his views, and in other respects, and on zoological grounds, he considers man ‘the only primate;’”—a statement reminding one of the opinion given by Professor Virchow in a late Address (Volume xxiv, p. 262 of the Institute’s Journal), in which, speaking of the question as to whether it was possible for the most degraded savages to have descended from apes, he says: “No one can answer with an absolute *No*. Why should it not be possible? But from possibility to reality there is a very long step; even all else that constitutes an ape. For it is not merely the process of the temporal bone, the catarrhine nose, and the prognathic jaw, that make an ape, but many other characteristics are necessary to constitute him. *First of all we can demonstrate an ape from every strip of hide*: No anatomist, I suppose, has ever doubted the fact. Indeed, the distinctions between Man and Ape reach so far, that almost every fragment suffices for a diagnosis.” It will be remembered that Professor Virchow long ago mentioned that the further his investigations went the greater seemed the gulf between Man and Ape.†

Some important communications have been received in regard to Professor Parker’s valued Paper.

The Rev. Professor DUNS, D.D., F.R.S.E., New College, Edinburgh, writes:—

“I have read and re-read Professor Parker’s Paper, ‘Principles of Rank among Animals.’ The subject is one of much interest both from the Natural Science and the Natural Theology points of

\* Now an Ambassador.

† His arguments at the “Moscow Anthropological Congress,” 1892, were to the same effect.—ED.

view. There is order in Nature. Scientific classification is the expression of this. It is not a mere arbitrary help to memory. It is, as Agassiz puts it, God's thoughts rendered into human language. Thus the basis and the function of plant and animal classification. 'There are gradations of likeness in animal structures.' The systematist does not determine these, he only interprets them, and his interpretation is the discovery to others of order in the gradation. He deals with both elements of structure and form (*κατασκευή και μορφή*), but rather with structure than with form and functions. The structural marks of gradation suggest community of organization among widely separated forms. Here the question of grade arises. What warrants it? What determines it? Is it complexity of type or concentration of type? Is it complexity of structure and organs or concentration of structure and organs? And, withal, what place is to be assigned to psychical qualities in the gradations of likeness and structure? These are vital questions. They are dealt with by Spencer in his *Data of Biology*, under the heads,—Vitality of Organisms, Environments of Organisms, and Individuality of Organisms. Corresponding aspects of thought lead to the discussion of the subject of Professor Parker's paper. He holds that 'A synopsis of recognized principles of rank in the animal kingdom is a desideratum.' It seems to me that the desideratum is to be supplied by collating the schemes of systematists rather than by the method followed by the Author. There are abundant materials at hand for this purpose in the schemes of Aristotle, Linnæus, Lamarck, Cuvier, Oken, Owen and Quaterfages. The summary of these in the work of Agassiz on 'Classification,' taken along with Huxley's 'Introduction,' brings the materials within reach for the deductions sought for in this Paper. I feel, however, that it would not be fair to say more by way of criticism, because justice could not be done to the Paper without a discussion which would occupy more space than the Paper itself."

The Rev. G. F. WHIDBORNE, M.A., F.G.S., writes:—

"It seems to me that in questions of rank in animals we ought to argue from the general to the particular rather than from the particular to the general.

Each animal fills its exact niche in nature and from that takes its actual rank. To discover or rightly to estimate this, it may be needful to consider its separate elements, and their consideration

may often correct false impressions or mistakes; but the animal really depends for its rank on its intrinsic position in nature, and not on the summation of different zoological characters. Thus, in actual fact, man's place in nature is altogether apart, and on a higher level from that of all other beings. This is our real axiom. To explain it, or measure it, we may then proceed to take into consideration his different characters in comparison with those of other animals; but these are in themselves explanatory, not dominant. Some individual characters may approximate, but because they do, we have no right to argue that the animals themselves are equally approximate in rank, or necessarily approximate at all. Even if we found that the sum of all acknowledged characters were approximate in any two animals, we should not have proved that those animals as animals were necessarily close in rank, unless we had confirmatory evidence that they were so *per se*; for some characters might have escaped observation, which would have made all the difference. This point may be abundantly illustrated from the comparative zoology of the lower animals, and still more so from palæontology, where species have constantly to be decided from very imperfect data. May I take an instance from the Brachiopoda, which I have been recently studying. Palæozoic *Atrypas* and *Rhynchonellas* have frequently been classed together, because the sums of their external characters are almost exactly the same; but when their internal characters are discovered a wide difference is at once discernible. So again some fossils of the genera *Terebratula*, *Glossia*, *Centronella*, and *Athyris* while totally differing in internal structure, are externally so similar that they have been apparently all accounted a single species, that is, of one rank, before their interiors were discovered. That is to say, the summation of all known characters in two animals may be the same, and yet their real rank be very different. We may now apply these principles to the animals. We see some which are closely approximate in all acknowledged zoological characters, but which are yet in themselves of very different rank in the true order of nature. Why is this? Because other sets of characters must have escaped our summation. That is to say, there is a vacancy for other characters besides those of ordinary zoological calculation in deciding an animal's rank. Thus, turning to the difference between the rank of man, and of the anthropoids, we find it actually very far greater than can be accounted for by mere zoological characters. Hence there is a vacancy for an 'unknown

quantity' from a zoological point of view; there must exist another set of important characters which have not been taken into account. In short 'actual rank' in nature is not necessarily synonymous with 'zoological rank.' They can only be harmonized by giving due systematic value to such characters as reason, mind, soul, and above all spirit."

Mr. H. F. KIRBY (F.L.S.).—I am sorry to say that I have not had much time to consider the Paper beforehand, dealing as it does with a large subject. Still I may say that I find that many naturalists of the most opposite schools of thought agree in considering that man ought to form a separate kingdom by himself. On the other hand I think that the Author of the interesting Paper we have had to-night should not include social insects in his account at all, because they stand entirely apart from man in the conditions of their lives and deserve to be treated independently. I see nothing unreasonable in the idea that there may be several totally different classes of reasoning beings in the same world, separated in the same manner as we are from domesticated bees. In the case of ants I very much doubt whether animals much larger in proportion as we are removed from ants would judge of our proceedings as being any more rational than those of ants appear to us, in addition to which it is believed that ants have an extension of the sense of sight, at all events, which no other higher animal possesses. Sir John Lubbock considers the range of their sight, by analysis of the spectrum, as quite equivalent to ours, and they can see further than we can on the violet side. Whether that has to do with the simple eyes or *ocelli* which ants and many other insects possess I do not know; but it is stated that the rudiments of these *ocelli* exist in some animals, notably in some lizards, and apparently in some of the fossil vertebrates they were more highly developed. It may be that the chemical action of the sun was greater than at present, and therefore there was more visible chemical action to be taken into account.

Dr. H. W. HUBBARD.—The subject is one that I have not considered much, but there is one point that I might allude to in which man stands apart from all other organisms, namely, in his articulate speech. It has been somewhat recently discovered, and is now very clearly marked out by all naturalists and philosophers, that in the human brain there is a space that is

allotted particularly to speech\* which does not occur in any other organized brain whatever ; but the human brain is now clearly and definitely marked out, and that portion of which speech is its particular function.

The CHAIRMAN.—Not having any claim whatever to be considered an authority upon zoological matters you will not expect me to say very much on this question. We are glad to have had the views of an American naturalist on what we may call the great question of the day. We have an abundance of literature and of scientific views enunciated from time to time of what you may call the two schools—one, tending to demonstrate that man is nothing but a very superior kind of ape—the other, that he is closely connected with God. We recollect in the celebrated debate in Parliament, what Lord Beaconsfield said on that subject, “As for me, I am on the side of the angels.” (!) Well, I daresay most of us prefer to be ranked in that position ourselves. The Author, however, has shown what we are all pretty well familiar with—that there is a vast gulf between ourselves and the apes, or any other order or genus in the whole range of animated creation ; and, I think he has brought out one or two points with special vividness from his own point of view. He goes, in fact, very much beyond what most naturalists will in the present state of the subject, though Mr. Kirby has informed us that the view is held that man is not only a distinct order, but that he belongs to a distinct kingdom. Did I understand Mr. Kirby to say that ?

Mr. KIRBY.—Yes ; among others I believe it is held by Professor St. George Mivart, and was also held by the late Mr. J. W. Jackson—men at the opposite poles of opinion !

The CHAIRMAN.—It is very satisfactory to have men of such opposite views agree on that point. Of course the question will depend on what this individuality is—this special feature. The differences between mind and instinct and structure undoubtedly go a very long way, and, as the Author of the Paper has pointed out, the quadrumanous and bimanous are very distinct in their structure and their necessary mode of progression, and the uses to which the fore limbs are applied ; but, after all, it is the brain, as

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\* See Sir F. Bateman's *Recent Researches in Language, Transactions of the Victoria Institute*, Vol. vii.—ED.

representing the organ of thought, and speech, as the outcome of the characteristics of the brain, that will have the greatest weight with reasoning creatures as ourselves. On that point none of us can have any doubt.

Whatever be the amount of sagacity—of marvellous instinct as we call it—exhibited by animals other than ourselves, we all know that it is limited in its amount or development. The birds that sing so sweetly to-day sang equally well 50,000 years ago, if they were then existing. The beaver constructs habitations which dam up the rivers, and its ancestors did the same many thousand years ago; but it has not yet done anything more; and the ape, no doubt, in the forests of Africa lives exactly as its ancestors did also many thousand years ago. In fact, all the powers of these animals are limited and incapable of development. But with man, his mental powers, that are capable of almost unlimited development, as far as the elements of nature or his environments permit, enable him to assume a position in nature which is infinitely superior to that of any other created being.

I am not prepared to go into this subject further to-night, but I must repeat that we are all indebted to the Author for his Paper.

The Meeting was then adjourned.

#### REMARKS ON THE FOREGOING PAPER.

Dr. W. BODKIN writes:—

I think the paper shows that man stands at the top of the animal kingdom, not because he has better sight, hearing, taste, smell, or feeling, nor yet from his power of running, but because he has fairly good averages of all these powers; and that the part where he does excel all the animal kingdom is the rational part. The reasoning power together with imagination has enabled man not only to compare things and draw conclusions as to likeness and difference, and make fresh combinations or inventions, but he is also possessed of the hand to carry out these inventions. Man has added to his eye power by the microscope and telescope, so that no other animal can at all approach him in seeing power. So again with the power of hearing, the telephone and phonograph enable man to out-distance all competitors. Then again, though man is not equal in the sense of smell to many animals, yet by his knowledge of chemistry he detects the presence or absence, of ozone,

carbonic acid, ammonia, and microbes in the air. It would seem that man armed with these instruments of precision, is likely to somewhat neglect the proper use of his organs, so that the civilized man is thought to be behind the savage in the acuteness of his sense organs.

The fact that man stands at the top of the animal pyramid I think no one will dispute.

Mr. J. W. SLATER, F.C.S., F.E.S., writes:—

The little time at my disposal does not permit me to enter upon a thorough critique of the difficult subject taken up by Professor Parker. I am very glad that the Author does not adopt the view of Professor Minot, who considers an animal the higher, the more widely its skull departs from the embryonic form. Were he to follow out consistently this principle he would assign the highest rank among the mammalia to the ant-eaters.

The Author of the Paper before us lays down certain principles for estimating the relative rank of an animal. These principles it must be admitted are clearly expressed, and are, in the main, trustworthy. But he does not clear the way by a preliminary explanation whether he would arrange the animal world on a single ascending line, or on a number of ramifications like the branches of a tree. The former plan, now generally abandoned, is fallaciously easy.

Professor Parker says, "That their so-called families, including lemurs, have as great or even greater visible differences among themselves does not bridge the chasm between him and the gorilla and chimpanzee on this zoological principle of rank." On this point differences of opinion exist.

Sec. 5. It is hard to see how the old Cuvierian distinction between "bimana" and "quadrumana" can be maintained. The hind extremities of the gorilla, etc., have heel-bones as decided as our own, and the man who can talk of a hand with a heel-bone seems to be playing with the intelligence of his hearers.

Sec. 7. The predominance of the head in an animal structure spoken of here as "James D. Dana's criterion," was, I believe, first noticed by Professor Carus, and is in full contradiction to the error of Minot.

The remark, however, that squirrels use their fore-hand in eating *more dextrously* than do monkeys must surprise anyone who has seen a monkey tie knots, or unscrew and screw the handle of a brush!

Sec. 10. How can it well be said that "Man, as compared with even the creatures nearest to him, certainly is unique in long post-natal development, physical and mental." On referring to Dr. A. R. Wallace's *Eastern Archipelago* we shall find an account of the babyhood of a Mias, which shows a striking parallelism with the infancy of our own species.

The fact that an infant gorilla is very like a human child, but that the resemblance fades as both approach maturity is a most instructive fact, and admits of being generalized, proving that the animal series is not linear. The embryonic dog (not to speak of the apes) is vastly more like the earlier pre-natal stages of man than are the mature individuals. We may even remark that up to the age of adolescence the negro, the Australian black fellow, etc., seem quite equal to our own race, but afterwards fall more and more into the background.

We shall, perhaps, best understand the position of man with relation to the anthropoids if we consider him as the head of a distinct ascending series.

### THE AUTHOR'S REPLY.

The discussion has interested me much. I am aware that I left abundant room for the additional suggestions, for I had confined myself most strictly to the topic announced, and condensed all to the utmost—not touching, for example, on the many past or present schemes of classification, genealogical or other, except in some reference to man's place in any scheme—and man was not brought into the paper until its close—in fact, it was the intellectual interest of the principles themselves that first prompted the essay, not a desire to seek and expound practical rules (which are not to be confounded with general principles) for tabulating the animal kingdom; indeed, this is not a matter of mere rules, but of the complete study of organisms.

Mr. Slater's valuable remarks are of the nature of *corrigenda*. In reply I would say that a linear arrangement of all animals is too obsolete to need disavowal, especially in a paper that deals with principles only, not tabulations. In regard to the word "quadrumana," it may be granted that it is not the best in the light of Anatomy; it remains as true as ever that the extremities of all the simian limbs are hand-like. As to squirrels, I grant that instead of the words "more deftly," it would have been clearer and more correct to say "as deftly in manipulating food." The last criticism by Mr. Slater seems to overlook the complete phrase used—"physical and mental"; also the long development of man, his mental development, under favourable circumstances, extending to old age.

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## NOTE ON THE RECESSION OF NIAGARA FALLS.

The question of the rate of the recession of the Falls of Niagara has been the subject of much inquiry, since Lyell estimated that "the cutting of the present gorge terminating at the heights towards Lake Ontario had taken 35,000 years."

Volume xix of the Victoria Institute's Transactions (p. 90) contains a summary of the Report of the New York Commission, and diagrams therefrom; from this Report it had been estimated that the cutting had taken only 10,000 years.—Through the kindness of one of the Institute's Members, Mr. Warren Upham, the Assistant U.S. Government Geologist, the following particulars are given as to where the results of most other surveys are recorded.

"The early report, by Prof. James Hall, in 1842, is in *The Natural History of New York, Geology*, Part IV, pp. 402-403.

"In 1875 a second survey was made by the United States Army Engineers.

"The next survey was made in 1886 by Mr. R. S. Woodward, of the United States Geological Survey, and his work was published in New York in *Science*, vol. viii, p. 205.

"Still more recent surveys have been made,\* of which a more important one is summarised in *Science*, vol. xviii, p. 216, 1891.

"Mr. John Bogart, State Engineer of New York, has sent in a report concerning the recession of Niagara Falls. In 1842 Professor James Hall made an accurate survey, and a comparison of his results with those in 1890, made in a bulletin of the American Geographical Society, shows that the annual recession at the American Fall has been 7·68 inches, and at the Canadian or Horseshoe Fall, 2 feet 2·16 inches. During this period the crest line of the American Fall has sunk from 1,080 to 1,060 feet, and that of the Canadian has risen from 2,260 to 3,010 feet. The area of rock which has been carried away during those forty-eight years is 32,900 square feet at the American Fall, and 275,400 square feet at the Canadian Fall.

"In 1889 Mr. G. K. Gilbert, of the United States Geological

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\* The reports of these may probably be obtained by addressing *The State Engineer of New York*, at Albany, N. Y., U.S.A.

Survey, Washington, D.C., discussed the 'History of Niagara River,' in a long and very valuable paper, with maps, originally published in the *Sixth Annual Report of the Commissioners of the State Reservation at Niagara for the year 1889*, pp. 61-84. This same paper is republished in one of the *Annual Reports of the Smithsonian Institution for the year 1891*. Mr. Gilbert finds the maximum rate of retreat of the apex of the Horseshoe Fall (the re-entrant angle where erosion is most rapid) to be 'between four feet and six feet per annum.' [Mr. Bogart's figure may be taken as the average for the whole line of the Horseshoe.] Arguing that 'the rate of retreat of the central portion of the Horseshoe is the rate at which the gorge grows longer,' Mr. Gilbert concludes that probably '7,000 years were needed to excavate the six miles of gorge from Queens-town Heights.' But various considerations qualify this estimate, some of these tending to shorten and others to extend it. These are discussed by him in the paper mentioned.

"See also a report of Mr. Woodward's work and discussion by Mr. Gilbert, in *Proc. Am. Assoc. Adv. of Sci.*, vol. xxxv, for 1886, pp. 222-3."

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## ORDINARY MEETING.\*

REV. PREBENDARY R. THORNTON, D.D., V.P., IN THE CHAIR.

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

MEMBER :—Peter F. Wood, Esq., Kent.

The following paper was then read by the author :—

*HOW THE WATERS OF THE OCEAN BECAME SALT.*

By Prof. EDWARD HULL, LL.D., F.R.S., F.G.S.

**T**HERE are many things in the world around us to which we are so accustomed from childhood that we never stop to enquire why they should be so. That rivers and lakes should consist of fresh water, and that the sea should be formed of salt water, seems so natural that we consider them as not only matters of course, but essential to the physical economy of the world; and if perchance our attention is called to the fact that some inland lakes are formed of salt water we proceed to investigate the cause of so unusual an occurrence— one which being exceptional requires special explanation. But how few of the thousands and millions who traverse the ocean or dwell upon its shores put to themselves the question “Why are its waters salt?” And this, notwithstanding that it is daily receiving supplies of fresh water both from the rain which falls upon its surface and from the rivers which empty themselves into it. Clearly there is something here which *does* require special investigation, a question which *does* need solution, because, as far as the sup-

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\* 3rd of 28th Session.

plies afforded by the rain and rivers are concerned, the ocean waters ought apparently to be fresh rather than salt.

<sup>2</sup> In using the terms "fresh" and "salt" here, and in the following pages, I do so in the popular sense of the words. Scarcely any natural water, except rain, is absolutely free from dissolved salts. All rivers contain them to a greater or less extent, as do also the waters derived from wells and springs. Such waters, however, are called (and properly called) "fresh," which does not necessarily mean water absolutely devoid of salts in solution; but when the proportion of salts is so great as to cause the water in which they are dissolved to appear "salt" to the taste, then the term salt water or brine is applied to them. The varieties of saline waters and the degrees of salinity are innumerable, and their properties and uses vary accordingly. There are the salt waters of the Dead Sea—so acrid as to be nauseous to the taste; there are those of the ocean, not so acrid: there are the varieties of mineral waters, and the brine springs highly impregnated with sodium chloride. But it is not necessary to go further into this branch of the subject; all that is necessary is to understand clearly the meaning of the terms we employ, and in the following essay I shall use the words fresh, brackish, and salt as applied to water in the sense they are popularly understood.

<sup>3</sup> But before entering upon the discussion regarding the cause or origin of the saltiness of the oceanic waters we may endeavour to ascertain whether this highly saline character has characterised these waters throughout a very long period of geological time. Now the evidence we can safely rely upon in this part of our enquiry is mainly derived from the character and affinities of the organic forms of past geological ages. At the present day the molluscan and other forms which inhabit the ocean waters are distinguishable from those which inhabit fresh water lakes and rivers, while there are numerous others, such as the *Actinozoa* or corals, starfishes, crinoids, sea-urchins, and echinoderms, exclusively confined to oceanic waters at the present day. Amongst the molluscs the Brachiopods (molluscoidea) and the Cephalopods are specially characteristic of oceanic waters of the present day, and are therefore of special value in the attempt to determine the character of the waters which they inhabited in past geological times.

<sup>4</sup> Now representatives of all these forms are found not only in Tertiary, Secondary, but even in early Primary or

Palæozoic strata. Not only in the Cretaceous and the Jurassic strata, but also in the Carboniferous, Devonian, and Lower Silurian (Ordovician) formations do we find corals, crinoids, starfishes, sea-urchins, various forms of Brachiopods and Cephalopods, differing indeed specifically from, but sometimes generically related to, those of the present day. The forms which are thus preserved to us in a fossil state are only those which were furnished with a stony or horny skeleton or integument. Many other forms there were which had no calcareous skeleton, and consequently have not been preserved in a fossil state, but which are represented in the ocean waters of the present day; and if these be allowed for, it becomes clear that amongst the invertebrate forms of marine life, those of the present day were largely represented in very early geological periods.

<sup>5</sup> Such being the case we are justified in coming to the conclusion that the waters of the ocean must have been salt from very early geological times; but it by no means follows that they were fully as saline as those of the present day.

The forms of life which require the high salinity of existing ocean waters were possibly represented by others capable of sustaining life when the salinity was only half as great as it is now. We know that some forms, such as those of the oyster, cockle, &c., are capable of surviving in the Baltic, or of ascending estuaries, where the water is almost brackish. Degrees of temperature, purity (or freedom from sediment), and other conditions were probably of greater importance in determining the existence of life than degrees of salinity. Adaptability to the conditions of environment has doubtless been a law of nature amongst marine forms as well as those of the air and the land throughout all past time.

<sup>6</sup> It is scarcely necessary to state here that the occurrence of beds of rock salt in several formations, especially in the Trias of the British Isles and of Europe, affords no evidence as regards the degree of salinity of the sea water in geological times. At no period have the waters of the ocean been so saturated with saline matters as to admit of the deposition of beds of rock salt. It has sometimes been suggested that such deposits may have been formed by the accidental accumulation of sand bars, owing to which portions of the ocean have been cut off from the main mass and the salts have been deposited as the waters have decreased and become supersaturated by evaporation. But the mode of

occurrence of the known beds of rock salt lend little support to this view; and recent investigations have led to the conclusion that deposits of rock salt have been accumulated over the floors of inland salt lakes like that of the Dead Sea in Palestine, along whose banks such deposits occur in the form of terraces which once formed the bed of the inland lake itself, when at a higher level than at present, but owing to the lowering of its waters are now exposed along its western margin, as in the case of the terraced hill known as *Jebel Usdûm*. Another fatal objection to the view of the marine origin of salt rock is to be found in the fact that this rock generally consists of nearly pure chloride of sodium, while ocean water contains large proportions of the chlorides of calcium, magnesium, and potassium, the precipitation of which would result in a deposit very different from that of the rock salt of Cheshire and Worcestershire, which is composed of 98·30 per cent. of chloride of sodium and only small traces of other salts.

7 But in addition to the evidence derived from organic forms of the primæval ocean we apparently possess very remarkable direct evidence that the waters were highly saline. It is known that some strata of the Upper Silurian period in North America are saliferous, constituting the Onondaga salt group and the Trenton and Chazy limestone series.\* These strata are characterised by large numbers of marine organisms, and there can be no doubt that they were formed in the waters of the Silurian seas. They also yield large quantities of saline waters which are used in commerce, and in which chloride of sodium predominates; and as the strata are often in the condition of basins below the level of the outer ocean, Dr. Sterry Hunt has inferred that the waters with which they are saturated were originally those of the Palæozoic ocean in which the strata were deposited. In other cases, however, where the strata are upraised above the ocean level and highly inclined, the same author considers that surface waters have gradually replaced those originally contained in the strata.† Thus we are justified in inferring, not only from organic, but from direct physical evidence, that the waters of the early Silurian oceans were salt.

8 On examining samples of water taken from the open

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\* Dana states that in the State of New York the salt is made from strong brine by sinking wells varying from 150 to 340 feet in depth. It takes from 35 to 45 gallons of this water to make a bushel of salt, whereas it takes 350 gallons of sea water for the same result.

† *Chemical and Geological Essays*, p. 104.

ocean of various regions and far from land, it has been found that the proportions of salts and carbonates do not much vary. This is doubtless owing to that wonderful system of currents by which the waters are kept in a state of perpetual movement, and owing to which there is a constant interchange of the warmer waters of the equatorial regions with the colder of the polar. Sea water is essentially a chlorinated alkaline mineral water, the saline contents of which consist chiefly of sodic, magnesian, potassic, and calcic chlorides and sulphates; together with a number of other substances in much smaller proportion. The total amount of dissolved contents in the water of the open ocean varies from about 28 to 39 grammes per litre. Forchhammer fixes the mean amount of such contents at 34.404 grammes per litre,\* and the mean proportions of the constituent substances to each other and 100 parts of chlorine are as follows†:—

Sodium.	Magnesium.	Calcium.	Chlorine.	Total saline constituents.
14.26	6.642	3.114	100	181.10

9 What is most striking in this analysis is the large proportion of chlorine, and the greatest difficulty we are met with in order to account for the salts of sea water is the abundance of this gas. Recollecting that chloride of sodium is the most abundant salt both in most salt lakes and in sea water, we are justified in seeking for a solution to our problem by an examination into the mode of origin of salt lakes.

10 Now there is one peculiarity which characterises all salt lakes over the surface of the globe, namely—that they have no outlet; they are closed lakes. Whether we take the case of the salt lakes of Western America, those of Central Asia and the Dead Sea, we shall find that they are not drained by rivers.

11 In such cases the lakes are constantly receiving supplies of water from streams and springs, but do not give it off in the same manner, inasmuch as it is evaporated into the air as fast

\* *Phil. Trans.*, civ, 303 *et seq.*

† *Watt's Dict. Chem.*, Vol. v, 1019.

as it falls. In the case of fresh water lakes it is otherwise. Here the water of the streams which enter the lake is at least partially discharged by means of rivers flowing out, in consequence of which the water remains fresh, as the saline ingredients are carried away as fast as they are delivered. Of these two varieties of inland lakes we have remarkable examples in the case of the Dead Sea and the Sea of Galilee. In the former case the river Jordan entering at the northern end keeps up a constant supply, but this lake, which is about 1,292 feet below the level of the Mediterranean, has no outlet, in consequence of which the water supplied by the Jordan passes away into the atmosphere in the state of vapour. In the case of the Sea of Galilee it is otherwise. The river which enters at the north passes out again at the south; hence the water of the lake is fresh and supports an abundant fauna of fishes and molluscs, while the waters of the Dead Sea are (as the name indicates) absolutely destitute of living beings, and fish entering it from the Jordan immediately perish. If there had been an outlet to the southwards from the Dead Sea into the Gulf of Akabah, and a continuous stream had been flowing from the time the depression was formed, the waters of the Dead Sea would have only differed from those of the Sea of Galilee by a somewhat greater proportion of salts and carbonates. Several other examples might be cited, but those of the Sea of Galilee and the Dead Sea are the most familiar and striking.

<sup>12</sup> There are two ways by which we may account for the salinity of the ocean waters from very early periods of geological time. First, by supposing that the primæval waters were saturated with acid gases which were held in suspension in the vapour surrounding the incandescent globe; or secondly, that the salinity resulted from a process resembling that by which salt lakes of the present day have been formed.\*

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\* Of the former method Dr. Sterry Hunt may be considered the chief exponent, and in order that I may not unintentionally misrepresent his views I will give them here in nearly his own words. Referring to that period in the physical history of our globe in which it may be presumed to have been in a molten state surrounded by an atmosphere and an envelope of vapour of water, he says:—"There would be the conversion of all the carbonates, chlorides and sulphates into silicates, and the separation of the carbon, chlorine and sulphur in the form of acid gases which, with nitrogen, vapour of water, and a probable excess of oxygen could form the dense primæval atmosphere. The resulting fused mass would contain all the bases as silicates, and must have resembled (when consoli-

13 We must, I think, concur with Dr. Hunt that from some cause or other, chlorine largely abounded in the waters of the primæval ocean, as by far the greater proportion of the salts are chlorides, and chlorine is but very slightly represented in river waters at the present day.

14 In contrast to the above, which may be called "the chemical theory," we may now consider that which may be called "the geological theory," though it very much depends upon certain chemical processes.

15 If we compare the analyses of waters brought down by rivers into the ocean at various parts of the globe we shall find that the matters in solution are very much the same as those which we find dissolved in oceanic waters; the proportions are doubtless immensely different, but the ingredients are essentially similar. Now, what are the dissolved ingredients of river waters? They are calcium, magnesium, sodium, potassium, a little iron, silica, alumina, and other matters, in combination with carbon-dioxide (carbonic acid gas), sulphuric acid, hydrochloric acid. Of these the carbonates of lime and magnesia are the most abundant, but chlorides of sodium and magnesium are almost always present even in waters where there can be no suspicion that they have been introduced by any artificial means. These constituents are also found in even larger proportions in the waters of natural springs; and in such chlorine occurs, sometimes in considerable quantity, in combination with sodium, magnesium, and potassium. Spring water coming as it does directly from the strata, or from rocks of various kinds, is

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dated?) certain furnace slags or volcanic glasses. The atmosphere charged with acid gases which surrounded this primitive rock must have been of great density. Under the pressure of a high barometric column condensation could take place at a temperature much above the present boiling point of water, and the depressed portions of the half-cooled crust would be flooded with a highly heated solution of hydrochloric and sulphuric acids, whose action in decomposing the silicates can easily be understood. The formation of the chlorides and sulphates of the various bases and the separation of silica would go on until the affinities of the acids were satisfied, and there would be a separation of silica taking the form of quartz, and the production of sea-water holding in solution, besides the chlorides and the sulphates of sodium, calcium, and magnesium, salts of aluminium and other metallic bases. The atmosphere being thus deprived of its volatile chlorine and sulphur compounds, would gradually approximate to that of our own time, but would differ in the greater amount of carbonic acid gas." *Chemical and Geological Essays*, p. 40 (1875).

generally free from any external or artificial ingredients, hence it may be regarded as the chief source of supply of the carbonates and salts found in streams and rivers. If we enquire what is the origin of spring water, the reply is simple. It is water which originally falling on the surface as rain or snow has percolated downwards into the rocky crust, and taking up the soluble matters with which it comes in contact, bursts forth at the surface along lines of fault, fissure, or other natural ducts. The relative proportions of the ingredients of sea water and of rivers or lakes may be gathered from the following selected examples:—

PROPORTION OF SOLUBLE INGREDIENTS IN THE WATERS OF THE OCEAN AND SPECIAL LAKES AND RIVERS.  
Parts in 1,000,000.

	Total Solid Contents.	Ca.	Mg.	Na.	K.	CO <sub>2</sub> .	SO <sub>4</sub> .	Cl.	Br.	SiO <sub>2</sub> .	Fe.	Authority.
Atlantic Ocean (41° 18' N., 36° 28' W.) ..	38,400	556	1,198	11,719	668	..	3,029	20,839	387	..	..	Von Bibra.
Caspian Sea (2 versts S.W. of Pischnoi) ..	6,296	191	409	1,444	139	77	1,337	2,737	..	..	40	Göbel.
Dead Sea.. ..	240,483	9,000	19,883	47,918	6,385	..	497	154,442	2,176	..	11	Herapath.
Rhine at Basle .. ..	169	55	4·8	0·6	..	86	15·4	1·5	..	2·1	..	Pagenstecher.
Aar, near Berne .. ..	216	66	10·0	0·3	..	103·3	33·7	0·3	..	2·7	..	„
Severn, Wales .. ..	38·7	3·0	2·0	6·1	1·2	2·0	12·8	8·2	..	2·0	..	Frankland and Odling.
Thames at Twickenham	321	83·8	4·7	9·2	4·2	119·9	31·4	14·2	..	3·9	..	Clark.
Thirlmere .. ..	51·5	4·3	1·2	4·9	..	10·9	7·5	11·0	..	0·7	..	Way.
Bala Lake .. ..	27·9	1·5	0·8	3·9	0·9	1·9	3·5	7·3	..	0·3	..	Frankland.

Decimals are omitted in the case of sea waters.

16 From the above results of the analysis of various waters, it will be seen that there is no essential difference between the waters of the ocean and those of lakes and rivers except in the proportions of the dissolved ingredients. There are, of course, occasionally substances specially abundant, as is the case with bromine in the waters of the Dead Sea, probably derived from the volcanic district on its borders; on the other hand, silica ( $\text{Si O}_2$ ), which is not mentioned in the waters of the Atlantic Ocean in the analysis of Von Bibra, is certainly present in those waters, and supplies the material from which sponges, diatoms, and radiolaria build up their skeletons. It will be observed also that chlorine and sulphuric acid is present in all the waters, and these gases uniting with the alkalies, give rise to the salts which are so abundant in the waters of the ocean and of closed lakes.

17 In considering the manner in which springs and surface waters have become impregnated with salts and carbonates, we have to recollect that all rocks decompose in presence of the atmosphere. This is mainly due to the carbonic acid (carbon-dioxide) contained in the air and rain water, which acts upon felspathic rocks, composed, as we have seen, of double silicates of alumina, potash, and soda. Ebelman has well explained the process by which basaltic and similar rocks are decomposed under the influence of the atmosphere. The carbonic acid (carbon-dioxide) combines with the lime and magnesia, while the silica is liberated in a soluble form. The felspar is more stable than the pyroxene and hornblende, but it ultimately gives way, forming a hydrous silicate of alumina. Thus we can account for the presence of carbonates of lime and magnesia, free silica, and by a further process in presence of sulphuric acid and chlorine of the various sulphates and chlorides.

18 Now, as bearing on the fact of sodium chloride (or common salt) being the chief ingredient in oceanic waters, as well as in those of the Dead Sea and most salt lakes, we must recollect that the soda-felspars are much more soluble than the potash-felspars, and on this account we have probably a true cause of the predominance of sodium chloride. The rocks composed in the main of such felspars as labradorite, albite, oligoclase, and andesine, were therefore more powerfully acted upon than those composed of orthoclase and sanidine; but even in these cases many orthoclase granites contain proportionate quantities of the soda felspars

such as oligoclase and albite, and the decomposition of these components would hasten that of the less soluble varieties.

<sup>19</sup> It seems not improbable from certain considerations connected with the organic structures of the ancient world, that carbon-dioxide was more abundant in the atmosphere of Palæozoic times than at present. The enormous quantity of carbon which must have been extracted from the air during the Carboniferous period in order to the formation of the beds of coal at intervals all over the world, seems to favour this view; and if this be so, then we may suppose that previous to the Carboniferous period, the air was highly charged with carbon-dioxide, and the process of decomposition on the land surface was carried on with even greater rapidity than at the present day; but even had this not been the case, it only requires a sufficiently long period in order to bring about the chemical reactions necessary to the salinification of the oceanic waters.

<sup>20</sup> We are now approaching the conclusion of our enquiry. From the examples of closed lakes we can determine the process of salinification with the utmost certainty. Throughout greater or shorter periods, these lakes have been receiving the waters of rivers bringing down, both mechanically suspended sediments and chemically dissolved salts, silicates and carbonates. The sediments are precipitated over the bottom of the lakes, and the water being carried off into the atmosphere in the form of vapour as fast as it enters, leaves behind the dissolved ingredients. These necessarily augment in quantity, and ultimately the waters of the lakes become saturated with salts and carbonates, which are then deposited.

<sup>21</sup> Now the ocean is a closed lake of enormous magnitude. Throughout all geological time it has been receiving continual supplies from rivers bringing down not only sediment, but salts and carbonates, together with free silica, in solution. The sediment is deposited over the ocean floor, and generally not far from the lands, while the dissolved ingredients are carried by the currents into all parts. Meanwhile the ocean surface is constantly giving off, particularly over the equatorial regions, enormous quantities of vapour which are carried into the higher regions of the atmosphere, and are precipitated in the form of rain and snow over the lands. Part of course falls on the sea again, but the greater quantity falls on the land surfaces, and is returned to the

ocean in streams charged with a fresh supply of the salts and carbonates it had left behind in the ocean.\* The consequence of this process must clearly be that the saline ingredients have been increasing in the oceanic waters from the earliest periods down to the present day. As regards the carbonates of lime and magnesia, and the silica which are being carried into the ocean by the rivers, we have no difficulty in accounting for their uses. Of these materials, the shells and skeletons of the molluscs, echinoderms, reef-building corals, foraminifera, sponges, radiolarians and diatoms and other forms are built up, and as these structures are continually being formed, and the materials solidified as fast as they enter the oceans, there is no reason why they should augment. Hence the proportion of carbonates of lime and magnesia in the ocean waters may be very much the same now as it was in Silurian and Carboniferous times.

22 We are thus brought to the conclusion that the saltiness of the sea may have originated in very much the same way as has that of the Dead Sea, Lake Oroomiah, or the Great Salt Lake of Utah, or many others which might be named, and which possess in common the characteristic of having no outlet. When the great envelope of vapour which surrounded the incandescent globe began to condense upon its cooling surface, the resulting waters, though containing, as Dr. Sterry Hunt supposes, acid gases, were destitute of saline ingredients. The process of salinification began with the first streams which entered the seas from the bordering uplands, and this process carried on throughout the long ages preceding the Silurian period brought the waters to a condition suited to sustain the life of forms of inhabitants representative of those which inhabit the ocean at the present day. These long ages may be supposed to include, not only the Archæan and Azoic periods, but that during which the first crust was in course of formation over the incandescent globe.

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\* This process of evaporation and supply by rivers is accurately described in the Book of Ecclesiastes i, 7.

The CHAIRMAN (the Venerable Archdeacon ROBINSON THORNTON, D.D., V.P.)—I am sure all have listened to this paper with much interest and desire to return the author their hearty thanks.

Captain F. PETRIE (Hon. Sec.)—Some communications have been sent by those unable to be present to-day. The first is from Professor JOHN TYNDALL, F.R.S. :—

“ Hind Head House, Haslemere.

“ DEAR SIR,

“ I have read with interest the paper by Professor Hull which you have been kind enough to send to me.

“ The theory which he enunciates is set forth with lucidity and scientific truth.

“ Yours very faithfully,

“ JOHN TYNDALL.

“ To Captain F. Petrie.”

The next is from Professor JOSEPH PRESTWICH, D.C.L., F.R.S. :—

“ There is one point in the interesting address of Professor Hull in which I cannot agree. Speaking of the great deposits of salt in the Triassic and other strata, he says: ‘ Another fatal objection to the view of the marine origin of rock-salt is to be found in the fact that this rock generally consists of nearly pure chloride of sodium, while ocean water contains large proportions of the chlorides of calcium, magnesium, and potassium, the precipitation of which would result in a deposit very different from that of the rock-salt of Cheshire and Worcestershire, which is composed of 98·30 per cent. of chloride of sodium and only small traces of other salts.’ As I have explained elsewhere (*Geology*, vol. ii, p. 160) it seems to me on the contrary probable that these salt beds were formed by the deposition on the evaporation of sea water in lagoons or inland lakes, the cause of the difference of composition being the different solubility of the various salts existing in sea water. Thus the sulphate of lime, which is the most insoluble, is deposited first, and this substance is always found associated with rock-salt, while the more soluble salts of potash and magnesia, which require a greater degree of concentration than the chloride of sodium (rock-salt), resist deposition till the last. Thus in the salterns on the coasts of the Channel the sea water let in first deposits the more insoluble sulphate, and then, when removed to other pans, deposits its chloride of sodium with but traces of the other ingredients, whilst in the mother

liquor which remains are to be found the more soluble bromides and chlorides of potassium, &c. The result is that the salt obtained in this manner direct from sea water corresponds almost exactly in composition with the rock-salt of Cheshire, as the following table will show:—

	Salt from salterns.	Rock-salt, Cheshire.
Chloride of sodium	98·80	98·32
Other chlorides	0·50	0·39
Bromides	none	none
Sulphates	0·70	0·62
Other ingredients	none	0·67
	100·00	100·00

“Thus, while sea water contains about 78 parts in 100 of chloride of sodium or common salt, the salt procured from it by evaporation consists of 98·80 parts in 100, which corresponds within a fraction with the proportion (98·32) existing in rock-salt.”

The third is from Mr. J. POSTLETHWAITE, F.G.S. :—

“I have read Professor Hull’s paper on ‘How the Waters of the Ocean became salt,’ with much interest, chiefly because my attention had been directed to the subject whilst endeavouring to investigate the source of certain mineral springs, near Keswick, for the purpose of laying the results of such investigation before the members of the Cumberland and Westmorland Association for the Advancement of Literature and Science, at their Annual Meeting in 1886. (See *Trans. C. and W. Assoc.*, vol. xi, p. 142.)

“The existence of those springs is a further confirmation of Professor Hull’s statement that ‘from direct physical evidence the waters of the early Silurian oceans were salt’ (sec. 7). The salt spring at Brandley Mine, on the margin of Derwentwater, issues from the Skiddaw Slate, in the lower part of the Ordovician (Lower Silurian) System; it contains a large amount of mineral matter in solution, namely, 203·78 grains per imperial pint, consisting of:—

Chloride of calcium	...	...	87·67 grains per pint.
”    ”    magnesium	...	...	1·53   ”    ”
”    ”    sodium	...	...	110·23   ”    ”
Sulphate of magnesia	...	...	4·35   ”    ”

Total 203·78

“The large amount of chloride of sodium proves that a large bed of this rock salt exists beneath Catbells and Maiden Moor, and this bed must have been formed in the early part of the Ordovician Age. The quantity of water issuing from this spring is, on the most moderate computation, about 150 gallons per minute, and the quantity of salt (chloride of sodium) contained in it amounts to about  $18\frac{1}{4}$  lbs., which gives a total of 12 tons 3 cwt. every twenty-four hours, 4·434 tons every year, or 443·400 tons in 100 years, and this has been going on for ages. Moreover, there is another spring at Saltwell Park, about three-quarters of a mile south of Brandley Mine, precisely the same in quality, but the quantity of water issuing from this spring is probably not more than one-third of that issuing from Brandley Mine. (When the mine was being worked it was found sometimes necessary in dry seasons to use the salt water, for a short time, for supplying the engine boiler, and I have seen cartloads of salt taken out of the boiler on these occasions.) The quantity of salt which is being continually conveyed away by these springs shows that the bed from which it is obtained must be very extensive.

“The presence of chlorine in these springs is also a confirmation of the opinion quoted from Dr. Hunt’s essay, to the effect that ‘chlorine largely abounded in the waters of the primeval ocean.’”

Mr. DAVID HOWARD, F.C.S.—I am sure all those who have paid attention to this subject must feel a great debt of gratitude to the author of the paper for the very careful research he has given to it. Of course it is not an easy subject, it is rather readily assumed either that the beds of rock salt are the source of the saltiness of the ocean or *vice versa*, and yet what seems so simple a thing is not really easy to understand. To begin with it is a puzzle for chemists to make from sea water salt of the marvellous purity of some beds of rock salt which are almost absolutely pure, and it is a remarkable fact that they are free from those elements which adhere most persistently to salt made from sea water. On the other hand, if one studies formations which undoubtedly are the result of the drying up of portions of sea or inland lakes, one is struck by the excessively mixed character of the resulting beds—as for instance in the nitre beds of South America, which are evidently the result of drying up—the different strata are formed of different substances which follow one another as you would expect from their solubilities, and very remarkable substances some of them seem. They are very difficult to make artificially,

and yet it is clearly seen how they are formed. It is very easy to find that some of the very substances obtained from these beds are obtained from sea water. Undoubtedly there are very minute traces in all sea water of boron components, which is found crystallised in the form of boro natro calcite in these nitre beds. You must evaporate an enormous quantity of sea water to get evidence of these substances. Boron you can find with the aid of the spectroscope, but iodine, which also abounds in these beds, is extremely difficult to obtain from salt water; but the processes of certain sea weeds, of obtaining it, for the physical requirements of the plant come to our aid, and it was first discovered from the ashes of these sea weeds, which contain a considerable quantity. I believe the more you study the chemistry of sea weeds the more confidence you will have in the value of this admirable paper.

Rev. F. A. WALKER, D.D., F.L.S.—There are two points upon which I should be glad to be permitted to ask for information. First:—Is it not a fact that certain seas do very greatly differ from one another in amount of salinity? the waters round the Channel Islands are said to be very salt. Secondly:—Is it the case that waters at a great depth down, say one mile or more, differ in their respective degree of salinity from the surface waters? would their smaller proportion of salinity tend to account for the total absence or great scarcity of organic life at a considerable depth, or is this absence or scarcity solely attributable to the absence of light at a great depth?

The CHAIRMAN.—There is a theory that the globe was once incandescent and probably surrounded by a quantity of acid vapour called carbon-dioxide, and chlorine vapour especially; if that theory be true does not Professor Hull think that the chlorine vapour and the sodium vapour would have been present and have united themselves, and to the union of these two vapours the immense supply which we have of chloride vapour may be due.

The AUTHOR.—Although the speakers are few they have given me enough to do if I am to answer their questions. But I am rather disappointed that I have had no what I may call downright opponent to meet.

The CHAIRMAN.—I think you cannot expect anybody to criticise so convincing a paper.

The AUTHOR.—Then I will, with the best grace I can, give my

replies. With regard to Mr. David Howard's remarks, he referred to the nitre beds of Western America. I have not seen those, they are very exceptional and very valuable; but I think he will, perhaps, find they are exceptional in this respect, viz., that they are all situated in volcanic regions, and nitre, as we know, is a volcanic product, and these are probably laid down in inland lake beds which have derived their supply of that salt from volcanic sources. It is quite true what he said about the possible existence of substances in such small quantities that in an ordinary—or indeed more than ordinary—chemical analysis they might be passed over; and I have referred in my paper to the case of free silica in solution in the waters of the ocean, which we know must be there, because from that the silicious sponges, diatoms, and other forms have built up their skeletons. Dr. Walker has given me some questions to answer, but I am afraid if I entered into them exhaustively I should keep you here too long. I will endeavour, therefore, to reply as shortly as possible. I think the first question is whether the salinity of the different parts of the ocean varies? No doubt it does to a certain extent. The surface portions of the ocean are not so saline as those of deep water; and, of course, waters which are in proximity to the outlets of large rivers are necessarily less saline than those which are in mid-ocean; but as regards the absence or prevalence of marine life in the ocean it is probably much more due to the difference of temperature than to salinity. Now the "Challenger" and other expeditions in their soundings over almost all parts of the ocean, adduced this remarkable and interesting fact—that the very deep parts of the ocean, even under the equator and the tropics, are intensely cold—almost as cold as the Arctic waters;—differing very slightly from the freezing point of water, viz., 32° F. In consequence of that, temperature is, as we know, the main factor in determining the presence or absence of animal forms in the ocean. There are many forms which will survive and flourish in warm water and will not do so in temperate water—much less will they do so in cold water; and after going down, say 3,000 fathoms, the temperature of the ocean does not vary much in any part of its floor area from the freezing point of water. Dr. Carpenter, we know, founded on that the very beautiful theory with regard to oceanic circulation which seems to be borne out by this fact. He showed that not only is there a surface circulation—the currents with which we are familiar, which

circulate over the surface of the ocean—but a vertical circulation. As the waters of the Arctic and Antarctic regions pass down—at a very slow rate it is true, but still they do pass down—along the bed of the ocean towards the equator; those on either hand gradually rise and replace the warm water which is constantly given off by the surface currents in the equatorial regions. As to the theory which the Chairman has mentioned that sodium may have been in a gaseous condition in the original highly heated circumincumbent air surrounding the incandescent globe—sodium gives a very marked line indeed in the spectroscopic analysis of the sun and of many of the heavenly bodies. But my paper refers to a more advanced stage in its course of consolidation, and I start from the period in which sodium and calcium would have entered into combination in the formation of rocks during the cooling of the crust owing to the radiation of the original heat into space. Crystalline rocks of the granitic or volcanic type may have been thus formed, and then the sodium would of course be in a combined state. It is the reaction of the supposed highly saline waters, which would still have remained as an envelope outside the incandescent globe, which, according to the view I have advanced, would result in the formation of various salts—sodium chloride being the principal and the most abundant.

I will now refer to the communications that have been received.

Let me say how much gratified I feel by Professor Tyndall's approval of my views. As regards Professor Prestwich's communication, which gives what may be considered the alternative theory regarding the origin of oceanic salinity, there is much to be said. But I have for a long time regarded it as an insufficient hypothesis; and as regards the statement that gypsum (sulphate of lime) "was deposited first," this is not generally the case; at least not in Worcestershire where the gypsum lies above the rock salt, nor can I admit that the Triassic strata are of marine origin in England.

Mr. Postlethwaite's letter is of very great interest to me, because it is the first case in which I have heard in the British Isles of such highly saline water as he describes being found in strata of the lower Silurian age. I do not know of any case in England, Ireland, Wales, or Scotland where these old rocks have yielded such highly saline waters as he describes. They seem to represent those which have been worked for so long a period

for chemical purposes in the United States, and this occurrence in Cumberland is very interesting, for it seems to show, as he concludes, that the waters of the lower Silurian period were really highly saline.

In conclusion I beg to thank all for the kind manner in which my paper has been received.

The Meeting was then adjourned.

#### A NOTE ON THE FOREGOING PAPER.

D. BIDDLE, Esq., M.R.C.S.E., writes :—

I feel sure that on consideration of the facts, Professor Hull's view as to the cause of the saltiness of the ocean will be found to be untenable. Although the first chapter of Genesis does not lend much countenance to the nebular hypothesis, yet in effect it states that the whole surface of the earth was fluid before the dry land appeared. Science has confirmed this testimony, and has thus assigned to the ocean the first place in mundane existence. Such being the case, it is scarcely too much to assume that the original liquid forming the ocean was capable of holding (and, in fact, did hold) in solution all those salts which are found in the ocean of the present day. It possibly held many more when its temperature was higher; and some geologists have gone so far as to assert that the solid crust of the earth is wholly a precipitate from the ocean, the stratified appearance of many rocks giving support to this hypothesis. But, be that as it may, it is not unreasonable to believe that the ocean originally held in solution all the sodium chloride entering into the earth's composition, and that so far from the land having given salt to the ocean, the reverse has been the case, the ocean having given salt to the land. One way in which this has been effected is by alterations of the earth's surface (at the first appearing of dry land and subsequently), whereby portions of the ocean have been imprisoned in basins, from which there has been no outlet except by evaporation. The salt left behind then forms part of the land, and by further alterations of the earth's surface may be overlaid, as in Worcestershire and Cheshire, or be upheaved, as in the Kalabagh Mountains of India.

Another argument against Professor Hull's view is to be found in the fact that at least one-fortieth of the ocean consists of sodium chloride, that the geographical area of the ocean is about three times that of the land, and its mean depth far greater than the mean height of the land above sea-level. Thus the salt at present in the ocean is fully equal to one-tenth of all the land from which, by gravitation, it could have been discharged, if Professor Hull's

view held good. This is, indeed, a prodigious proportion of soluble material to be even temporarily withheld from an almost omnipresent solvent. Is it not much more reasonable to believe that the ocean, as it receded from the upheaved land, took its salt with it?

The following is the author's reply:—

I do not think there is any discrepancy between my views and those of the creation of land and ocean in Genesis: on the contrary I venture to maintain they are quite consistent. Nor can I see how Dr. Biddle is to account for the sodium of the sodium chloride unless it was derived from the decomposition of the rocks by the chlorine which (I assume) existed in the original aqueous atmosphere. His statement that "it is not unreasonable to believe, &c.," is not scientific induction, but only mere assumption. As for the beds of salt in the strata of Cheshire and Worcestershire, the opinions of geologists are almost unanimous that they were formed on the beds of inland lakes like those of the Dead Sea, of Utah and of Central Asia; though, I admit, that there are instances of their formation in the way Dr. Biddle describes.

## 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:—

ASSOCIATES:—Rev. C. W. A. Clarke, M.A., India; Rev. J. P. Clark, M.A., London; Rev. H. D. Buswell, Mauritius; Rev. H. J. Hoare, India.

A lecture entitled "Primitive Indian Philosophy, with some Modern Parallels," was given by Mr. W. H. Robinson.

\* 8th of 28th Session.

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ORDINARY MEETING.<sup>1</sup>

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 :—Rev. J. Cockin, Cornwall ; Commander Heath, R.N., London.

A translation, see p. 93, of the following paper was then read :—

## LA LISTE DE SHESHONQ À KARNAK.

PAR G. MASPERO.

**L**A liste que Sheshonq I<sup>er</sup> a fait graver des villes qu'il avait ou prétendait avoir prises, pendant sa campagne contre Roboam, a été souvent étudiée par les Égyptologues. Champollion le Jeune\* et Osburn† en tirèrent tout le parti qu'il était possible à une époque où, ni le mécanisme de l'écriture hiéroglyphique, ni la géographie de la Palestine n'étaient encore bien connus. Brugsch en donna plus tard une analyse complète,‡ qui permit à Blau d'en proposer une interprétation plus sérieuse que toutes celles qu'on avait faites jusqu'alors.§ Le commentaire de Blau, modifié par

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\* Champollion, *Lettres écrites d'Égypte*, p. 99-100, *Grammaire Égyptienne*, p. 160, et *Monuments, Texte*, T. II, p. 114.

† Osburn, *Egypt, her Testimony to the Truth*, p. 158-162.

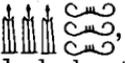
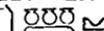
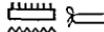
‡ Brugsch, *Geogr. Ins.*, T. II, p. 56-71.

§ Blau, *Sisaqs Zug gegen Juda aus dem Denkmale bei Karnak erläutert*, dans la *Zeitschrift der deutschen Morgenländischen Gesellschaft*, T. XV., p. 233 sqq.

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<sup>1</sup> 10th of 28th Session.

Brugsch dans la seconde édition de son " Histoire d'Égypte,"\* est resté depuis lors presque classique dans la science, et la plupart des identifications auxquelles il s'était arrêtées ont été admises sans discussion par les archéologues et par les géographes.† Un premier examen, fait en 1880, m'avait montré pourtant que Blau avait pris trop de libertés avec la forme extérieure des noms, et n'avait obtenu beaucoup de rapprochements qu'au prix d'inversions et d'altérations trop nombreuses pour être légitimes: je me suis efforcé alors de prouver que les lettres égyptiennes, transcrites rigoureusement en lettres hébraïques, donnent presque partout des formes régulières de l'hébreu, et par conséquent n'exigent ni changements ni corrections.‡ J'ai voulu, dans le présent article, rassembler, après dix ans bientôt de recherches nouvelles, les résultats partiels auxquels je suis parvenu, et les soumettre, sous bénéfice d'inventaire, à la critique de mes confrères en Égyptologie. J'ai établi le texte par la comparaison de toutes les copies publiées depuis le commencement du siècle, et par la collation de la copie de Champollion avec ce qui subsiste encore de l'original sur la muraille de Karnak.§

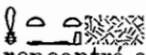
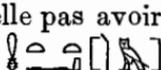
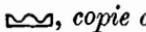
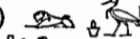
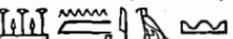
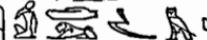
Les dix premiers cartouches étaient remplis par les formules générales qu'on rencontre au début de plusieurs listes géographiques. Bien qu'un certain nombre d'entre eux soient détruits complètement, on peut les rétablir presque à coup sûr: (No. 1)  *To-qimâiti*, le pays du midi, (No. 2)  *To-mihiti*, le pays du Nord, (No. 3) , les tribus situées entre le Nil et la Mer Rouge, de la hauteur d'Assouân à celle de Siout (No. 4) , les *Tahouou*, les tribus berbères au delà des Oasis de Thébaïde, en pendant aux *Aniou* du cartouche précédent, (No. 5) , les Bédouins, qui vivent entre le Nil et la Mer Rouge, de la hauteur de Siout aux environs de l'Ouady Toumilât, (No. 6) , les tribus Berbères qui occupent les Oasis à l'ouest du Birket Kéroun, parallèlement aux Bédouins Pittiou, (No. 7) , les *Montiou*, les Bédouins de l'Arabie Pétrée entre

\* Brugsch, *Geschichte Ägyptens*, p. 660-663.

† C'est au mémoire de Blau que Mariette a emprunté cette étrange hypothèse de corps d'armée égyptiens, manœuvrant comme feraient des corps d'armée modernes (*Les Listes des pylones de Karnak*, p. 46-48).

‡ Maspero, *Notes sur différents points de grammaire et d'histoire*, dans la *Zeitschrift*, 1880, p. 44-49.

§ Maspero, *Révision des listes géographiques de Thoutmos III*, p. 100-101.

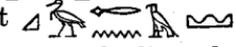
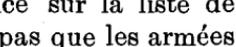
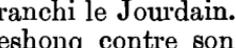
l'Égypte et la Syrie], (No. 8) les , *Paditiou*, nomades de Syrie entre les Montiou de les frontières du Naharanna,\* enfin les (No. 9)  *Haïounivou* de l'Asie-Mineure et des îles de la Méditerranée. Le dernier cartouche, (No. 10)  est le seul que je ne me rappelle pas avoir rencontré ailleurs. Peut-être faut-il le restituer  , copie des *Asiatiques*, en considérant ces mots comme une sorte de titre qui s'appliquerait à l'ensemble des noms qui suivent: ce n'est toutefois qu'une simple conjecture. Les treize cartouches qui viennent ensuite ne présentent pas non plus de grandes difficultés d'interprétation. Je me bornerai à les énumérer, avec les restitutions que j'ai cru pouvoir y joindre en 1880, et auxquelles je ne vois rien à changer pour le moment. (No. 11)  *Gazatou*, Gaza, [No. 12  *Magidi*, Mageddo], (No. 13)  *Rabbati*, רבית d'Issachar, (No. 14)  *Taânaqou*, תענך, (No. 15)  *Shaunamá*, שונים d'Issachar, † (No. 16)  *Bit-Shaïnla*, *Bit-Shâilla*, où il m'a semblé reconnaître le Shiloh  *Shiloh* d'Ephraïm, ‡ (No. 17)  *Rouhaïba*, רחב, aujourd'hui Rehabş au sud de Beïsan, (No. 18)  *Hapourouma*, חפרים d'Issachar, (No. 19)  *Adoulmim* אדלמים, que ni l'orthographe hiéroglyphique ni la position qu'elle occupe dans la liste ne permettent d'identifier avec l'Odollam  de Juda. Le numéro 20, qui est entièrement mutilé, renfermait peut-être le nom de Sichem, une des capitales d'Israël sous Jéroboam I<sup>er</sup>. Le No. 21  *Shaouadi* est sans doute *Souèda*, (Kharbét es-Suweidéh de la

\* Sur ces peuples voir J. de Rougé, *Textes géographiques du temple d'Edfou* (H<sup>te</sup>-Égypte), extrait de la *Revue Archéologie*, 1865, p. 12-16.

† L'identification a été proposée pour la première fois par Osburn, *Egypt*, p. 158.

‡ Sur les noms géographiques de la liste de Thoutmés III qu'on peut rapporter à la Judée, dans les *Transactions du Victoria Institute*, T. XXII, p. 69-70.

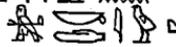
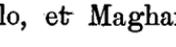
§ Cfr. Eusèbe, *Onomasticon*: καὶ ἐστὶ Ῥοῶβ κόμη ἀπὸ δ' σημείου Σκυθοπώλεως, ἣν δὲ Λεβίταις ἀφωρισμένην (edit. Parthey, p. 316).

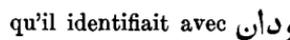
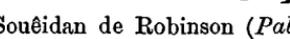
carte anglaise), à peu de distance de la rive droite du Jourdain.\* Les numéros suivants représentent  Mahanaïm  au-delà du Jourdain,† et  Gabaon  de Benjamin.‡ La présence sur la liste de villes appartenant à Jéroboam, ne prouve pas que les armées égyptiennes aient pénétré en Galilée ou franchi le Jourdain. Le roi d'Israël, en implorant l'aide de Sheshonq contre son rival, avait fait par-là même acte de vasselage vis-à-vis de l'Égypte: cela suffisait pour que ses villes figurassent à Karnak parmi les cités soumises au cours de la campagne.

Pour déterminer le site des localités qui se présentent au-delà de Gabaon, j'emploierai le procédé qui m'a servi déjà à propos des listes de Thoutmos III: je diviserai la liste en sections comprises chacune entre deux villes connues, et dont la position sur le terrain aura été indiquée de façon sinon certaine, du moins vraisemblable, par les explorateurs récents. De Gabaon à la lacune du numéro 30, le scribe égyptien a suivi la ligne de places ou de postes fortifiés qui couvraient la frontière septentrionale du royaume de Juda.

(No. 24)  Bit-haouaroun est le Bethoron

 d'Ephraïm,§ (No. 26)  Aiaouloun,

l'Aialon  de Dan,|| (No. 27)  Mâkidau,  c'est-à-dire Bêt-Our, Yalo, et Magharah  el-

\* Le déterminatif  est encore très visible sur l'original et complète le mot (Maspero, *Recueil*, T. VII, p. 100). Blau (*Bp. l.*, p. 237) restituait  qu'il identifiait avec  Arak es-soudan, ou  es-Souéidan de Robinson (*Palestina*, III, p. 867, II, p. 657).

† Champollion, *Grammaire Égyptienne*, p. 160, *Monuments, Texte*, T. II, p. 114; Rosellini, *Mon. St.*, T. IV, p. 157.

‡ Brugsch, *Geogr. Ins.* T. II, p. 61.

§ Champollion, *Grammaire*, p. 160, *Monuments, Texte*, T. II, p. 114; Rosellini, *Mon. Stor.*, T. IV, p. 157.

|| Champollion, *Monuments, Texte*, T. II, p. 114; Brugsch, *G. Ins.*, T. II, p. 62.

¶ Champollion (*Mon.*, *Texte*, T. II, p. 114, et *Grammaire*, p. 160), Rosellini (*Mon. St.*, T. IV, p. 157-158), Osburn, *Egypt, Her Testimony to the Truth*, p. 160), Brugsch (*G. Ins.*, T. II, p. 62), E. de Rougé (*Mémoire sur l'origine*, p. 53), ont voulu reconnaître ici Mageddo; Blau (*op. l.*, p. 237-238) a fait observer que Mageddo serait ici hors de sa place et a proposé Makkédah, ce que j'ai accepté (*Zeitschrift*, 1880, p. 45).

Moghâr,\* à quelque distance au S.E. d'Yebuah. Cet ensemble de positions certaines nous permet de rejeter à priori les identifications proposées pour (No. 25)  Qadoutim, par Champollion avec עִיטָם Etham de Juda,† par Brugsch et par Rougé avec קְדֵמוֹת Kedemôth de Ruben.‡ Blau pense à la ville d'Adithaïm עֲדִיתַיִם, qui devait être quelque part dans le voisinage, et j'avais cru d'abord pouvoir accepter cette identification : la transcription  $\Delta$  Q du  $\epsilon$  peut se justifier en effet par l'exemple de  Qazatou, Gaza, עֲזָה.§ Il faut remarquer toutefois que, dans les noms où le  $\epsilon$  hébraïque tend à la prononciation du  $\xi$  arabe, les versions grecques et la Vulgate ont ordinairement un  $\gamma$ ,  $g$ , Γάζα, Γατ, Ἀγγατ = עֵי, הָעֵי, Γαδερ = מְגַדְל־עֵדָר, Βεθφοργόρ = בֵּית־פְּעוֹר, &c.; or עֲדִיתַיִם n'est jamais transcrit Γαδιθαίμ, mais Ἀδιθαίμ, ce qui semble montrer que, dans ce mot, la lettre initiale est un  $\epsilon$  pur sans tendance au  $\xi$ , et me porte à rejeter l'équivalence de עֲדִיתַיִם Adithaim avec  Qadoutim. Le groupe hiéroglyphique, transcrit en lettres hébraïques, nous donne d'ailleurs une forme עֲדִיתַיִם de עֲדָר, incisio, sulcus, turma, agmen militum, qui nous oblige à le considérer comme ayant été noté correctement par le scribe et par les sculpteurs de Karnak. L'équivalent moderne de ce nom serait, avec chute de la finale plurielle יַם et substitution du  $\zeta$  au  $\gamma$ , un mot Djedid ou Djédoud, qui se serait confondu infailliblement avec l'adjectif جديد neuf, nouveau : les Djoudèidèh qu'on rencontre en plusieurs endroits de nos cartes, sont trop éloignées d'Aïalon et de Bethoron pour qu'on ait le droit de les rapprocher de notre Qadoutim, Qadoudim. Cette localité devait se trouver entre Bêt-Our et Yalo, probablement vers le point où la route qui réunit ces deux bourgs franchit le Ouady Selmân, et

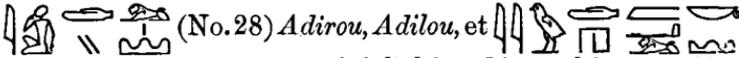
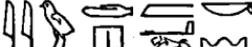
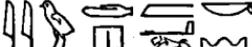
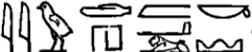
\* Le site d'el-Moghâr, proposé pour Makkédah par MM. Warren (*Palestine Exploration Fund Quart. Stat.*, 1875, p. 181) et Conder (*Quart. St.*, 1875, p. 165-167), est le plus vraisemblable de tous ceux auxquels on a songé jusqu'à présent.

† Champollion, *Mon., Texte*, T. II, p. 114.

‡ Brugsch, *Geogr. Ins.*, T. II, p. 61 ; E. de Rougé, *Mémoire sur l'origine*, p. 53, 91.

§ Blau, *Sisqa Zug*, dans la *Z.d.d.M.*, XV, p. 237 ; Maspero, dans la *Zeitschrift*, 1880, p. 45.

de façon à barrer dans la plaine le chemin de Jérusalem ; la carte anglaise porte en cet endroit un Kharbèt Bêt-Nashef *خربة بيت ناشف* qui pourrait être *Qadoutim, Qadoudim*.

 (No. 28) *Adirou, Adilou*, et  *Iaoudhamalouk* (No. 29) ont été l'objet d'hypothèses variées et contradictoires. Comme la direction dans laquelle on a chance de rencontrer Adirou dépend de celle dans laquelle on trouvera Iaoudhamalouk, je m'inquiéterai d'abord de ce dernier nom. Champollion y avait vu l'image du royaume de Juda,\* Rosellini celle du roi de Juda.† E. de Rougé persista jusqu'à la fin à tenir l'opinion des premiers Égyptologues comme vraisemblable, sinon comme certaine.‡ Brugsch, au contraire, estima qu'on avait ici une simple bourgade dont l'équivalent moderne serait un Yahoudiyéh, el-Yehoudiyéh, soit celui des environs de Tibnîn, soit celui des environs de Jaffa.§ Blau se rangea à l'avis de Brugsch, et ajouta que notre localité, étant située au voisinage de Makkédah, se confondait nécessairement avec le יְהוּד Iehoud de Dan, c'est-à-dire avec el-Yehoudiéh voisin de Jaffa: || Iaoudhamalouk aurait été la forme pleine, Iehoud une forme abrégée. Dans ces derniers temps M. Max Müller a entrepris de démontrer que l'Égyptien  ne contient pas le nom de Juda: on devrait, dit-il, retrouver dans l'Égyptien le premier ה de יְהוּדָה et avoir  au lieu de . Il pense que le terme initial du nom est יָד *la main*, et que l'ensemble correspond à יְדִהַמְלֵךְ *Iad-hammelek*: la ville Idhammelek

\* Champollion, *Lettres écrites d'Égypte*, p. 99.

† Rosellini, après avoir adopté l'opinion de Champollion (*Mon. Stor.*, T. II, p. 79-80), fut amené par des scrupules philologiques à la modifier, et à voir dans le nom de notre localité la mention du roi de Juda (*Mon. Stor.*, T. IV, p. 158-159).

‡ E. de Rougé, *Mémoire sur l'origine égyptienne de l'alphabet phénicien*, p. 53, *Leçons de M. de Rougé dans les Mélanges*, T. II, p. 274, note 9. M. de Rougé, ou M. Robiou qui a publié les *Leçons*, attribuait à Champollion la traduction de Rosellini, et revenait au sens de *royaume*, qui est précisément celui que Champollion avait proposé.

§ Brugsch, *Geogr. Ins.*, T. II, p. 62-63.

|| Blau, *Sisaks Zug*, dans la *Z.d.d.M.*, T. XV, p. 238.

n'aurait plus rien de commun avec Iehoud de Dan.\* Malgré la très grande estime que j'ai pour M. Max Müller (de Nüremberg), et bien que M. Le Page Renouf lui ait prêté l'appui de son autorité, je ne pense pas que l'objection qu'il élève contre la lecture de Brugsch soit insurmontable.

Le mot  renferme un élément gênant, l'ou  qui suit les deux plumes  et qui n'a pas de raison d'être, si on admet la lecture : aussi MM. Müller et Le Page Renouf ont-ils essayé de se tirer d'affaire en expliquant qu'il ne fallait pas en tenir compte. Je pense au contraire qu'il ne faut jamais le négliger, ni dans le cas présent, ni dans les autres cas où il se rencontre. Le signe , commençant un mot, paraît avoir eu toujours un *a* pour voyelle inhérente, et cet *a*, diphthongué avec un *ou*, qui tantôt est exprimé, tantôt est supprimé dans l'écriture, a donné dans le copte tantôt un *æ* ou un *ε*, tantôt un *o*, *ω*: ,

, *iaoumá*, , la mer, , *B.*, , *T.M.*,

, *iaourou*, le fleuve, , *T.*,

, *M.*, &c. Je lis donc  *Iaoud*, non *Ioud*, et

je pense que l'hiatus de l'*a* sur l'*ou* rend l'aspirée très-faible de  entre deux voyelles, de la même manière qu'il fait

dans la transcription *Iaoudaï* des textes assyriens.  *Iaoud* formerait ainsi la transition entre la forme pleine  de l'hébreu classique et la forme réduite *'Ioudás* des Grecs. Je conserverai, jusqu'à nouvel ordre, la lecture

*Iaoud-ha-malouk*, *Iehoud-ham-melek*, et l'identification avec

*Iehoud de Dan*, *el-Yâhoudiyéh*. Le No. 28 

*Adirou*, placé entre cette localité et *Makkédah*, doit donc avoir eu sa place marquée dans la plaine entre *el-Yâhoudiyéh*

et *Môghar*. *Blau* prétend y reconnaître une mauvaise inter-

prétation égyptienne de , car, dit-il, une ville de l'importance de *Lydda* ne saurait manquer à la liste de *Sheshonq*.†

\* Max Müller, *The supposed name of Judah in the list of Sheshonq*, dans les *Proceedings of the Society of Biblical Archaeology*, T. X, p. 81-83 à la suite de ce mémoire, on trouve (p. 83-86) des *Remarks* dans lesquelles M. Le Page Renouf approuve les conclusions de M. Max Müller.

† *Blau*, *Sisags Zug*, dans la *Z.d.d.M.*, T. XV, p. 231.

Brugsch avait fait observer très justement que  rend lettre pour lettre un dérivé de la racine **אָדָר**, *amplus fuit*, sans doute **אָדִיר**, *amplus, potens*.\* Ce nom *Addirou*, *Addir*, présente une consonnance si proche de celle de l'arabe **الدِير** *al-déir, ed-déir*, qu'il a dû se confondre avec l'un des nombreux *déir* qui figurent sur nos cartes modernes. Donnée la position qu'il occupe sur la liste, je suis tenté de le reconnaître dans le **خربة ديران** *Kharbét-Déirân* que la carte anglaise signale à quelque distance au nord d'el-Môghâr.

Le cartouche No. 30 est détruit à l'exception du signe  qui ne nous apprend rien. La série qui recommence au-delà, et qui est interrompue après le No. 40 par une longue lacune, nous offre vers la fin un nom (No. 38)  *Shaouka*, qui est écrit  *Saouka* sur la liste de Thoutmos III (No. 69): c'est la *Shokoh* de la plaine judéenne, aujourd'hui *Kharbét-Shouwèikéh*.† Les noms compris entre *Iaoud-ham-melek* et *Shaouka* doivent donc s'échelonner plus ou moins régulièrement entre *el-Yahoudiyéh* et *Kharbét-Shouwèikéh*. De plus le No. 35, qui est mutilé  se laisse rétablir avec certitude en

 *Iaouhama*, qui est le (No. 68)

 *Iouhamá, Iaouhmá*, des campagnes de Thoutmos III: or, *Iaouhama* est, comme l'a montré Saulcy,‡ *el-Khéiméh الخيمة*. Cette restitution nous permet de diviser la série en deux sections, une de quatre noms de *Iaoud-ham-melek* à *Iaouhama*, une de cinq de *Iaouhama* à *Shaouka* et au-delà. Les quatre noms qui composent la première section ne sont pas malheureusement d'une identification aisée. Le No. 31

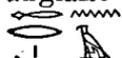
 *Haianim, Hianim* se présente à nous comme une forme plurielle **חַיִּים** d'un mot dérivé de la racine **חָפַן** *propitius fuit, favit alicui*; il est identique pour la signification au **בֵּית־חָפַן** de Dan ou Juda, et je suis disposé à le rapprocher du *Kharbét-Hannounâh خربة حنونة*, situé dans le

\* Brugsch, *Geogr. Ins.*, T. II, p. 62.

† Brugsch, *Geogr. Ins.*, T. II, p. 64.

‡ F. de Saulcy, *Lettre à M. Chabas*, dans les *Mélanges d'Archeologie Egyptienne*, T. I, p. 122-123.

collines à l'Est d'el-Yahoudiyéh,\* et auprès duquel la carte anglaise marque des ruines.† Le nom suivant (No. 32)



*Alana, Alouna* se transcrit en lettres hébraïques עֵלון, עֵלון, et, par conséquent, ne saurait être ni l'Elon אֵילון de Dan, ni Eglon עֵגְלוֹן, comme le voudraient Brugsch ‡ et Blau : § nous avons ici une localité portant le même nom

que la  de Thoutmos III, où j'ai reconnu une variante de l'hébreu עֵלִיִן, *superior, suprema, summus*. La nomenclature contemporaine nous donne plusieurs عَليْن Alin, dont l'ortographe s'accorde parfaitement avec celle de notre ville. La seule dont le site puisse à la rigueur nous convenir est celle que la carte anglaise appelle Kharbét Ouady Alin خربة وادي عليْن, et qui est au Nord de Shouwêikéh, près d'Ain Shems, où l'on place ordinairement la Beth-Shemesh de Juda : toutefois le saut serait trop grand entre Kharbét Hannounah et Kharbét Ouady Alin pour que j'ose rien affirmer à cet égard. Brugsch lit 

*Biloma* le numéro 33 et l'identifie à בִּלְעָם Bileam de Manasséh, malgré l'absence de ע dans la transcription égyptienne. || De fait Champollion, Rosellini et Lepsius donnent tous  *Biromam, Bilomam*, et c'est la leçon qu'on déchiffre encore sur la muraille. *Biroumim* ou *Biloumim*, est en effet le pluriel régulier d'un mot provenant, soit de la racine בָּלַם *constrinait, clausit*, soit de la racine בָּרַם *fremuit* :

בְּרוּמִים, qui marque le nom d'une sorte d'étoffe brodée, le reproduit lettre pour lettre. Je ne trouve malheureusement sur aucune carte, aucun nom moderne qui rappelle celui de *Biroumim* ou *Biloumim*.  (No. 34) *Zaidipoutir* ou *Zadipoudil* nous est connu au *Papyrus Anastasi* No. 1, sous

\* Guérin, *Samarie*, T. II, p. 74.

† Osburn (*Egypt, her Testimony*, p. 160) a rapproché Haianim de הַיָּנִים la vallée de Hinnom. Sans parler des difficultés topographiques que présente cette identification,  ne répond jamais au הָ hébraïque.

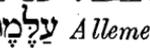
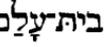
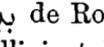
‡ Brugsch, *Geogr. Ins.*, T. II, p. 63.

§ Blau, *Sisags Zug*, dans la *Z.d.d.M.*, T. XV, p. 235.

|| Brugsch, *Geogr. Ins.*, T. II, p. 64.

la forme  *Zidipouti* ou *Zaidipouti*, avec chûte de  R, L, finale.\* Le nom est évidemment formé de deux mots. Le premier se rattache à la racine צור, *venari*, et d'après la vocalisation en ו de l'Égyptien, répond plus particulièrement à צד *venatio, fera venando capta, cibus, commeatus*: c'est la même origine que celle de la Sidon צידון des Phéniciens. Le second nom peut-être comparé à diverses racines, פדר d'où פדר *adeps*, פמר *fidit*, פתל *contorsit*, nevit פתר *interpretatus est somnium*, entre lesquelles je laisse au lecteur le soin de choisir ce qui lui conviendra le mieux. Ces noms composés s'abrègent de toute manière: si l'on admet que le second terme  *poutir* soit tombé, le premier  *Zaidi*, rappelle aussitôt le bourg de  Saïdoun, Sîdoun, qui est situé un peu au Sud de Tell-Djezer, et au Nord de Kheïmèh. Guérin y signale quelques débris qui lui font supposer en cet endroit l'existence "d'une antique bourgade, que l'histoire ne mentionne pas, et qui, à la différence de la grande ville de Sidon, son homonyme, est "demeurée toujours obscure et probablement sans importance."† L'emplacement de Saïdoun convient à la position que Zaidi-poutir occupe auprès de Iaonhamâ.

Brugsch lisait pour le No. 36  *Bit-âlemt*,

et proposait d'y reconnaître  *Alletmet*,  *Almôn* de Benjamin,‡ aujourd'hui 'Almît au N.E. de Jérusalem. La lecture et l'identification ont été acceptées par Rougé.§ Blau de son côté préfère transcrire  *Bêth-Olam*,|| et se déclare pour la Beit-alam  de Robinson.¶ Comme les copies de Champollion, de Rosellini et de Lepsius portent  *Bî-âlamim*, j'avais cru pouvoir re-

\* *Papyrus Anastasi I*, pl. xxii, l. 5; Chabas, *Voyage d'un Égyptien*, p. 199, a songé le premier à comparer le nom de la liste de Sheshonq à celui du Papyrus Anastasi. Il ne propose aucune identification.

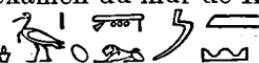
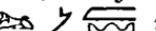
† Guérin, *La Judée*, T. II, p. 33.

‡ Brugsch, *Geogr. Ins.*, T. II, p. 64.

§ E. de Rougé, *Mémoire sur l'origine de l'alphabet phénicien*, p. 95.

|| Blau, *Sisaks Zug*, dans la *Z.d.d.M.*, T. XV, p. 238.

¶ Robinson, *Biblical Researches in Palestine*, T. II, p. 403; cfr. Guérin, *Judée*, T. II, p. 369.

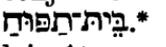
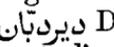
pousser les deux hypothèses.\* L'examen du mur de Karnak m'a montré qu'il fallait écrire  *Bitoumim* ou *Bitou-Roumim* avec un  et non pas un . † On ne peut songer à une lecture Bit-Toloumin ou Bit-Touroumim qui nous donnerait un nom équivalent soit à la Telem  ou  *Telaïm* de Juda, soit au Tolmah  *des cartes modernes.* ‡  est ici une variante de la finale , *ti, t* de  *Bit*, et indiquent une vocalisation en *o* analogue à celle que la prononciation *Bethogabra*, *Betogabris*, nous révèle. La seconde partie du nom  *roumam*, *loumam*, ou *roumim*, *oumim*, peut-être, soit un mot singulier comme  *elatio*, soit un pluriel,  *bubalus*, ou d'un dérivé de la racine  *altus* *fuit*. *Bit-roumim* est un nom correct, mais que je ne sais où placer sur le terrain.  (No. 37) *Qaqali*, *Qaqari*, est pour Blau § la  *Kéilah* de Juda, qu'on identifie avec la *Kharbét Kilâ* de l'Ouady *Souwéidéh*, à l'Est de *Beit-Djibrin*. Le rapprochement de *Qaqali*, *Qaqali* avec *Kéilah* me paraît être légitime, car la transcription *Kegila* de la Vulgate montre que le *y* avait dans ce nom la tendance au *g*; il pouvait être rendu par  $\Delta$  en Egyptien, comme le *y* de *Gaza* l'est par  $\Delta$ . Si l'on trouvait que le site de *Kéilah* est trop au Sud, on pourrait songer à un autre *Kharbét Kila*, que la carte anglaise signale à l'Ouest d'*Eshouâ*, et dont l'emplacement au Nord de *Shouwéikéh* et à l'Est de *Khéiméh* est en accord suffisant avec la position de *Qaqali* entre *Iaouhamâ* et *Shaouka*. Les deux noms qui succèdent à celui de *Shaouka* (No. 39)  *Bit-tioupou*, *Bit-Toupou*, et (No. 40)  *Abila*, ont déjà été signalés sur la liste de *Thoutmos III* avec l'orthographe (No. 98)  *Tioupounou*, *Tipounou* et (No. 99)  *Aoubilou*, dans le même ordre où les a rangés le scribe de *Sheshonq*. Le retranchement ou l'addition de  *Bith*

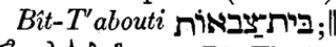
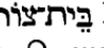
\* Maspero, dans la *Zeitschrift*, 1880, p. 46.

† Maspero, dans le *Recueil*, T. VII, p. 100.

‡ Guérin, *Judée*, T. I, p. 256.

§ Blau, *Sisacs Zug*, dans la *Z.d.d.M.*, T. XV, p. 238.

est un fait trop fréquent dans la nomenclature juive pour nous étonner ici, et la finale  *nou* se rencontre dans  *Loudni*, par exemple, pour *Loud*. J'ai rejeté déjà la conjecture de Brugsch, *Bit-Tipounou* = Beth-Tappouah, .\* Blau ne l'avait admise qu'après que Brugsch lui eût assuré avoir retrouvé sur la pierre l'équivalent du  final.† J'ai constaté que ce  n'existait pas réellement et que le mur portait    non    ou    et l'absence de cette lettre suffit pour rendre la comparaison impossible entre les deux noms. Le rapprochement avec *Téphôn*, *Topho* du premier livre des Maccabées IX, 50, n'est admissible qu'à la condition que cette Téphôn inconnue ne soit pas une forme grécisée de Beth-Tappouakh, Tappouakh.‡ Si le nom de  Déir Doubbân § pouvait être considéré comme provenant d'un caprice d'étymologie populaire, qui aurait substitué le mot  à un nom ancien, *Bit-Touyou*, *Touyou* pourrait avoir occupé le site que les fellahs appellent de la sorte. L'Abila du No. 40 a disparu.

La grande lacune qu'on remarque après Abila, ne compte pas moins de douze cartouches, dont deux seulement prêtent à restitution. Brugsch avait d'abord complété (No. 46)  en  *Bit-T'abouti* ;|| Blau songea ensuite à rétablir  *Bit-T'abiro* qu'il affirma être  Beth-Zour de Juda.¶ Toutefois, si l'on a parfois un  *oua* où l'hébreu met un  on n'a

\* Maspero, *Sur les noms de la liste de Thoutmos III qu'on peut rapporter à la Judée*, dans les *Transactions du Victoria Institute*, T. XXII, p. 167-68.

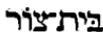
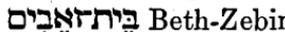
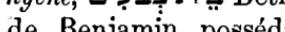
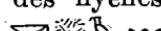
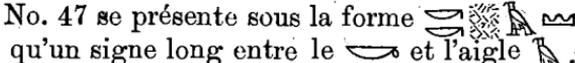
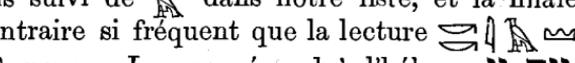
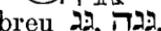
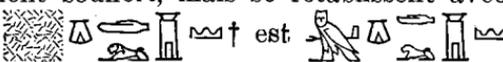
† Blau, *Sisags Zug*, dans la *Z.d.d.M.*, T. XV, p. 238. "Das schliessende *h'* nach Brugsch's mündlicher Mittheilung wirklich von ihm nachträglich auf dem Steine gefunden worden ist."

‡ *Macchabées* I, ix, 50. De même pour le nom de *Καφαρόφα* que Rufin paraît avoir lu dans Josèphe (*de Bello*, V, 4) au lieu de *Καφαρόβα* (Reland, *Palästina*, T. II, p. 692). Neubauer (*Géographie du Talmud*, p. 112) tend à y reconnaître Tappouakh, ce qui m'empêche de le rapprocher de notre *Bit-Touyou*.

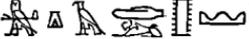
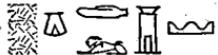
§ Robinson, *Biblical Researches*, T. II, p. 2-354, 421, qui incline à reconnaître en cet endroit le site de Gath-Rimmon; cfr. Guérin *Judée*, T. II, p. 104-6.

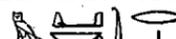
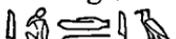
|| Brugsch, *Geogr. Ins.*, T. II, p. 65.

¶ Blau, *Sisags Zug*, dans la *Z.d.d.M.*, T. XV, p. 238-9. Au témoignage de Blau, Brugsch aurait adopté l'identification avec Beth-Zour.

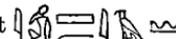
jamais un  pour un  hébreu, et  serait transcrit  non . Les copies de Champollion, de Rosellini et de Lepsius diffèrent légèrement de celle de Brugsch, et j'ai pu vérifier moi-même que le texte original porte .\* La seule restauration possible est celle d'un M diversement écrit et diversement vocalisé, soit  soit  *Bit-Zabima*. Le mot  *Zabim* est un pluriel régulier, pouvant venir soit de  *loup*,  *Beth-Zebim*, *la maison des loups*, soit même de  *hyène*,  *Beth-Zeboim*, *la maison des hyènes*: la tribu de Benjamin possédait de même une vallée des hyènes . Le No. 47 se présente sous la forme  où il ne manque qu'un signe long entre le  et l'aigle . En rétablissant  on aurait l'équivalent de  *stella*, mais cette restitution si séduisante qu'elle soit est invraisemblable; le  n'est jamais suivi de  dans notre liste, et la finale  y est au contraire si fréquent que la lecture  *Koka* s'impose à nous. Le nom répond à l'hébreu  *גְּכָה*, *tectum, superficies altaris* et s'appliquerait fort bien à un village situé en terrasse sur le sommet d'une colline. Je ne ferai aucune conjecture sur l'emplacement de ces deux localités; la lacune qui les enveloppe est trop grande pour qu'on puisse déterminer même la direction dans laquelle on doit les chercher. La liste reprend avec le No. 52 et continue, non sans mutilations, jusqu'au No. 58. Les deux derniers numéros 57 et 58 ont légèrement souffert, mais se rétablissent avec certitude: le No. 58  est 

\* Maspero, dans le *Recueil*, T. VII, p. 100.

† Champollion (*Monuments, Texte*, T. II, p. 116) porte , Rosellini (*M. St.*, pl. cxlviii), , Lepsius (*Denkm.*, III, bl. 252), Brugsch (*Geogr. Ins.*, T. II, pl. xxiv), . J'avais reconstitué de toutes ces copies la lecture  (*Zeitschrift*, 1880, p. 46); la muraille de Karnak porte  (Maspero, dans le *Recueil*, T. VII, p. 100), qui prouve que la restitution était exacte.

*Magdilou*, et le No. 59  *Iarza*.\* Les deux noms figuraient déjà sur les listes de Thoutmos III,  *Magdilou* (No. 71) et  (No. 60), et sont aujourd'hui el-Medjdel et Kharbét Ierzah. Il y a donc grand chance pour qu'une partie au moins des noms qui précèdent immédiatement ces deux-la aient appartenu à des localités voisins de Kharbét Ierzah et d'el-Medjdel. Le No. 56  *Adima* † a été identifié par Brugsch avec le pays d'Edom, ce à quoi Rougé ne répugne pas. ‡ Le rapprochement, irréprochable au point de vue philologique, tombe de lui-même quand on se rappelle que nos listes ne contiennent pas des noms de pays étendus, mais simplement la désignation d'accidents de terrain, de villes ou de villages.  *Adouma* doit donc indiquer ici un bourg qui s'appellent *אַדְמָה* la rouge ou *אַדְמָה* le champ, comme une des bourgades de la tribu de Naphtali, ou comme une des cinq villes maudites *אַדְמָה*. Le seul nom moderne qui puisse être mis à côté d'Adouma, est celui de Bêit-Timéh بیت طیمة, gros village situé à l'Est de Ierzah, et où Guérin signale l'existence de ruines romaines ou byzantines: § le site en conviendrait fort bien à la position relative des noms dans la liste et l'orthographe moderne peut à la rigueur se déduire de l'orthographe ancienne. Le No. 58  *Zaloumim*, est un pluriel du mot *זְלִימָה* *umbra*, mais ne peut être identique à la station *זְלִמוֹנָה* *Zalmonah* de l'itinéraire des Hébreux dans le désert, comme le voudrait Brugsch: || le voisinage de noms comme Migdol et Ierzah ne nous autorise pas à descendre si loin dans le sud, en cet endroit de notre liste. On ne trouve plus sur le terrain aucun nom qui rappelle celui de Zaloumim, mais le mot lui-même est expressif, et peut rappeler les ombrages des jardins qui

\* La restitution Ierza, que j'avais proposée en 1880 (*Zeitschrift*, 1880, p. 46), a été confirmée par l'examen du texte original (*Recueil*, T. VII, p. 100).

† Champollion, *Monuments, Texte*, T. II, p. 116) lisait  (cfr. *Zeitschrift*, 1880, p. 46) : la muraille porte réellement *Adima*, par un , comme Brugsch le disait (*Geogr. Ins.*, T. II, pl. xxiv).

‡ Brugsch, *Geogr. Ins.*, T. II, p. 66-67; E. de Rougé, *Memoire sur l'origine de l'alphabet phénicien*, p. 53.

§ Guérin, *Judée*, T. II, p. 127-128.

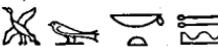
|| Brugsch, *Geogr. Ins.*, T. II, p. 67.

entourent el-Medjdel: un site comme celui du village de Hammâméh حممة conviendrait au peu que nous devinons de Zaloumim, Zelemim. Les trois numéros qui précèdent ne devaient pas être situé bien loin d'el-Medjdel. 

Noup-ïlou (No. 53) est composé de la finale  El, Dieu, et d'un dérivé de la racine  *agitavit*, ou  *eminentia*,  *ag.*

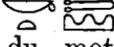
*locus, editus.* La ville de  Neballat, Beit-Nebâla, dans la tribu de Benjamin, que Blau reconnaît ici, ne répond à  Noup-ïlou, ni par l'orthographe ni par la position: \*

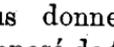
je ne vois d'ailleurs, entre Shouëikéh et el-Medjdel, aucun nom qui semble provenir du nom antique et se prête à lui être assimilé.  (No. 54) Dishati, Doushati, est malgré sa tournure exotique, un nom sémitique. C'est une forme féminine, dérivée de la racine  *terere*, *conterere, triturare frumentum*; mais cela dit, je ne vois aucun moyen de placer la ville sur le terrain. Le numéro 55 est non-seulement difficile à localiser, mais difficile à déchiffrer. Je le

lis comme Champollion . † Il renferme l'article masculin égyptien  *pa*, dont nous avons nombre

d'exemples dans  *Pa Hagala*, 

*Pa âmaqou*,  *pa nagabou*. Le signe suivant est bien le signe  *oirou*, le Grand, le chef, qui se rencontre

presque aussi souvent sans son  final qu'avec son  dans les textes hiéroglyphiques. 

transcrit en hébreu nous donne  pluriel du mot  *torcular*.

Osburn a proposé de traduire le tout par *Le prince des Gadites*, ‡ et en effet aucune raison philologique ne s'oppose à ce qu'on traduise comme lui les deux premiers mots; seulement le dernier ne désigne certainement pas les gens de Gad qui n'ont rien à voir en cet endroit. Il serait très agréable de traduire le chef de Gath en toute sécurité, mais il ne me

\* Blau, *Sisags Zug*, dans la *Z.d.d.M.*, T. XV, p. 240. Brugsch, après avoir reconnu l'étymologie réelle (*Geogr. Ins.*, T. II, p. 65), tendait à reconnaître dans Noup-ïlou un équivalent de  Pnuel, ce qui ne répond ni à l'orthographe du nom, ni la place qu'il occupe sur la liste de Sheshonq.

† Champollion, *Monuments, Texte*, T. II, p. 116.

‡ Osburn, *Egypt, her Testimony to the Truth*, p. 162.

semble pas que *Kitout* puisse être כִּתּוּת. Cette interprétation ne nous tire pas, comme on voit, de nos difficultés; elle a même l'inconvénient de soulever une objection très forte. Les chefs des pays vaincus ne figurent jamais dans les listes: le cartouche No. 54 de Sheshonq serait un cas unique dans l'archéologie égyptienne, s'il fallait le prendre pour ce que Osburn a vu en lui. Mon impression est donc que nous ne devons pas ici diviser le groupe: il faut le considérer comme formant un seul mot *Pouroukit*, *Paouroukit*, que le scribe s'est amusé à écrire avec des éléments donnant en Égyptien un sens qui n'a rien de commun avec la signification originale en hébreu. Il a transcrit la première syllabe *Pour*   *paourou* le chef, au lieu de   par exemple; il a choisi pour la seconde, *kit*, le terme  qui est une variante graphique de  || *kiti*, qui signifie *autre*, et le nom *Pouroukit*, s'est trouvé analysé en une phrase égyptienne plus ou moins correcte qui veut dire *l'autre chef*.     *Pouroukiti*, *Pouloukiti* est pour moi le mot פְּלֹגוֹת de פְּלֹגָה, פְּלָג rivus, en arabe فَلَاحٍ, فَلَاحٍ. Nous avons en effet dans le canton d'el-Medjdel un bourg de فالوجا Faloudja,\* el-Faloudjy † el-faloujy ‡ qui, pour le nom et la position, me paraît convenir à notre Pouloukiti.

Une nouvelle lacune de quatre cartouches interrompt de nouveau la série. Le numéro 64   ... *papen*, a été complété par Blau † en 'Aapen עֶפְנִי Ophni, Gophnah: la restitution ne tient pas compte de la syllabe médiale *pa*, et ne se défend pas, mais je ne sais, non plus que Brugsch, § comment rétablir le groupe. Par bonheur, le numéro 65 nous fournit une indication précieuse. Brugsch a reconnu que       *Aazama* ¶ répondait soit à l'Azem עֶזְמֹן de Juda, attribuée ensuite à Siméon, ¶ soit à עֶזְמוֹן

\* Guérin, *Judée*, T. II, p. 124.

† Robinson, *Biblical Researches in Palestine*, T. II, p. 421, T. III, *App.*, p. 209.

‡ Blau, *Sisags Zug*, dans la *Z.d.d.M.*, T. XI, p. 241.

§ Brugsch, *Geogr. Ins.*, T. II, p. 67.

¶ Brugsch, *Geogr. Ins.*, T. II, p. 68.

¶ Josué xv, 29; xix, 3.

l'Azmon, qui marque la limite méridionale du territoire juif.\* Son opinion fut rejetée par Blau, qui préfère Etham עִיִם,† mais Rougé‡ se prononça pour Azem, qui répond en effet plus exactement qu'Azmon à l'orthographe hiéroglyphique. L'identité des deux villes est certaine, mais la position d'Azem est tenue pour indéfinie par la plupart des auteurs qui se sont occupés de la Bible. La façon dont le texte de Sheshonq introduit Azama à peu de distance de Migdol-Gad (el-Medjedel) et d'Iourza (Kh. Ierzah), nous oblige à écarter les hypothèses de ceux d'entre eux qui placent Azem très loin vers le Sud, celle de Wilton, par exemple, qui ne veut reconnaître qu'une seule localité dans les noms Ijim et Azem du livre de Josué, et la met à el-Aujéh dans le territoire des Arabes Azâziméh. Il est probable que cette ville devait se trouver dans la partie la plus septentrionale de Siméon, entre le Ouady el-Hesî et le Ouadi esh-Sheriâh, plus près du premier que du second, puisque la liste égyptienne n'intercale que cinq cartouches entre Iourza et Azama. La place précise en est d'autant plus malaisée à déterminer que, pour rencontrer une ville dont l'emplacement ne prête sujet à aucun doute, nous devons descendre à plus de quarante cartouches plus bas, à l'Arad (No. 108) cananéenne. Là du moins nous nous retrouvons un moment sur un terrain solide: עֲרָד Arad est le Tell-Arad de nos cartes modernes.§ Si nous réfléchissons que notre liste consisté en plusieurs séries de noms représentant des sites peu éloignés l'un de l'autre, nous serons portés à croire que ces quarante et quelques cartouches, de valeur indéterminée pour l'instant, doivent être disséminés, de façon plus ou moins régulière, sur le pays qui s'étend des environs de Ierzah jusqu'à ceux d'Arad. La présence, dans les sections précédentes, de plusieurs localités sises assez près l'une de l'autre au Nord de l'Ouady el Hesy, me porte à penser que, les premiers au moins de ces quarante cartouches doivent être recherchés, soit sur le cours même de cet Ouady, soit dans le massif de collines qui longe sa rive méridionale. D'autre part, l'absence de noms tels que Gérar et Ber-Sheba semble prouver que l'aire géographique de la liste ne s'étend pas très loin vers le Sud. Le canton à explorer n'est donc pas aussi considérable qu'on serait tenté de le croire au premier

\* Nombres xxxiv, 4 ; Josué xv, 4.

† Blau, *Sisaks Zug*, dans la *Z.d.d.M.*, XV, p. 241.

‡ E. de Rougé, *Mémoire sur l'origine*, pp. 77, 95.

§ Brugsch, *Geogr. Ins.*, T. II, p. 70.

abord : malheureusement il est dans une partie encore imparfaitement connue, malgré les beaux travaux du *Palestine Exploration Fund*, et les cartes y laissent subsister des espaces presque entièrement vides de noms ou d'indications topographiques. Les identifications y ont donc un caractère d'incertitude plus grand encore que celui qu'elles présentent dans les régions étudiées précédemment.

A bien considérer les choses, les quarante et quelques cartouches sont loin de représenter autant de localités indépendantes. Beaucoup d'entre eux contiennent, comme l'a vu Brugsch, des noms communs qui servent à désigner des accidents de terrain. Ces mots, précédés quelquefois d'un article masculin  *pa* ou féminin  *ta*, forment la première partie d'un nom, dont la seconde partie est inscrite dans un autre cartouche, avec ou sans intervention de la préposition égyptienne  *n*. Le plus fréquemment employé de ces mots est, avec des orthographes diverses, 

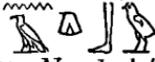
(No. 71) *Hougra*,  (No. 77) *Haqra*, 

(No. 94) *Hagri*, une fois même au pluriel ou au duel

 (No. 107) *Haqrîma*, *Haqraïma*. Brugsch

y a vu le mot arabe  *pietre*,\* et j'ai adopté son interprétation.† Elle soulève une objection des plus graves :

 est arabe, et nous sommes en pays hébreu. Le seul équivalent légitime du mot égyptien serait  *הגרין*, qui se trouve dans quelques passages géographiques du Talmud, et auquel on attribue le sens *enceinte*, *mur*, de la racine  *הגרה*.‡ On pourrait entendre ce mot de ces grandes enceintes de pierre, dont beaucoup subsistent encore dans l'Arabie Pétrée, et dont on a retrouvé plus d'un vestige dans les parties du pays où la liste de Sheshonq nous conduit.§ Le second mot

 *nagabou* est comparé par Brugsch soit au  *Negeb*, hébreu, soit au  *nakb*, ou passe des Arabes. La même objection qui a été

\* Brugsch, *Geschichte Ägyptens*, p. 661-662.

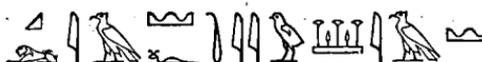
† Maspero, dans la *Zeitschrift*, 1880, p. 47.

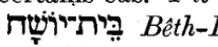
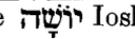
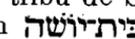
‡ H. Hildesheimer, *Beiträge zur Geographie Palästinas*, p. 67, sqq.

§ En voir une description très claire dans Palmer, *The Desert of the Exodus*, T. II, p. 320 sqq.

soulevée contre  vaut également contre , et c'est réellement  qui seul peut répondre au terme égyptien.

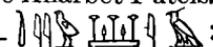
                

 Pa hagra-fit-iaousha.

Le nom présente une particularité assez curieuse.  y est pour  par substitution du , v. f. au   b : nous verrons plus loin que le  est transcrit  oua dans plusieurs mots. Ces variantes ne sont pas dues au caprice du scribe égyptien : je pense qu'elles nous révèlent un fait de phonétique nouveau. Il semblerait, d'après elles, que, dans l'hébreu des gens de Siméon, le  était affaibli en *v, f*, au moins dans certains cas. *Fit-iaousha* est donc la transcription exacte d'un  *Bêth-Ioshah*, dont le premier élément est légèrement défiguré par une prononciation *Vit, Fit*, pour *Bit*. Le terme joint à  *בֵּית* n'est pas, comme je l'avais cru,  *feu* : la coupe  *Fiti*  *aousha*\* que suppose cette identification n'est pas admissible dans notre liste, où  est toujours écrit sans  final. Je coupe  *Fit*  *Iousha*, et je prends *Iaousha* pour la transcription de  *Ioshah*. Ce nom désigne, dans le premier livre des Chroniques,† un des chefs Siméonites qui, au temps d'Ezéchias, émigrèrent à l'Orient de la ville de Guédor, cherchant des pâturages pour leurs troupeaux. Quelque soit la valeur du renseignement fourni par les Chroniques, il nous montre du moins que le nom de *Iaousha* était usité dans la tribu de Siméon, et confirme la légitimité de la transcription  *Bêth-Ioshah* que j'ai adoptée pour *Fit-Iaousha*. Pour retrouver dans la nomenclature actuelle un équivalent de cette localité, il convient de ne pas oublier que le phénomène dialectal saisi par l'oreille des contemporains de Sheshonq a dû se perpétuer chez toutes les populations qui se sont succédées dans ces parages : un nom, une fois pris dans une prononciation, passe avec cette prononciation aux générations différentes qui ont à s'en servir journellement. L'équivalent arabe du  initial doit donc être quelque chose d'analogue à l'Égyptien  *vit*, *fit*, soit *فيت* ou *فت*. Je trouve en effet, un peu au sud de l'Oued esh-Sheriah, un oued et une ruine que Guérin appelle *واد فتيس* Oued Ftis et *واد الفتيس* Kharbét Oued

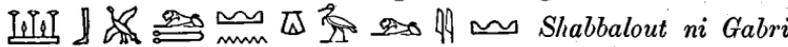
\* Maspero, dans la *Zeitschrift*, 1880, p. 47.

† 1 Chroniques iv, 35.

el-*Ā* *ās*,\* et que la carte anglaise orthographie Kharbét Futéis.  : *فتيس* renferme tous les éléments de *فتيس* = *פִּית*, et *פִּית* répond à *פִּית* par cette substitution du *ס* au *ש* qui est si fréquente dans la passage à l'arabe des noms hébreux. L'identification de Fit-Iaousha avec Kharbét Foutéis, Fatéis ou Ftis confirme l'opinion que j'exprimais plus haut au sujet d'Azamah, et m'encourage de plus en plus à chercher cette ville entre l'Ouady el-Hesy et l'Oued esh-Sheriah, à peu près sur une ligne menée de Kharbét Foutéis à el-Medjdel ou à Kharbét Ierzah.

C'est également dans le voisinage de Kharbét-Foutéis qu'il conviendrait de chercher les bourgs qui suivent, si les cartes n'étaient d'une pauvreté désespérante.  *Arouhaloul*, *Alou-haloul*, est un de ces noms ou Rougé voudrait rencontrer l'article arabe *ال* ; † j'ai déjà dit plus haut, ‡ combien il était difficile d'admettre dans notre liste la présence de formes arabes et je n'insiste pas. Je pense que nous avons ici un de ces noms *אֶל-הַלָּל* *El-halal*, où entrent et le mot *אל* dieu, et la racine *הלל* *luxit, splenduit*. Le site m'en est inconnu.

 (Nos. 71-72) *Pa hougra abilama* contient un pluriel *אֶבְלִים* de *אֶבֶל* *pré, prairie* : le tout se traduirait l'*Enceinte des prés*, et désigne un site inconnu.

 (Nos. 73-74) signifie littéralement *le fleuve du Héros*, car *Gabri* est la transcription exacte de *גַּבְרִי* *vir, miles*. Blau avait identifié le second cartouche à Betogabris, qui est aujourd'hui Beit-Djibrin, § et je m'étais rangé à son avis, || mais Beit-Djibrin est trop éloignée du pays où le voisinage de Kharbét Foutéis nous oblige à rester, pour qu'il soit permis de persister dans cette opinion. J'avais songé un moment à Azion-Gaber *עֲצִיּוֹן גַּבְרִי*, mais cette ville est trop

\* Guérin, *Judée*, T. II, p. 287.

† E. de Rougé, *Mémoire sur l'origine*, p. 90

‡ Voir plus haut, p. 18-19.

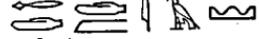
§ Blau, *Sisaks Zug*, dans la *Z.d.d.M.*, T. XV, p. 23. Il lisait le nom *Ngbarij*, "wobei das n, entweder bloss lautlicher Vorschlag ist, oder graphisch richtiger am Ende der Cartouche zu stellen sein wird."

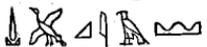
|| Maspero, dans la *Zeitschrift*, 1880, p. 47.

loin vers le Sud. Je chercherai plutôt, notre bougade de Gabri et son fleuve dans le voisinage d'el Gabra الجبرى, un peu à l'Est d'Oumm er-Roumanin. El-Djabri est en effet l'équivalent arabe de l'hébreu גַבְרִי. *Le torrent du Héros* est suivi du *Torrent des Bénédctions* (Nos. 75-76) 

 *Shabbalout - Ouarakit* où l'hébreu בְּרָכָה, בְּרִיכָה, pluriel בְּרִיכוֹת, a son ב transcrit  *Oua*, selon la prononciation dialectale que j'ai indiquée plus haut.\* Cette localité est certainement différente de la Vallée de Bénédiction עַמְק בְּרָכָה des Chroniques,† mais le site en est incertain.

 *Pa haqra n - Azai* (Nos. 77-78) renferme le  *n* de liaison que nous avons déjà eu dans *Shabbalout ni-gabri*; le déterminatif de la flamme  tient au sens du mot égyptien et non à celui du mot sémitique :

 *azai*, se rattache soit à עֵז *capra*, soit à עֵז, עֵזוּ, *robur, potentia, fortitudo*. Site inconnu. 

(No. 79) *Adidima* selon la copie de Brugsch,‡ peut se rattacher à la racine עֲדָה *induit ornatum, ornavit se* : ce serait alors une forme analogue à celle de אֲדִיתַיִם *Aditaim* (duplex ornatum) qui désigne une ville de Juda. Je n'en vois pas le site. 

*Zapaqa* (No. 80) est la transcription qu'on admet depuis que Brugsch l'a proposée, bien qu'elle ne présente aucun rapport avec aucune racine connue de l'hébreu. Peut-être serait-il permis de diviser le mot en deux : la première partie serait un dérivé de la racine צָפָה *speculatus est, prospectavit*, et la seconde rendrait גֵּינָה *vallis*, mais tout cela est trop incertain pour que je m'y arrête. Les deux noms qui suivent sont mutilés sans ressource, mais le No. 83

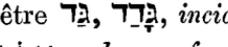
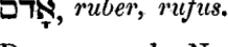
 *Ganat* nous rend un terme connu גַּנָּה *hortus*; c'est peut-être le Kharbét Jenneta خربة جنتا, qui est situé à quelque distance au Sud-Ouest d'el-Daouaïmèh. En ce cas les localités intermédiaires entre Shoubbalout ni-Gabri et Ganat devraient être cherchées, partie dans la vallée de

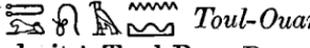
\* Voir plus haut, p. 20.

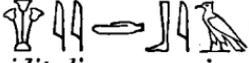
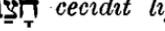
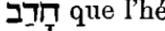
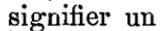
† 2 Chroniques xx, 26, *cf.* dans Joséphe, *Arch.*, ix, 1, 3.

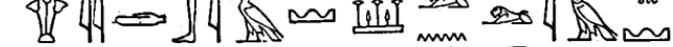
‡ Brugsch, *Geogr. Ins.*, T. II, pl. xxiv, No. 79.



plus loin les Enceintes d'Arad et la ville d'Arad (Nos. 108-111). Entre ces deux endroits ou à côté d'eux on rencontrait (No. 96)  *Alagad, Alougad*, et (No. 97)  *Adimaïm*. Le premier nom renferme peut-être ; le second se rattache à . Tous ces endroits étaient assez près de Doura, car le No. 100 est  Adora le Grand, qui est identique à Adoraïm et à Dourah.\*

(Nos. 101-102)  l'Enceinte de Toul-Zan; Brugsch lit  *Toul-Ouan*, qui, avec le  *oua* pour , équivaldrait à Toul-Ban, Ban étant peut-être  *filius*.† Le signe douteux a entièrement disparu aujourd'hui, comme j'ai eu l'occasion de le constater à Karnak : il n'est donc plus possible de savoir quelle était la véritable lecture.

(No. 103)  *Haideba* vient de la racine  *cecidit lignum*, qui sous la forme  signifie *cecidit, excidit lapides* : l'orthographe égyptienne suppose une variante  que l'hébreu n'a pas conservée. *Haideba*  pourrait signifier un endroit où on taille la pierre, une carrière ; comme ce mot revient plus bas (No. 105), on doit peut-être y reconnaître un nom commun comme 

*nagabou*,  *Hagara*, qu'il faut réunir au cartouche suivant.  *sic*

(Nos. 103-104) *Haideba Sharounram* et  (Nos. 105-106) *Haideba Diouati* seraient alors les carrières de Sharounram et de Diouati. Le premier nom Sharounram semble de prime abord être étranger aux langues sémitiques ; mais la combinaison 

\* Maspero, *Sur les noms de la liste de Thoutmos III qu'on peut rapporter à la Judée*, dans le *Victoria Institute*, T. XII, p. 63-65.

† Brugsch, *Geogr. Ins.*, T. II, pl. xxiv, No. 102.

nr de l'Égyptien n'a, au moins dans les transcriptions de noms étrangers, d'autre valeur que celle d'une *r* ou d'une *l* prononcée fortement. *Sharounram* est donc un dérivé soit de la racine שָׁלַל *traxit, extraxit, spoliavit*, soit de la racine שָׁרַר *torsit, firmus, durus fuit, oppressit*. La terminaison  pourrait répondre à יים du pluriel; mais cette flexion est écrite presque toujours dans notre liste avec une voyelle finale  *má*, et sans . Je pense plutôt qu'il y a ici une faute de graveur et qu'on doit lire  au lieu de  on aurait alors à faire à un nom שָׁרַר, שָׁלַל.   
*Diouati*, dérive de la racine דָּוָד *amavit*, d'où le nom du roi David, ou de la racine דָּוָה *languit, cærotus fuit*. Aucune de ces localités n'a laissé de traces reconnaissables aujourd'hui.

On s'étonnera peut-être de me voir indiquer avec autant de minutie les racines hébraïques auxquelles il me semble que répondent le nom de notre liste. Ce n'est point affectation de recherche philologique: c'est, je crois, une précaution indispensable dans le genre hasardeux d'étude auquel j'ai été obligé de me livrer. On n'est que trop porté à supposer une erreur de copiste, une faute du scribe qui a compilé la liste, et à intervertir l'ordre des lettres pour obtenir un rapprochement avec un nom connu ancien ou moderne. En montrant que les lettres égyptiennes transcrites en lettres hébraïques nous donnent des formes régulières ou possibles en hébreu, je m'évite à moi-même, et j'évite peut-être aux savants qui traiteront après moi ce sujet, la tentation d'attribuer à une erreur de scribe la présence de tant de noms inconnus, et la faute de modifier ces noms par interversion ou par substitution d'une articulation à une autre articulation. Si nos transcriptions en lettres hébraïques nous donnent des mots réguliers, c'est que les scribes égyptiens ont reproduit aussi exactement que leur alphabet le leur permettait les sons qu'ils entendaient en Judée: nous n'avons donc pas le droit de rien changer à leur transcription.

Les Nos. 108-110 nous fournissent la première identification absolument certaine que nous ayons dans cette partie

de la liste:  *Haqaraim*

*Arada*, les deux enceintes d'Arad et 

 *Rabbit Aradai* רַבֵּית עֵרָד. Les deux enceintes

d'Arad étaient dans le voisinage de la ville d'Arad, et peut-être une exploration du pays plus complète nous en ferait-elle aujourd'hui encore découvrir les traces. J'ai à peine besoin de rappeler \* que Rabbat Arad est  Arad de la Bible aujourd'hui Tell Arad . (No. 112)  *Iaourahma* me paraît être identique au  Ierahméel, de la tribu de Juda, dont le Négeb fut pillé par David.  manque à la fin du nom égyptien, mais il manque aussi à la fin du nom arabe Ouady Rahaiméh  *ואד רחיים*, qui a succédé au nom hébreu: la chute du nom divin, qui a permis aux Arabes de transcrire comme ils l'ont fait, est sans doute un fait primitif, puisqu'on trouve dans la liste de Sheshonq  *Iaourahma*. Le No. 111  *Nebatout*, placé entre Rabbat-Arad et Iaourahma, doit être cherché entre Tell Arad et l'Oued-Rahaiméh, mais aucun des noms connus aujourd'hui ne lui ressemble assez pour qu'on ait lieu de l'identifier. *Nabatout* paraît être un pluriel  d'un mot féminin  *נבטות*, qui serait dérivé de la racine  *נָבַט* *conspexit, vidit*.

Trois cartouches ont disparu entièrement derrière *Nabatout*. Le No. 116  *Ari m.*, est trop mutilé pour rien donner. Le No. 117  *Adorashirau*, Adora le petit, par apposition à l'Adora le Grand du No. 86 nous ramène au nord de Ierahméel et d'Arad, probablement dans la partie de la montagne de Juda qui s'étend au Sud d'Hébron, mais sans que j'aie la prétention d'en déterminer exactement le site. Le No. 118, lu par Brugsch  *Pabia*, † mais dont le premier signe est laissé indécis par Champollion, m'a paru être plutôt  *Zabia*: rien n'est plus facile en effet que de confondre un  endommagé avec un . Cette lecture est d'autant plus vraisemblable qu'il n'y a plus de racine  *פב*, mais plusieurs

\* Brugsch, qui a le premier reconnu Arad, en a séparé le cartouche  qu'il lit *Lebat*, et identifie à  *בֵּית לְבָאוֹת* Bêt-Lebaoth de Siméon (Brugsch, *Geogr. Ins.*, T. II, p. 69-70).

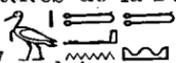
† Brugsch, *Geogr. Ins.*, T. II, pl. xxiv, No. 118.

racines **צָבָה** *prodiit, processit miles in bellum*, d'où **צָבָה** *exercitus*, **צָבָה** *prodiit stella*, etc. : *Zabia* serait la transcription exacte du nom **צָבִיָּה** *dorcas femina*, donné aux femmes **צָבִיָּה**, **צָבִיָּה**, et qui serait appliquée ici à une localité. Le No. 119 est lu par Champollion  *Rahouga*, *Lahouga*, par Brugsch  *Mâhouga*. Comme les racines **רָחַק** *longe discessit*, **לָחַד** *linxit*, **מָחַק** *percussit*, sont là pour appuyer celle des lectures qu'on préférera, l'étude seule de la muraille permettrait de décider entre Champollion et Brugsch. Elle est tellement endommagée aujourd'hui que je n'y ai pu rien reconnaître : peut-être un autre sera-t-il plus heureux. Le No. 120 est évidemment

 *Ouariouk* avec  *oua* pour **ב**, comme plus haut, soit un nouveau nom dérivé de la racine **בָּרַד**, peut-être le *Kharbét Barouk* **خربة باروك**, de Guérin.

(No. 121)  *Fir-timda*, renferme, comme plus haut  *Fir*,\* une forme dialectale *Fir* pour **בְּיָר**, **בְּיָר** *le puits* : le nom serait **בְּיָר דִּמְעָה** *Ber-Dimeah*, le puits de la larme,  ayant souvent en Égyptien la valeur du **ד** vocalisée en *i* et  équivalant à **מֵע**. Les noms commençant par *Bir* sont fréquents aujourd'hui dans la région déserte qui s'étend entre Hébron et la Mer Morte, mais aucun d'eux ne rappelle notre *Ber-Diméah*. (No. 122)

 *Abilou* est une **אָבִיל** inconnue, situé dans cette région du désert de Juda. (No. 123) 

*Biar-Rouza*, *Biar-Louza*, est **בְּיָר לֹוזָה** *Ber-Louz*, *Ber-Louzah*, le puits de l'amandier avec l'orthographe ordinaire par **B**  et non plus par **V**, **F** . Ce *puits de l'amandier* n'a rien de commun avec les deux *Louz* de la Bible, dont l'une était le *Bethel* de Benjamin, et dont l'autre appartenait aux Hittites de la Palestine Septentrionale. Le nom suivant est  *Bit-Anati*, que j'identifierai comme Brugsch † avec la **בֵּית עֲנֹת** *Bethanoth*

\* Guérin, *Judée*, T. III, p. 164.

† Brugsch, *Geogr. Ins.*, T. II, p. 70.

de Juda, aujourd'hui Bêt Anoun **خربة بيت عنون**. Ber-Louzah devait se trouver quelque part au S.E. de ce site, sur le versant des montagnes qui descend à la Mer Morte.

Bit-Anat est le dernier nom de la liste qu'on puisse placer sur la carte de manière certaine. Au-dela, il ne subsiste plus que deux cartouches intacts, et les débris plus ou moins lisibles d'une demi-douzaine de cartouches. (No. 125)

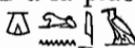


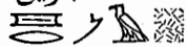
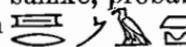
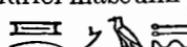
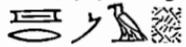
*Shalhatou*, se rattache à la racine **שָׁלַח**, *misit*,

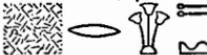
d'où vient le nom **שָׁלַח**, **שָׁלַח** de la piscine de Siloéh. Le groupe  qui termine le mot est le pluriel *toou* du mot  *to*, terre, et ne peut guères être employé ici, dans la transcription d'un nom étranger que pour rendre la syllabe *tou*, *toou* :

comme  *Shalaha* nous fournit déjà les trois lettres de la racine **שָׁלַח**, la finale *tou* est une flexion grammaticale et l'équivalent du              

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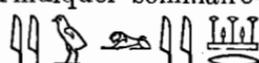
Robinson,\* ce qui conviendrait assez à la place qu'Alamâten occupe dans notre liste. (No. 127)  *Galouna*, *Garouna* n'est certainement pas, comme Brugsch le pense † la גֹּלָן *Gôlan* de Manassé, qui est trop éloignée du pays où la liste nous oblige à nous maintenir. Il me semble que nous avons ici une transcription exacte du mot גֵּרְנָה, גֵּרְן, *area*: je ne trouve sur la carte aucun endroit nommé جرن

*Djarn* ou جرين *Djarin*, qui serait la forme arabe du nom antique.  (No. 123) *Alama* . . . , *Arama* . . . , renfermant les trois lettres d'une racine אלם, ne peut se compléter que par un suffixe, probablement celui du pluriel, soit le pluriel masculin  *Alamam*, soit le pluriel féminin  *Amat*. Il m'est impossible de dire celui qu'on doit préférer ici, car אֱלָמָה *merges, manipulus, frugum*, qui est le prototype de  *Alama*, a les deux pluriels אֱלָמִים et אֱלָמוֹת.

Le nom suivant que Brugsch donne ainsi  . . . *lahat* ou . . .

*rahat* (No. 129), paraît avoir été , soit אֲרַחֲוֹת, pluriel de אֲרַחַ, *via, semita*: je ne sais où cette localité était située. Les numéros  . . .

*la* (No. 130)  *Má* . . . (No. 131),  *El* . . . (No. 132) ne sont susceptibles d'aucune interprétation.

Le dernier  (No. 133) *Iaoura* . . . prête à une hypothèse que je me contente d'indiquer sommairement, après Blau. Si on le complétait 

 *Iaourishalama*, on aurait ici יְרוּשָׁלַם *Jérusalem*, qu'on s'étonne à bon droit de ne pas rencontrer parmi les villes prises par Sheshonq.

Tel est le résultat de cette étude. Les lacunes dont la liste est criblée ne me permettent pas d'affirmer d'une manière certaine que les villes importantes de Juda ou de la Philistie dont les noms n'ont pas été mentionnés, Ascalon,

\* Robinson, *Biblical Researches*, T. II, p. 270.

† Brugsch, *Geogr. Inschriften*, T. II, p. 70.

Ashdod, Gath, Gézer, Hébron, Jéricho, etc., n'y figuraient pas effectivement. Les listes de Thoutmos III, qui sont intactes, présentent tant d'omissions de ce genre que je suis tout prêt à croire, pour mon compte, qu'elles manquaient réellement à celle de Sheshonq, et que les cartouches aujourd'hui détruits ne devaient contenir à l'origine pour la plupart que des noms de localités insignifiantes, aussi obscures que celles dont le souvenir nous a été conservé. Sheshonq avait une surface déterminée de muraille à couvrir, et voulait pour cela un nombre déterminé de noms : les bulletins de son armée et les rapports des prisonniers ou des alliés lui fournirent le nombre dont il avait besoin. On dirait que les scribes ont moins eu l'intention d'énumérer les principales villes de leur nouvelle conquête que d'en fixer le contour : les localités qu'ils choisirent forment autour de Jérusalem et du massif de Juda une sorte de cercle, qui semble suivre assez exactement la frontière du royaume. Beaucoup d'entre elles sont complètement inconnues, d'autres ne sont identifiées que sous toutes réserves avec des noms hébraïques ou arabes, le plus petit nombre est placé sur la carte de façon indubitable. Mon travail n'est ici que provisoire ; j'espère le reprendre plus tard, ou, si je ne puis, d'autres le reprendront et le pousseront plus avant.

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The following paper was read by Mr. T. G. Pinches, of the Oriental Department of the British Museum, the author being unavoidably absent.

### THE LIST OF SHESHONQ AT KARNAK.

BY G. MASPERO.

*Translated by Henry George Tomkins.*

THE list which Sheshonq I, caused to be sculptured of the towns that he had taken, or professed to have taken, during his campaign against Rehoboam, has often been studied by Egyptologists. Champollion the younger\* and Osburn† extracted all that was possible at a period when neither the structure of hieroglyphic writing nor the geography of Palestine was well known. Brugsch has since given a complete analysis‡ which has enabled Blau to propose a more serious explanation than any which had hitherto been made.§ The commentary of Blau, modified by

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\* Champollion, *Lettres écrites d'Égypte*, p. 99-100, *Grammaire Égyptienne*, p. 160, and *Monuments, Texte*, T. II, p. 114.

† Osburn, *Egypt, her Testimony to the Truth*, p. 158-162.

‡ Brugsch, *Geogr. Ins.*, T. II, p. 114.

§ Blau, *Sisags Zug gegen Juda aus dem Denkmale bei Karnak erläutert*, in the *Zeitschrift der deutschen Morgenländischen Gesellschaft*, T. XV, p. 233 sqq.

Brugsch in the second edition of his "History of Egypt,"\* has since remained almost classic in the science, and most of the identifications which he had reached have been admitted without discussion by archæologists and geographers.† A first examination, made in 1880, shewed me, however, that Blau had taken too great liberties with the outward form of the names, and had obtained many of his approximations only at the price of inversions and alterations too numerous to be permissible: I have since endeavoured to prove that the Egyptian letters, transcribed rigorously in Hebrew letters, give almost everywhere the regular Hebrew forms, and therefore need neither changes nor corrections.‡ I desire, in the present paper, to collect, after nearly ten years of fresh research, the partial results at which I have arrived, and to submit them, with due reserve, to the criticism of my brethren in Egyptology. I have ascertained the text by comparison of all the copies published since the beginning of the century, and by collation of Champollion's copy with what still remains of the original on the wall at Karnak.§

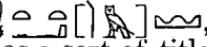
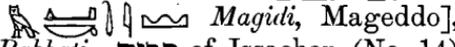
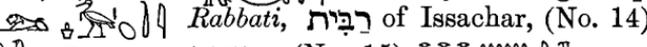
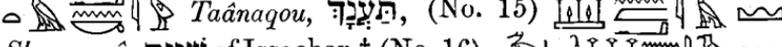
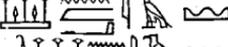
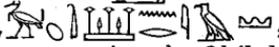
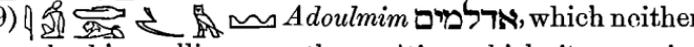
The first ten cartouches were filled by the general forms which we meet with at the starting of most geographical lists. Although a certain number of them are quite destroyed, we may restore them with certainty: (No. 1)  *To-qimâiti*, the country of the south, (No. 2)  *To-mihiti*, the country of the North, (No. 3)  the tribes situated between the Nile and the Red Sea, from the latitude of Assouan to that of Siout, (No. 4)  the *Tahonou*, the Berber tribes beyond the Oasis of the Thebaïd, corresponding to the *Aniou* of the last cartouche, (No. 5)  the Bédouins who live between the Nile and the Red Sea, from the latitude of Siout to the neighbourhood of the Ouady Toumilât, (No. 6)  the Berber tribes who occupy the Oases to the west of the Birket Kéroun, parallel to the Pittiou Bédouins, (No. 7)  the *Montiou*, the

\* Brugsch, *Geschichte Egyptens*, p. 660-663.

† It is from Blau's Memoir that Mariette has borrowed that strange hypothesis of Egyptian army-corps manœuvring as modern army-corps do (*Les Listes des Pylones de Karnak*, p. 46-48).

‡ Maspero, *Notes sur différents Points de Grammaire et d'Histoire*, in the *Zeitschrift*, 1880, p. 44-49.

§ Maspero, *Révision des Listes géographiques de Thoutmos III*, p. 100-101.

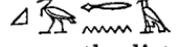
Bédouins of Arabia Petræa between Egypt and Syria], (No. 8) the , *Paditiou*, nomads of Syria between the Montiou and the frontiers of Naharanna,\* lastly the (No. 9)  *Haiounivou* of Asia Minor and the Isles of the Mediterranean. The last cartouche (No. 10)  is the only one which I cannot recollect to have met with elsewhere. Perhaps it should be restored , *copy of the Asiatics*, considering these words as a sort of title applying to the whole of the following names: this is, however, a mere conjecture. The thirteen cartouches which come next present no greater difficulties of interpretation. I content myself with enumerating them with the restorations which I thought right to add in 1880, and in which I see at present nothing to change. (No. 11)  *Gazatou*, Gaza, [No. 12  *Magidi*, Mageddo], (No. 13)  *Rabbati*, רבית of Issachar, (No. 14)  *Taánaqou*, תענקה, (No. 15)  *Shaunamá*, שונים of Issachar, † (No. 16)  *Bit-Shaïnla*, *Bit-Sháilla*, where I seem to recognize the Shiloh שילה of Ephraïm, ‡ (No. 17)  *Rouhaïba* רחב, now Rehab, § to the south of Beïsan, (No. 18)  *Hapourama*, חפורים of Issachar, (No. 19)  *Adoulmim* אדלמים, which neither the hieroglyphic spelling, nor the position which it occupies in the list, permit us to identify with the Adullam אדולם of Judah. No. 20, which is entirely mutilated, perhaps contained the name of Sichein, one of the capitals of Israel under Jeroboam I. No. 21  *Shaouadi*, is doubtless *Souéda*, (Kharbét es-Suweidéh of the English map),

\* On these peoples see J. de Rougé, *Textes géographiques du Temple d'Edfou* (*H<sup>te</sup>. Égypte*), taken from the *Révue Archéologique*, 1865, p. 12-16.

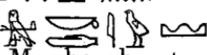
† The identification was proposed for the first time by Osburn, *Egypt*, p. 158.

‡ *Sur les Noms géographiques de la Liste de Thoutmés III qu'on peut rapporter à la Judée*, in the *Transactions of the Victoria Institute*, Vol. XXII, p. 69-70.

§ *Cfr.* Eusebius, *Onomasticon*: καὶ ἐστὶ Ῥωδὸβ κάμῃ ἀπὸ σημείου Σκυθοπόλεως, ἣν δὲ Λευίταις ἀφωρισμένη (edit. Parthey, p. 316).

a little way from the right bank of the Jordan.\* The following numbers represent  Mahanaïm מְחַנַּיִם beyond Jordan,† and  Gibeon גִּבְעוֹן of Benjamin.‡ The presence on the list of towns belonging to Jeroboam does not prove that the Egyptian armies had penetrated into Galilee or passed the Jordan. The king of Israel, in imploring the aid of Sheshonq against his rival, had thereby made himself vassal to Egypt: this would suffice to make his towns figure at Karnak among the cities subjected in the course of the campaign.

To determine the site of the places which occur beyond Gabaon, I have used the process which has already availed me with regard to the lists of Thoutmos III: I have divided the list in sections, each comprised between two towns already known, and whose position in the land has been indicated, if not surely at least probably, by recent explorers. From Gabaon to the vacant place of No. 30, the Egyptian scribe has followed the line of places or fortified posts which covered the northern frontier of the kingdom of Judah.

(No. 24)  Bit-haouaroun is the Beth-horon בֵּית-הַחֲרוֹן of Ephraim,§ (No. 26)  Aiaouloun, the Aialon אֵיָלוֹן of Dan,|| (No. 27)  Mákidau, מִקְדָּה, ¶ that is Bêt-Our, Yalo, and Magharah, مغارة

\* The determinative  is still very visible in the original, and completes the word (Maspero, *Recueil*, T. VII, p. 100). Blau (*op. l.*, p. 237)

restores  which he identifies with عرق السودان,

Arak es-Soudan, or السويدان es-Souëidan of Robinson (*Palestine*, III, p. 867, II, p. 657).

† Champollion, *Grammaire Égyptienne*, p. 160, *Monuments, Texte*, T. II, p. 114; Rosellini, *Mon. St.*, T. IV, p. 157.

‡ Brugsch, *Geogr. Ins.*, T. II, p. 61.

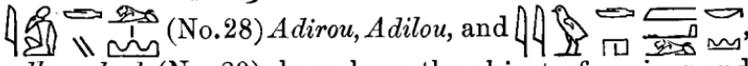
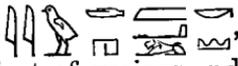
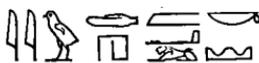
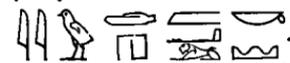
§ Champollion, *Grammaire*, p. 160, *Monuments, Texte*, T. II, p. 114; Rosellini, *Mon. Stor.*, T. IV, p. 157.

|| Champollion, *Monuments, Texte*, T. II, p. 114; Brugsch, *G. Ins.*, T. II, p. 62.

¶ Champollion (*Mon.*, *Texte*, T. II, p. 114, and *Grammaire*, p. 160), Rosellini (*Mon. St.*, T. IV, p. 157-158), Osburn, *Egypt, Her Testimony to the Truth*, p. 160), Brugsch (*G. Ins.*, T. II, p. 62), E. de Rougé (*Mémoire sur l'Origine*, p. 53), have wished to recognize Mageddo here; Blau (*op. l.*, p. 237-238) has remarked that Mageddo would be here out of its place, and has proposed Makkedah, which I have accepted (*Zeitschrift*, 1880, p. 45).



Suliemân, and about the place where it crosses the way to Jerusalem; the English map shews in this place a Kharbèt Bêt-Nashef خربة بيت ناشف, which may be *Qadoutim*, *Qadoudim*.

 (No. 28) *Adirou*, *Adilou*, and , *Iaoudhamalouk* (No. 29), have been the object of various and contradictory hypotheses. As the direction in which we may meet with *Adirou* depends on that in which we may find *Iaoudhamalouk*, I have already troubled myself about this latter name. Champollion has seen in it the symbol of the kingdom of Judah,\* Rosellini that of the king of Judah.† E. de Rougé persisted to the end in holding the opinion of the first Egyptologists as probable, if not certain.‡ Brugsch, on the other hand, thought that we have here a mere village whose modern representative would be a *Yahoudiyéh*, *el-Yahoudiyéh*, either that in the neighbourhood of Tibnîn, or that in the neighbourhood of Jaffa.§ Blau held to the opinion of Brugsch, and added that our locality, being situated in the neighbourhood of *Makkédah*, must be identical with the ידד *Iehoud* of Dan, that is to say with *el-Yehoudiéh* near Jaffa:¶ *Iaoudhamalouk* would be the full form; *Iehoud* an abridged form. Of late M. Max Müller has undertaken to show that the Egyptian  does not contain the name of Judah: we ought, says he, to find in the Egyptian the first ה of יהודה and to have  in place of . He thinks that the initial element of the name is יד, “the hand,” and that the whole corresponds to יד-המלך *Iad-hammelek*: the town *Idhammelek*

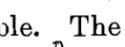
\* Champollion, *Lettres écrites d'Égypte*, p. 90.

† Rosellini, after having adopted the opinion of Champollion (*Mon. Stor.*, T. II, p. 79–80), was induced by philological scruples to modify it, and to see in the name of our locality the mention of the king of Judah (*Mon. Stor.*, T. IV, p. 158–159).

‡ E. de Rougé, *Mémoire sur l'Origine égyptienne de l'Alphabet phénicien*, p. 53, *Leçons de M. de Rougé* in the *Mélanges*, T. II, p. 274, note 9. M. de Rougé, or M. Robiou, who has published the *Leçons*, attributes to Champollion the translation of Rosellini and returns to the sense of *kingdom*, which is precisely that which Champollion had proposed.

§ Brugsch, *Geogr. Ins.*, T. II, p. 62–63.

¶ Blau, *Sisags Zug*, in the *Z.d.d.M.*, T. XV, p. 238.

would have no longer anything in common with Iehoud of Dan.\* In spite of the very high esteem which I have for Herr Max Müller (of Nüremberg), and although Mr. Le Page Renouf has lent him the support of his authority, I do not think the objection he has raised against the reading of Brugsch is insurmountable. The word  contains a troublesome element, the *ou*  which follows the two feathers , and which has no business there if we allow the reading : so MM. Müller and le Page Renouf have tried to get quit of it by explaining that we need not take it into account. I think on the contrary that we must never neglect it, neither in this case nor in other cases where it occurs. The sign  in the beginning of a word appears to have always an *a* for its inherent vowel, and this *a* with diphthongal *ou*, which is sometimes expressed, sometimes suppressed, in writing, has given in Coptic sometimes  $\alpha$  or  $\epsilon$ , sometimes  $o$ ,  $\omega$ : , , *iaoumä*, , the sea,  *B.*,  *T.M.*, , , *iaourou*, the river,  *T.*,  *M.*, &c. I read then  *Iaoud*, not *Ioud*, and I think that the hiatus between the *a* and *ou* renders the very weak aspirate of  between two vowels, in the same manner that it does in the transcription *Iaoudai* in Assyrian texts.  *Iaoud* will thus form the transition between the full form of the classic Hebrew  and the reduced form *Ioudás* of the Greeks. I will retain, till further intelligence, the reading *Iaoud-ha-malouk*, *Iehoud-ham-melek*, and the identification with *Iehoud* of Dan, *el-Yâhoudiyéh*. No. 28  *Adirou*, placed between this locality and *Makkédah*, ought then to have its place marked in the plain between *el-Yâhoudiyéh* and *Môghar*. Blau professes to recognize in it a bad Egyptian version of , for, says he, a town so important as *Lydda* would not be missing in the list of *Sheshonq*.† *Brugsch* has very justly remarked that 

\* Max Müller, *The supposed name of Judah in the list of Sheshonq*, in the *Proceedings of the Society of Biblical Archaeology*, Vol. X, p. 81-83; after this memoir we find (p. 83-86) some *Remarks* in which M. Le Page Renouf approves the conclusions of M. Max Müller.

† Blau, *Sisags Zug*, in the *Z.d.d.M.*, T. XV, p. 231.

renders letter for letter a derivative of the root **אָדַר**, *amplus fuit*, doubtless **אָדִיר**, *amplus, potens*.\* This name *Addirou*, *Addir*, presents so close a consonance with the Arabic **الدير** *al-déir, ed-déir*, that it may be confounded with one of the numerous *déirs* which figure on our modern maps. Having regard to the position which it holds in the list, I am tempted to recognize it in the **خربة ديران** *Kharbét-Déirân* which the English map shews at some distance north of el-Môghâr.

The cartouche No. 30 is destroyed with the exception of the sign , which tells us nothing. The series which begins beyond, and which is broken after No. 40 by a long gap, offers us towards the end a name (No. 38)  *Shaouka*, which is written  *Saouka* in the list of Thoutmos III (No. 69): it is the Shokoh of the Judæan plain, now *Kharbét-Shouwéikéh*.† The names comprised between *Iaoud-ham-melek* and *Shaouka* must then range themselves more or less regularly between *el-Yahoudiyéh* and *Kharbét-Shouwéikéh*. For the rest, No. 35, which is mutilated 

, may be restored with certainty in

 *Iaouhama*, which is the (No. 68)

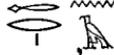
 *Iouhamâ, Iaouhmâ*, of the campaigns of Thoutmos III: now *Iaouhama* is, as *Saulcy* has shewn,‡ *el-Khéiméh, الخيمة*. This restoration permits us to divide the series into two sections, one of four names from *Iaoud-ham-melek* to *Iaouhama*, one of five from *Iaouhama* to *Shaouka* and beyond. The four names which compose the former section are unhappily not easy to identify. No. 31

 *Haianim, Hianim*, appears as a plural form **חַיִּים** of a word derived from the root **חָיַן**, *propitius fuit, favit alicui*; it is the same in meaning as **בֵּית חַיִּין** of *Dan* or *Judah*, and I am disposed to compare it with *Kharbét-Hannounâh* **خربة حنونة**, situated in the hills to the east of

\* *Brugsch, Geogr. Ins., T. II, p. 62.*

† *Brugsch, Geogr. Ins., T. II, p. 64.*

‡ *F. de Saulcy, Lettre à M. Chabas, in the Mélanges d'Archéologie égyptienne, T. I, p. 122-123.*

el-Yahoudiyéh,\* near to which the English map marks some ruins.† The name following (No. 32)  *Alana, Alouna*, would be transcribed in Hebrew letters ערן, ערן, and consequently cannot be either the l'Elon אֵילֹן of Dan, or Eglon עֵגְלוֹן, as Brugsch‡ and Blau:§ would have it: we have here a locality bearing the same name as the  of Thoutmos III, where I have recognized a variant of the Hebrew עֵלְיוֹן, *superior, suprema, summus*. The present nomenclature gives us many علين Alîns, of which the orthography agrees perfectly with that of our town. The only one whose site can rigorously agree is that which the English map calls Kharbét Ouady Alîn خربة وادي علين, and which is to the north of Shouwèikéh, near 'Ain Shems, where the Beth-Shemesh of Judah is generally placed; yet the space will be too great between Kharbét Hannounah and Kharbét Ouady Alîn for me to venture any affirmation on it. Brugsch reads (No. 33)  *Biloma*, and identifies it with בִּלְעָם Bileam of Manasséh, in spite of the absence of *y* in the Egyptian transcription.|| In fact Champollion, Rosellini, and Lepsius all give  *Biromam*, *Bilomam*, and this is the reading which can still be deciphered on the wall. *Biroumim* or *Biloumim* is in fact the regular plural of a word derived either from the root בָּלַם *constrinxit, clausit*, or from the root בָּרַם *fremuit*: בְּרוּמִים, which denotes the name of a sort of embroidered fabric, is here reproduced letter for letter. Unhappily I cannot find on any map any modern name which recalls that of *Biroumim* or *Biloumim*.  (No. 34) *Zaidipoutir* or *Zadipoudil* is known

\* Guérin, *Samarie*, T. II, p. 74.

† Osburn (*Egypt, her Testimony*, p. 160) has compared Haianim with הַיִּהּוֹן, the valley of Hinnom. Without speaking of the topographical difficulties which this identification presents,  never answers to ה in Hebrew.

‡ Brugsch, *Geogr. Ins.*, T. II, p. 63.

§ Blau, *Sisags Zvg*, in the *Z.d.d.M.*, T. XV, p. 235.

|| Brugsch, *Geogr. Ins.*, T. II, p. 64.

to us in *Papyrus Anastasi* No. 1, under the form   *Zidipouti* or *Zaidipouti*, with loss of  R, L, final.\* The name is evidently formed of two words. The first belongs to the root צוד *venari*, and, after the vocalization of the Egyptian in \, answers more particularly to ציד *venatio, fera venando, capta, cibus, commeatus*: it is the same origin as that of the Sidon צידון of the Phœnicians. The second name may be compared with different roots, פדר, whence פדר *adepts*, פטר *fidit*, פתל *contorsit, nevit*, פתר *interpretatus est somnium*, among which I leave to the reader the task of choosing that which pleases him best. These compound names get shortened in any fashion: if we admit that the second element  *poutir* has lapsed, the first ,  *Zaïdi*, immediately recalls the town of  *Saïdou*, *Sîdou*, which is situated a little south of Tell-Djezer, and north of Kheimèh. Guérin here notices some ruins which make him suppose in this place the existence "of an ancient village which history does not mention, and which, in contrast to the great town of Sidon, its namesake, has always remained obscure, and probably without importance."† The position of Saïdou fits the position which Zaïdi-poutir occupies near Iaouhamâ.

Brugsch read for No. 36   *Bit-âlemt*, and proposed to recognize in it  *Allemet*,  *Almôn* of Benjamin,‡ now 'Almît to the N.E. of Jerusalem. The reading and identification have been accepted by Rougé.§ Blau for his part prefers to transcribe  *Bêth-Olam*,|| and declares for the Beit-alam  of Robinson.¶ Since the copies of Champollion, Rosellini and Lepsius bear    *Bi-âlamim*, I have thought fit to reject

\* *Papyrus Anastasi I*, pl. xxii, l. 5; Chabas, *Voyage d'un Égyptien*, p. 199, has been the first to think of comparing the list of Sheshong with that of the Anastasi Papyrus. He does not propose any identification.

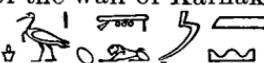
† Guérin, *La Judée*, T. II, p. 33.

‡ Brugsch, *Geogr. Ins.*, T. II, p. 64

§ E. de Rougé, *Mémoire sur l'Origine de l'Alphabet phénicien*, p. 95.

|| Blau, *Sisacs Zug*, in the *Z.d.d.M.*, T. XV, p. 238.

¶ Robinson, *Biblical Researches in Palestine*, Vol. II, p. 403; *cf.* Guérin, *Judée*, T. II, p. 369.

the two hypotheses.\* An examination of the wall of Karnak has shown me that we ought to write  *Bito-Loumim* or *Bito-Roumim* with a                                                                                                                     (No. 37)

*Qaqali, Qaqari*, is, in the opinion of Blau,§ the קַעִילָה Kéilah of Judah, which we identify with the Kharbét Kilá of the Ouady Souwêidéh, to the east of Beit-Djibrín.

The comparison of *Qaqali, Qaqari* with Kéilah appears to me legitimate, for the transcription *Kegila* of the Vulgate shews that the *y* has in this name the tendency towards *g*; it may be rendered by  $\Delta$  in Egyptian, as the *y* of Gaza is by  $\Delta$ . If we find that the site of Kéilah is too far south, we may think of another Kharbét Kíla which the English map marks to the west of Eshouá, and whose situation north of Shouwêikéh and east of Khéiméh is sufficiently in accord with the position of *Qaqali* between Iaouhamâ and Shaouka.

The two succeeding names after Shaouka (No. 39)

   *Bit-tioupou, Bit-Toupou*, and (No. 40)

   *Abila*, have been already noticed in the list of Thoutmos III with the spelling (No. 98)  

*Tioupounou, Tipounou*, and (No. 99)   *Acoubilou*, in the same order assigned to them by Sheshonq's scribe.

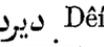
The omission or addition of   *Bit* is a thing too

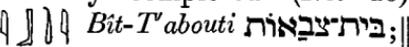
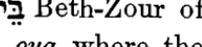
\* Maspero, in the *Zeitschrift*, 1880, p. 64.

† Maspero, in the *Recueil*, T. VII, p. 100.

‡ Guérin, *Judée*, T. I, p. 256.

§ Blau, *Sisacs Zug*, in the *Z.d.d.M.*, T. XV, p. 238.

frequent in Jewish nomenclature to surprise us here, and the final  nou occurs in  Loudni, for example, for Loud. I have already rejected the conjecture of Brugsch, *Bit-Tipounou* = Beth-Tappouah, .\* Blau only admitted it after Brugsch assured him that he had found the equivalent of final  on the stone.† I have ascertained that this  does not exist really, and that the wall bears   not   or   , and the absence of this letter suffices to render the comparison of the two names impossible. The parallel with *Téphón*, *Topho* of the 1st book of Maccabees IX, 50, is only admissible if this unknown *Téphón* is not a Grecized form of Beth-Tappouakh, Tappouakh.‡ If the name  Déir Doubbân§ may be considered as arising from a caprice of popular etymology, which has substituted the word  for an ancient name *Bit-Toupou*, *Toupounou* may have occupied the site which the fellahs call after that fashion. The Abila of No. 40 has disappeared.

The great gap which we notice after Abila accounts for no less than twelve cartouches, of which two only admit of restoration. Brugsch has already completed (No. 46)  as  *Bit-T'abouti* ;|| Blau afterwards thought of restoring it as  *Bit-T'abiro*, which he affirmed to be  Beth-Zour of Judah.¶ Yet, if we have sometimes a  *oua* where the

\* Maspero, *Sur les Noms de la Liste de Thoutmos III qu'on peut rapporter à la Judée*, in the *Transactions of the Victoria Institute*, Vol. XXII, p. 167-68.

† Blau, *Sisaks Zug*, in the *Z.d.d.M.*, T. XV, p. 238. "Das schliessende *h'* nach Brugsch's mündlicher Mittheilung wirklich von ihm nachträglich auf dem Steine gefunden worden ist."

‡ *Maccabees* I, ix, 50. Similarly in the name of *Καφαρόφα* which Ruffinus appears to have read in Josephus (*de Bello*, V, 4) in the place of *Καφαρόβα* (Reiland, *Palästina*, T. II, p. 692). Neubauer (*Géographie du Talmud*, p. 112) is inclined to recognize here Tappouakh, which hinders me from comparing it with our *Bit-Toupou*.

§ Robinson, *Biblical Researches*, T. II, p. 2-354, 421, who is inclined to recognize in this place the site of Gath-Rimmon; *cf.* Guérin *Judée*, T. II, p. 104-6.

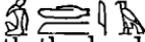
|| Brugsch, *Geogr. Ins.*, T. II, p. 65.

¶ Blau, *Sisaks Zug*, in the *Z.d.d.M.*, T. XV, p. 238-9. On the authority of Blau, Brugsch would have adopted the identification with Beth-Zour.

Hebrews puts a ב, we have never a ] for a Hebrew ב, and בית צור would be transcribed not . The copies of Champollion, Rosellini, and Lepsius differ slightly from that of Brugsch, and I have myself been able to verify the original text as .\* The only possible restoration is that of a M differently written and vocalized, either or *Bit-Zabima*. The word *Zabimā* is a regular plural which may come either from זאב, *wolf*, בית זאבים *Beth-Zebim, the house of wolves*, or even from צבוע *hyæna*, בית צבועים *Beth-Zeboim, the house of hyænas*: the tribe of Benjamin had similarly a valley of *hyænas*, גי הצבועים. No. 47 occurs under the form where only one long sign is wanting between and the eagle . By restoring ] we should have the equivalent of כוכב, *star*, but this restitution, attractive as it may be, is unlikely; the ] is never followed by in our list, and the final on the contrary is here so frequent that the reading *Koka* forces itself on us. The name answers to the Hebrew גג, *roof, surface of the altar*, and will apply very well to a village situated on the terraced top of a hill. I will not offer any conjecture as to the situation of these two places; the lacuna which contains them is too large to enable us to determine even the direction in which we ought to seek them. The list begins again with No. 52, and continues, not without mutilations, till No. 58. The last two numbers, 57 and 58, have suffered slightly, but are restored with certainty: No. 58 is *Magdilou*, and

\* Maspero, in the *Recueil*, T. VII, p. 100.

† Champollion (*Monuments, Texte*, T. II, p. 116) has , Rosellini (*M. St.*, pl. cxlviii), , Lepsius (*Denkm.*, III, bl. 252), Brugsch (*Geogr. Ins.*, T. II, pl. xxiv), . I have restored from all these copies the reading (*Zeitschrift*, 1880, p. 46); the wall at Karnak has (Maspero, in the *Recueil*, T. VII, p. 100), which proves that the restoration was exact.

No. 59  Iarza.\* The two names have already figured in the lists of Thoutmos III,  Magdilou (No. 71) and  (No. 69), and are now el-Medjdel and Kharbét Ierzah. There is therefore great likelihood that part at least of the names which immediately precede these two belonged to places near Kharbét Ierzah and el-Medjdel. No. 56  Adima† has been identified by Brugsch with the land of Edom, which Rougé does not deny.‡ The comparison, blameless from a philological point of view, falls of itself when we remember that our lists do not contain the names of extensive countries, but only the designation of features of the land, towns, or villages.  Adouma must then here indicate a town which was called  *the red*, or  *the field*, like one of the villages of the tribe of Naphtali, or like one of the five accursed towns, . The only modern name which can be set beside Adouma is that of Bêt-Timéh  a large village situated to the east of Ierzah, where Guérin mentions the existence of Roman or Byzantine ruins:§ the site will very well suit the relative position of names in the list, and the modern orthography may strictly be deduced from the ancient. No. 58  Zaloumim, is a plural of the words  *shade*, but cannot be identical with the station  Zalmonah of the itinerary of the Hebrews in the desert, as Brugsch would have it: || the vicinity of such names as Migdol and Ierzah does not authorize us to go down so far to the south in this part of our list. We find no longer in the country any name which recalls that of Zaloumim, but the word itself is expressive, and may recall the shades of the gardens which surround el-Medjdel: a site

\* The restoration Ierza, which I proposed in 1880 (*Zeitschrift*, 1880, p. 46), has been confirmed by the examination of the original text, (*Recueil*, T. VII, p. 100).

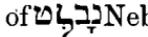
† Champollion, *Monuments, Texte*, T. II, p. 116) read  (cfr. *Zeitschrift*, 1880, p. 46): the wall really has *Adima*, with a , as Brugsch said (*Geogr. Ins.*, T. II, pl. xxiv).

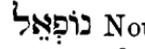
‡ Brugsch, *Geogr. Ins.*, T. II, p. 66-67; E. de Rougé, *Memoire sur l'Origine de l'Alphabet phénicien*, p. 53.

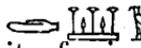
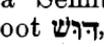
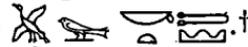
§ Guérin, *Judée*, T. II, p. 127-128.

|| Brugsch, *Geogr. Ins.*, T. II, p. 67.

such as that of the village of Hammâméh  would closely suit what we conjecture of Zaloumim, Zelemim. The three preceding numbers ought not to be situated far from el-Medjdel.  Noup-ïlou (No. 53) is composed

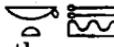
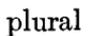
of the final , God, and a derivative of the root  *agitavit*, or  *eminentia*,  *locus*, *editus*. The town of  Neballat, Beit-Nebâla, in the tribe of Benjamin, which

Blau recognizes here, does not answer to  Noup-hîlou either in orthography or in position: \* I do not see elsewhere, between Shouëikéh and el-Medjdel, any name which seems derived from the ancient name and fit to be assimilated to it.

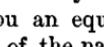
 (No. 54) *Dishati*, *Doushati*, is, in spite of its foreign cast, a Semitic name. It is a feminine form derived from the root  *terere*, *conterere*, *triturare frumentum*; but when this is said, I know no way of locating the town in the land. No. 55 is not only hard to place, but hard to decipher. I read it as Champollion did, . †

It includes the Egyptian masculine article  *pa*, of which we have numerous examples in  *Pa Haqala*,

 *Pa âmaqou*,  *pa nagabou*. The sign following is most likely  *oirou*, the Great, the Chief, which occurs almost as often without as with its final

 in the hieroglyphic texts.  transcribed in Hebrew gives us  *gathot*, plural of the word  *a press*.

Osburn has proposed to translate the whole as *The prince of the Gadites*, ‡ and in fact no philological reason prevents our translating thus the first two words; only the latter certainly does not designate the people of Gad, who had nothing to do with these parts. It would be very pleasant to translate with confidence *the chief of Gath*, but it does not seem to me

\* Blau, *Sisaks Zug*, in the *Z.d.d.M.*, T. XV, p. 240. Brugsch, after having recognized the real etymology (*Geogr. Ins.*, T. II, p. 65), inclined to recognize in Noup-ïlou an equivalent of  Pnuel, which answers neither to the spelling of the name, nor to the place which it occupies in the list of Sheshonq.

† Champollion, *Monuments, Texte*, T. II, p. 116.

‡ Osburn, *Egypt, her Testimony to the Truth*, p. 162.

that *Kitout* can be **קִיתוּת**. This interpretation does not get us out of our difficulties, as we see; it has even the inconvenience of raising a very strong objection. The chiefs of conquered lands never figure in the lists: the cartouche No. 54 of Sheshonq would be an unique case in Egyptian archæology if we ought to take it in Osburn's light. My impression then is that we ought not here to divide the group: it should be considered as forming one single word *Pouroukit*, *Paouroukit*, which the scribe amused himself by writing with elements giving in Egyptian a sense which has nothing in common with the original meaning in Hebrew. He has transcribed the first syllable *Pour*  , *paourou*, the chief, in lieu of   for example; he has chosen for the second, *kit*, the term  , a graphic variant of   *kiti*, which signifies *other*, and the name *Pouroukit* finds its analysis in an Egyptian phrase more or less correct which would mean *the other chief*.     *Pouroukiti*, *Pouloukiti*, is for me the word **פְּלֹגָת**, from **פְּלֹגָה**, **פְּלֹג**, a *stream*, in Arabic **فَلَجٌ، فَلَاحٌ**. We have in fact in the district of el-Medjdel a town of **فالوجا** Faloudja,\* **الفالوجى**† el-Faloudjy, which for name and position appears to me to agree with our Pouloukiti.

A new lacuna of four cartouches breaks the series afresh. No. 64,     ... *papen*, has been completed by Blau‡ as 'Aapen, **עֶפְנִי** Ophni, Gophnah: the restoration has taken no account of the middle syllable *pa*, and is indefensible, but I know no more than Brugsch§ how to complete the group. Happily No. 65 furnishes us a precious indication; Brugsch has recognized that       *Aazama*|| answers either to the Azem **עֶצֶם** of Judah, afterwards reckoned to Simeon,¶ or to **עֶצְמוֹן** Azmon, which marks the southern

\* Guérin, *Judée*, T. II, p. 124.

† Robinson, *Biblical Researches in Palestine*, Vol. II, p. 421, Vol. III, *App.*, p. 209.

‡ Blau, *Sisags Zug*, in the *Z.d.d.M.*, T. XI, p. 421.

§ Brugsch, *Geogr. Ins.*, T. II, p. 67.

|| Brugsch, *Geogr. Ins.*, T. II, p. 68.

¶ Joshua xv, 29; xix, 3.

limit of the Jewish territory.\* His opinion was rejected by Blau,† who prefers Etham עֵיטָם, but Rougé ‡ pronounces for Azem, which answers in fact more exactly than Azmôn to the hieroglyphic orthography. The identity of the two towns is certain, but the position of Azem is considered undecided by most authors who have studied the Bible. The way in which the text of Sheshonq introduces Azama, a little distance from Migdol-Gad (el-Medjdel), and Iourza (Kh. Ierzah), obliges us to dismiss the hypotheses of those among them who place Azem very far towards the south; that of Wilton, for example, who would recognize only one place in the names Ijîm and Azem in the book of Joshua, and sets it at el-Aujéh, in the territory of the Azâziméh Arabs.

It is probable that this town should be found in the most northern part of Simeon, between Ouady el-Hesî and Ouadi esh-Sheriâh, nearer the former than the latter, since the Egyptian list inserts only five cartouches between Iourza and Azama. The precise place is all the harder to determine, because to meet with a town whose situation shall be free from doubts, we must go down more than forty cartouches lower, to the Canaanite Arad (No. 108). There at least we find ourselves for a moment on solid ground. עָרָד Arad is the Tell-Arad of our modern maps.§ If we reflect that our list consists of many series of names representing sites little remote from one another, we shall be brought to believe that these forty and odd cartouches, of unsettled value for the moment, should be scattered in more or less regular fashion over the country which extends from the environs of Ierzah to those of Arad. The presence in the preceding sections of many places set pretty close to one another to the north of Ouady el-Hesî leads me to think that the earlier at least of these forty cartouches should be sought either on the very course of this Ouady, or in the mass of hills which border its southern edge. On the other hand the absence of names such as Gêrar and Ber-Sheba seems to prove that the geographical area of the list does not extend very far towards the south. The district to explore is not then so considerable as we should be tempted to believe at first

\* Numbers xxxiv, 4; Joshua xv, 4.

† Blau, *Sisaks Zug*, in the *Z.d.d.M.*, XV, p. 241.

‡ E. de Rougé, *Mémoire sur l'Origine*, pp. 77, 95.

§ Brugsch, *Geogr. Ins.*, T. II, p. 70.

start; unhappily it is in a part still imperfectly known, in spite of the fine works of the Palestine Exploration Fund, and the maps leave spaces more or less entirely void of names or topographical indications. The identifications there have then a still more uncertain character than they present in the regions already studied.

On careful consideration, the forty and odd cartouches are far from representing so many independent localities. Many of them contain, as Brugsch has seen, common names which serve to designate characteristics of the ground. These words, preceded sometimes by a masculine article  *pa*, or feminine  *ta*, form the first part of a name whose second part is inscribed in another cartouche, with or without the insertion of the Egyptian preposition  *n*. The most often employed of these words is, with different spellings,

 (No. 71) *Hougra*,  (No. 77) *Haqra*,

 (No. 94) *Hagri*, once more the same in plural

or dual  (No. 107) *Haqrîma*, *Haqrâïma*.

Brugsch has seen here the Arabic word  *stone*,\* and I have adopted his interpretation.† It raises an objection of the gravest:  is Arabic, and we are in Hebrew land. The only lawful equivalent of the Egyptian word would be  *חֹמֶה*, which is found in some geographical passages of the Talmud, and to which we attribute the sense, *inclosure*, *wall*, from the root  *חִנַּוּ*.‡ We may understand this word of

those great circles of stone, of which many exist still in Arabia Petræa, and of which more than one vestige has been discovered in the parts of the country whither the list of Sheshonq leads us.§ The second word 

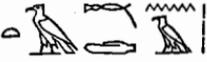
*nagabou* is compared by Brugsch either to  *Negeb*, Hebrew, or to  *nakb*, or 'pass' of the Arabs. The same objection which has been raised against  avails equally against

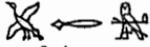
\* Brugsch, *Geschichte Egyptens*, p. 661-662.

† Maspero, in the *Zeitschrift*, 1880, p. 47.

‡ H. Hildesheimer, *Beiträge zur Geographie Palästinas*, p. 67, sqq.

§ See a very clear description in Palmer, *The Desert of the Exodus*, Vol. II, p. 320, sqq.

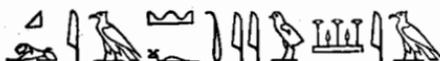
نقب, and it is really **נֶבֶב** which alone can answer to the Egyptian term.   $\Delta$  *âmaqou* is **עֵמֶק**, the valley;  | *ta shodinaou* is an Egyptian term which seems to mean *the canals, the ditches*. As to  *Shabbalout*, where Brugsch has thought to recognize **שְׁפֵלָה**, *the plain*, which is impossible,  answering to **ב**, never to **פ**,—it is **שְׁפֵלָה**, *a stream of water, a river, a torrent*.<sup>\*</sup> All these words are in perfect accord with the nature of the country where the localities are placed which they serve to designate: as the names which the lists of Thoutmos III bring to our knowledge, Abilou, Karmona, Ganotou, shew us the fertility of the central territory of Judah,† so do those of the list of Sheshonq bear witness to what was the territory of Simeon.

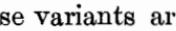
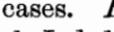
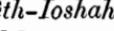
When we have taken account of the preceding observations, the number of sites becomes perceptibly limited: from No. 65 to No. 110, from thirty to forty-five cartouches are lacking.‡ Here they are in the same order in which Sheshonq has given them to us. (Nos. 65–66)   **הָעֵמֶק עֵימָם**, the Valley of Azama, that is to say probably the valley where lay the town of Azama, and the town itself: site unknown. (No. 67)  |  *Anara* or *Anala*, not *Anali* or *Anari*, for the fashion in which  is cut makes me believe that the sculptor, not having kept room enough for the  final, was content to insert  before . This name is one of those, very rare they are, of which I do not find the Semitic equivalent. Perhaps it contains a mistake, and we should read *Alouna*, which will give us a regular form **אֵלֹן**, *an oak*. Anyhow the site remains unknown. (Nos. 68–69) 

\* Maspero, in the *Zeitschrift*, 1880, p. 47.

† See some observations on this subject in the *Transactions of the Victoria Institute*, Vol. XXIII, p. 67 and 74.

‡ Henceforth I shall rarely cite Blau, since he takes each cartouche for a complete name, the perpetual repetition of words of which I speak has led him into almost as many errors as there are cartouches remaining to the end of our list.

 Pa hagra-fit-iaousha.

The name presents a rather curious peculiarity.  is here for  by substitution of , v. f. for  : we shall see further on that the  is transcribed  *oua* in several words. These variants are not due to the caprice of the Egyptian scribe. I think they reveal to us a new fact in phonetics. It should seem, according to them, that in the Hebrew of the race of Simeon the  was weakened to v, f, at least in certain cases. *Fit-iaousha* is then the transcription of a  *Bêth-Ioshah*, of which the former element is slightly disfigured by a pronunciation *Vit, Fit*, for *Bit*. The term joined with  is not, as I have believed,  *fire*: The division   *Fiti*,      *aousha*,\* which supposes this identification, is not admissible in our list, where  is always written without  final. I divide   *Fit*      *Iousha*, and take *Iaousha* for the transcription of  *Ioshah*. This name designates, in the first book of Chronicles† one of the Simeonite chiefs who, in the time of Hezekiah, emigrated to the East from the town of Gedor in search of pasturage for his herds. Whatever may be the value of the information furnished by the Chronicles, it shows us at least that the name *Iaousha* was used in the tribe of Simeon, and confirms the legitimacy of the transcription  *Bêth-Ioshah* which I have adopted for *Fit-Iaousha*. To recover in the present nomenclature an equivalent of this locality, we must not forget that the dialectic phenomenon caught by the ear of the men of Sheshonq's time, must have perpetuated itself among all the populations who have succeeded in these parts. A name once adopted in one pronunciation passes with this pronunciation to different generations who have used it daily. The Arabic equivalent of  initial ought then to be something analogous to the Egyptian  *vit, fit*, either  or . I find, in fact, a little to the south of the Oued esh-Sheriah, a *oued* and a ruin which

\* Maspero, in the *Zeitschrift*, 1880, p. 47.

† 1 Chronicles iv, 35.

Guérin calls *واد فتيس*, Oued Ftis and *خربة واد التتيس* Kharbét Oued el-Ftís,\* and which the English map spells Kharbét Futéis. فتيس contains all the elements of : فت is here the counterpart of בית = and يس answers to יושב by that substitution of ש for which is so frequent in the transition of Hebrew names to Arabic. The identification of Fít-Iaousha with Kharbét Foutéis, Fatéis or Ftís confirms the opinion which I have above expressed on the subject of Azamah, and encourages me more and more to seek this town between Ouady el-Hesy and Oued esh-Sheriah, rather near a line drawn from Kharbét Foutéis to el-Medjdel, or to Kharbét Terzah.

It is equally in the neighbourhood of Kharbét-Foutéis that it would be worth while to seek the towns which follow, if the maps were not so desperately poor. Arou-haloul, Alou-haloul, is one of those names in which Rougé would recognize the Arabic article ال; † I have already said above † how difficult it is to allow in our list the presence of Arabic forms, and I will not repeat it. I think that we have here one of those names El-halal, in which are present both the word God, and the root luxit, splenduit. The site is unknown to me. (Nos. 71-72) Pa hougra abilama contains a plural from meadow, field: the whole is translated *the enclosure of meadows*, and designates an unknown site. Shabbalout ni Gabri (Nos. 73-74) literally signifies *the river of the Hero*, for Gabri is the exact transcription of גבר man, soldier. Blau has identified the second cartouche with Betogabris, which is now Beit-Djibrín, § and I adhered to his opinion, || but

\* Guérin, *Judée*, T. II, p. 287.

† E. de Rougé, *Mémoire sur l'Origine*, p. 90.

‡ See above, p. 18-19.

§ Blau, *Sisaks Zug*, in the *Z.d.d.M.*, T. XV, p. 23. He read the name *Ngbarij*, "wobei das N, entweder bloss lautlicher Vorschlag ist, oder graphisch richtiger am Ende der Cartouche zu stellen sein wird."

|| Maspero, in the *Zeitschrift*, 1880, p. 47.

Beit-Djibrîn is too distant from the country where the vicinity of Kharbét Foutéis obliges us to remain, for allowable persistence in this opinion. I thought for a moment of Azion-Gaber, עֲצִיּוֹן גַּבֵּר, but this town is too far toward the south. I will rather seek our village of Gabri and its stream in the vicinity of el-Gabra الجبْرِى, a little to the east of Oumm er-Roumanin. El-Djabri is in fact the Arabic equivalent for the Hebrew גַּבֵּר. *The torrent of the Hero* is followed by the *Torrent of Blessings* (Nos. 75-76) *Shabbalout-Ouarakit*, where the Hebrew בְּרַכַּת, בְּרָכָה, plural בְּרָכוֹת, has its ב transcribed *Oua*, according to the dialectic pronunciation which I have indicated above.\* This locality is certainly different from the Valley of Blessing, עֵמֶק בְּרָכָה of Chronicles,† but the site is uncertain.

*Pa haqra n-Azai* (Nos. 77-78) includes the *n* of connexion which we have already had in *Shabbalout ni-gabri*; the determinative of the flame belongs to the sense of the Egyptian and not to that of the Semitic word: *ázai* belongs either to *goat*, or to *עוֹז*, *עוֹז*, *strength, power, fortitude*. Site unknown. (No. 79) *Adidima*, according to Brugsch's copy,‡ may belong to the root *induit ornementum, ornavit se*: this will then be a form analogous to that of *Adithaim* (double adornment) which designates a town of Judah. I am not aware of the site. *Zapaqa* (No. 80) is the transcription which is admitted since Brugsch proposed it, although indeed it shows no connexion with any root known in Hebrew. Perhaps it may be permitted to divide the word in two, the former part will be a derivative from the root *speculatus est, prospectavit*, and the latter *valley*, but all this is too uncertain to dwell upon. The two names that follow are helplessly mutilated, but No. 83 *Ganat* gives us a well-known term *garden*; it is perhaps the Kharbét Jenneta حَرَبَةُ جَنْتَا, which is situated at some distance to the south-west of

\* See above, p. 20.

† 2 Chron. xx, 26, *cf.* in Josephus, *Arch.*, ix, 1, 3.

‡ Brugsch, *Geogr. Ins.*, T. II, pl. xxiv, No. 79.

el-Daouaïméh. In this case the localities intermediate between Shoubbalout ni-Gabri and Ganat should be sought, partly in the valley of Oued en-Nâs, partly in that of Oued el-Djezair, from south to north.

(Nos. 84-85) *pa nagabou âzahout* furnishes us a new example of a name which the scribe has disfigured by giving it an orthography that resembles an Egyptian word: he has decomposed *Azahout* into two terms, of which the former became for him the verb

*to spoil, to rob*. As there is no such root as or , I am tempted to see here one more compound whose first member will be *strength, fortitude*.

The names which follow it no more lend themselves to a reasonable identification than this, and it will suffice for me to enumerate them.

(Nos. 86-88) *ta shodinaou pa hagali Shanaïa*, which ought to be translated, *the canals and the enclosure of Shanaïa*: *Shanaïa* is probably a derivative of the root *quievit*.

(No. 89) *Haqa* belongs to *murmur-avit, susurravit*.

(Nos. 90-91) *Pa nagabou ouaha-ouarouk*, the land of *Ouahaouarouk*. *Ouarouk* is here a dialectic form of *Barouk*; as we have seen above: the preceding may be the article , but I do not see to what *oua* can answer.

(Nos. 92-93) the land of *Ashakati*. *Ashakati*, with the determinatives is a derivative of *a pit*.

(Nos. 94-95) The enclosure of *Haninia*, is certainly not the *Beit-Hanîna* of the neighbourhood of Jerusalem; \* it is a locality of Simeon or of the southern districts of Judah. *Haninia* is derived from a form of and appears to answer to

\* Brugsch, *Geogr. Ins.*, T. II, p. 69.

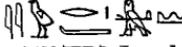


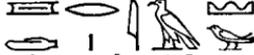
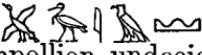
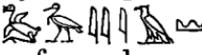
of Diouati. The former name Sharounram seems at first to be foreign to the Semitic languages; but the combination *nr* in Egyptian has not, at least in the transcriptions of foreign names, any other value than that of *r* or *l* strongly pronounced. *Sharounram* is then a derivative either of the root *travit, extravit, spoliavit*, or of the root *torsit, firmus, durus fuit, oppressit*. The termination may answer to *ים* of the plural; but this inflexion is almost always written in our list with a final vowel *mâ*, and without . I think rather that there is here a mistake of the cutter, and that we should read instead of : we should then have to do with a name *שררה, שללה*. *Diouati*, derived from the root *amavit*, whence the name of king David, or from the root *languit, aegrotus fuit*. Neither of these localities has left any still recognizable traces.

Some may perhaps be astonished to see me indicate so minutely the Hebrew roots to which this and that name of our list seems to me to answer. This is not affectation of philological research: it is, I believe, an indispensable precaution in the hazardous sort of study to which I have been bound to devote myself. One is only too prone to suppose an error of the copyist, a mistake of the scribe who has compiled the list, and to invert the order of the letters to obtain a comparison with an ancient or modern name already known. In shewing that the Egyptian letters transcribed in Hebrew letters yield regular or possible Hebrew forms, I avoid for myself, and perhaps for scholars who will treat this subject after me, the temptation to attribute to an error of the scribe the presence of so many unknown names, and the fault of modifying these names by inversion or by substitution of one articulation for another. If our transcriptions in Hebrew letters give us regular words, it is because the Egyptian scribes reproduced as exactly as their alphabet allowed them the sounds that they heard in Judæa: we have not then the right to make any change in their transliteration.

Nos. 108–110 furnish us with the first absolutely certain identification which we have in this part of the list:

*Haqaraim Arada*, the

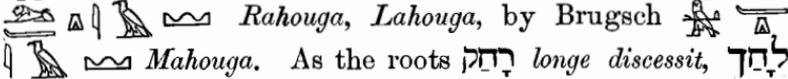
two inclosures of Arad, and  *Rabbit Aradai*, רַבֵּית עֶרֶד. The two inclosures of Arad were in the vicinity of the town of Arad, and perhaps a more complete exploration of the country will help us in our time to discover the traces. I scarcely need recall\* that Rabbat Arad is עֶרֶד of the Bible, now Tell Arad, تل عراد. (No. 112)  *Iaourahma*, appears to me to be identical with יְרַחְמֵאל Ierahméel, of the tribe of Judah, the *Négeb* of which was pillaged by David. יְרַחְמֵאל is wanting at the end of the Egyptian name, but it is also wanting at the end of the Arabic name Ouady Rahaiméh, واد رخيمه, which has succeeded to the Hebrew name: the omission of the divine name, which has permitted the Arabs to transcribe as they have done, is doubtless a primitive occurrence, since we find יְרַחְמֵאל *Iaourahma*. No. 111  *Nebatout*, placed between Rabbat-Arad and Iaourahma, should be sought between Tell Arad and Oued-Rahaiméh, but none of the names known hitherto enough resemble it to give room for identification. *Nabatout* appears to be a plural נְבָטוֹת of a feminine word נְבָטָה, which would be derived from the root נָבַט *conspexit, vidit*.

Three cartouches have entirely disappeared after *Nebatout*. No. 116  *Ari... m...*, is too mutilated to yield anything. No. 117  *Adora-shirau*, Adora the little, by antithesis to the Adora the Great of No. 100, brings us back to the north of Ierahméel and Arad, probably in the part of the mountain land of Judah which stretches south of Hebron, but I cannot pretend exactly to determine the site. No. 118, read by Brugsch  *Pabia*,† but whose first sign is left by Champollion undecided, has appeared to me to be rather  *Zabia*: nothing is in fact more easy than to confuse a damaged  with a .

\* Brugsch, who was the first to recognize Arad, has separated from it the cartouche  which he reads *Lebat*, and identifies with לְבָאוֹת בֵּית לְבָאוֹת Bêt-Lebaoth of Simeon (Brugsch, *Geogr. Ins.*, T. II, p. 69-70).

† Brugsch, *Geogr. Ins.*, T. II, pl. xxiv, No. 118.

This reading is so much the more likely that there is no root פב, but many roots such as צבא, *prodiit, processit miles in bellum*, whence צבא *army*, צבא *prodiit stella*, &c.: Zabia would be the exact transcription of צבא a doe, a name given to women, צבא, צבא, and which may be here applied to a locality. No. 119 is read by Champollion

 *Rahouga, Lahouga*, by Brugsch  *Mahouga*. As the roots רחק *longe discessit*, לחך *linxit*, מחק *percussit*, are there to support whichever reading

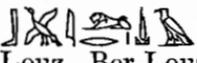
we may prefer, only the study of the wall will permit a decision between Champollion and Brugsch. It is now so damaged that I am not able to recognize anything in it; perhaps someone else may be more happy. No. 120 is evidently

 *Ouariouk* with  *oua* for ב above, either a new name derived from the root ברך, perhaps the Kharbét Barouk, خربة باروك, of Guérin. (No. 121)

 *Fir-timá*, includes, as  *Fir*,\* above, a dialectic form *Fir* for באר, ביר *the well*: the name

will be באר דמעה *Ber-Dimeah*, the well of the tear,  having often in Egyptian the value of ד vocalized with *i*, and  equivalent to מע. Names beginning with *Bir* are frequent at present in the desert region which extends between Hebron and the Dead Sea, but none of them recalls our *Ber-Diméah*. (No. 122)  *Abilou* is an unknown

 *Abilou*, situated in this region of the desert of Judah. (No. 123)

 *Biar-Rouza, Biar-Louza*, is באר לו *Ber-Louza, Ber-Louzah*, the well of the almond tree, with the ordinary orthography in B  and no more in V, F .

This *well of the almond tree* has nothing in common with the two places of the Bible called Louza, one of which was the Bethel of Benjamin, and the other belonged to the Hittites of northern Palestine. The following name is  *Bit-Anati*, which I will identify, as Brugsch does,† with the

\* Guérin, *Judée*, T. III, p. 164.

† Brugsch, *Geogr. Ins.*, T. II, p. 70.

בֵּית עֲנוֹת Bethanoth of Judah, now Bêt Anoun, خربة  
 بيت عنون. Ber-Louzah ought to be found some way S.E.  
 of this site, on the slope of the mountains which descends  
 to the Dead Sea.

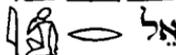
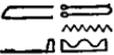
Bit-Anat is the last name of the list which we can set on the  
 map with certainty. Besides, no more exists than two cartouches  
 intact, and the remains, more or less legible, of half a dozen  
 cartouches. (No. 125)  *Shalhatou*, belongs

to the root שָׁלַח, *misit*, whence comes the name שָׁלַח, שְׁלַח  
 of the pool of Siloéh. The group  which ends the word  
 is the plural *toou* of the word  *to*, land, and could scarcely  
 be employed here, in the transcription of a foreign word,

except to render the syllable *tou*, *toou*: as  *Shalaha*

furnishes us already with the three letters of the  
 root שָׁלַח, the final *tou* is a grammatical inflexion, and the  
 equivalent of  TI = T, which serves to write the  
 termination of the feminine plural. שְׁלַחוֹת, *sprouts*, answers  
 exactly to *Shalahatou*. The book of Joshua makes known to  
 us a town of analogous name, שְׁלַחִים (*armed men*), situated  
 in the southern part of Judah.\* The modern site of

*Shalahatou* is not known to me. (No. 126) 

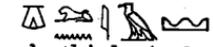
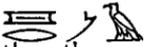
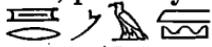
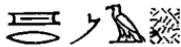
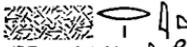
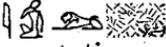
*Alomâten* or *Armâten* is a name composed of  אל  
 and , which may answer to מִדִּין *Middin*, or to any

other form of the root מִדִּין *reperere, moderari*; I have cited מִדִּין  
 in preference, because it is the name of a town of the tribe of  
 Judah.† As Middin was in the vicinity of the Dead Sea,  
 that is to say in the region where we know that the last  
 cartouches of our list are situated, we may ask ourselves  
 whether it is not identical with our Alamaten; Middin would  
 then be an abbreviation of a more complete form el-Middin.  
 We do not know from any other source the situation of  
 Middin: Saulcy‡ alone fixes it at قصر مردة Qasr Mirdéh, the

\* Joshua xv, 32.

† Joshua xv, 61.

‡ F. de Sauley, *Dictionnaire topographique de la Terre-Sainte*, p. 223  
 s.v. *Meddin*.

حرية مرد Kharbét Mird of the English map, Mird مرد of Robinson,\* which will sufficiently agree with the place which Alamâten occupies in our list. (No. 127)  Galouna, Garouna, is certainly not, as Brugsch thinks,† the גולן Gólan of Manasseh, which is too remote from the country to which the list obliges us to keep. It seems to me that we have here an exact transcription of the word גרנה, גרן, threshing-floor: I do not find on the map any place named جرن Djarin or جرین Djarín, which would be the Arabic form of the ancient name.  (No. 123) Alama . . . , Arama . . . , including the three letters of a root אלם, cannot be completed except by a suffix, probably that of the plural, either the masculine plural  Alamam, or the feminine plural  Amat. It is impossible for me to say which we should prefer here, for אלה a sheaf, a bundle of corn, which is the prototype of  Alama, has both plurals אלמים and אלות. The following name, which Brugsch gives thus  . . . lahat or . . . rahat (No. 129), appears to have been , either ארחות, plural of ארה, way, path: I do not know where this locality was situated. Nos.  . . . la (No. 130)  Má . . . (No. 131),  El . . . (No. 132) are not susceptible of any interpretation. The last  (No. 133) Iaoura . . . affords an hypothesis which I will content myself with indicating summarily, after Blau. If we complete it  Iaourishalama, we should have here ירושלם Jerusalem, which with good right we should be astonished to miss among the towns taken by Sheshonq.

Such is the result of this study. The gaps with which the list is riddled do not permit me to affirm with certainty

\* Robinson, *Biblical Researches*, Vol. II, p. 270.

† Brugsch, *Geogr. Inschriften*, T. II, p. 70.

that the important towns of Judah or of Philistia whose names have not been mentioned, Ascalon, Ashdod, Gath, Gezer, Hebron, Jericho, &c., did not figure there in fact. The lists of Thoutmos III, which are intact, present so many omissions of this kind, that I should be quite ready to believe, for my part, that they were lacking really in that of Sheshonq, and that the cartouches now destroyed may not originally have contained, for the most part, any names but those of insignificant localities as obscure as those whose memorial has been preserved to us. Sheshonq had a definite surface of wall to cover, and wanted for that purpose a determinate number of names. The despatches of his army and the reports of prisoners or of allies furnished him the number of which he had need. We will say that the scribes had less the intention to enumerate the principal towns of their new conquest than to mark its outline: the places which they chose form round Jerusalem and the block of the country of Judah a sort of circle which seems to follow pretty exactly the frontier of the kingdom. Many of them are quite unknown, others are only identified under all reserve with some Hebrew or Arabic names; the smaller number are placed on the map in an indubitable manner. My work is here but provisional; I hope to resume it hereafter, or, if I am unable, others will take it up and carry it further.

The CHAIRMAN (Professor E. HULL, LL.D., F.R.S., F.G.S.).—Our thanks are due in the first place to M. Maspero, the author of this paper, which is one, as you can judge for yourselves, of considerable difficulty and research; in the next place to Mr. Pinches, who has read it so ably; and, I have also to ask you to return your thanks to the member who has been kind enough to translate it from the original French, viz., the Rev. H. G. Tomkins, of whose translation of M. Maspero's former papers on the names on the *List of Thothmes III* (see vols. xx and xxii) the author said, "il etait aussi fidèle et aussi élégante que possible." (Applause.) I will now ask that the communications received in regard to this paper may be read.

The following communication was then read:—

*Notes on Professor Maspero's Paper on the List of Shishak.*

From Major C. R. CONDER, R.E., D.C.L., LL.D., &c.:—

Professor Maspero's valuable paper throws light on a list which was previously very obscure. I began to study the list of Shishak's conquest of Palestine in 1879, and I thought the whole, as published that year in Brugsch's *History of Egypt*, very difficult, so that I only ventured to publish a few identifications, some of which did not agree with his. In two cases M. Maspero supports my view. He began to study the question next year as appears from his paper. His amended copies of some of the names explain many difficulties. Generally speaking it seems clear that the list begins with the country between Gaza and Megiddo, and goes south, along the Philistine plains and low hills to the east. It then enumerates places in the Beersheba deserts, and it returns north by the Hebron hills, perhaps to Jerusalem.

One or two general remarks may be of use, before considering the towns in detail, when I think I may be able to reinforce M. Maspero's general view, by some new proposed identifications which he does not notice. Though we are in a Hebrew country it does not follow that the names of the towns are strictly speaking Hebrew. The Canaanites, as shown by the Tell Amarna letters, spoke, from 1500 B.C. downwards, an Aramaic dialect. The old town nomenclature was unchanged in most cases by the Hebrews, and in the present list, as in that of Thothmes III, there are indications that the Egyptian scribes followed the Aramaic rather than the Hebrew forms of the words. This is specially marked in the terminations in *u* which was the nominative in Canaanite, as in Assyrian, but not in Hebrew.

The order is no doubt roughly consecutive, and M. Maspero has very properly rejected names which have been suggested in distant regions, for others which are near each other; but it is not always very certain what the order is in detail; and an identification may be missed by not looking widely enough on the map. In 1880 the Survey Memoirs were not published, and M. Maspero has not referred to them. This has led him into one or two minor errors; and I am sure he would not have brought the charge which he makes against my Survey, if he had personally visited the region, or had read the memoirs. On page 110 he says, "the

maps leave spaces more or less entirely void of names, or topographical indications"; but the district to which he refers is an open pastoral desert, with a few arable tracts, in which there are neither ruins nor springs, and in which—as in the desert of Judah and in Moab—names are few, and no traces of ancient settled population occur. This region was quite as carefully surveyed as others, and cannot be said to be "imperfectly known." Want of acquaintance with the country has led M. Maspero to make a statement which I am obliged to notice, because he has unintentionally brought a charge against the Surveyors, which I am certain he would not have made if he had read the account of the country in the Survey Memoirs; and which if unnoticed might mislead others. The hills, valleys, and natural features in this district are given with the same amount of detail as in the thickly populated parts of my Survey.

To proceed to the details of the list, which (as concerns Palestine) begins with No. 11 Gaza and No. 12 Megiddo, the towns are as follows:—

- No. 13. *Rabbati*, Rabbith, follows Brugsch. The site I have placed at the modern *Raba*.
- No. 14. *Taanaku*, Taanach, follows Brugsch. The termination in *u* here denotes the Canaanite form.
- No. 15. *Shaunama*, Shunem (Brugsch) is now *Sålem*.
- No. 16. *Bit Shanla*. It seems to me that Shiloh is too far away, and Brugsch's Beth Shean more probable.
- No. 17. *Ruhaiba*, *Tel Rehab*. M. Maspero adopts the identification which I proposed in 1879 with the Roob of the Onomasticon, and discards Brugsch's suggestion of Rehob, which is far away to the north.
- No. 18. *Hapurama*, Haphraim, as Brugsch proposed in 1879, I believe to be the modern *El Farriyeh* west of the plain of Esdraelon.
- No. 19. *Adulmim* could certainly, as M. Maspero says, not be Adullam. Perhaps it might be Idalah of Zebulon, the later Hirii (Talmud of Jerusalem, *Megillah* 1) which appears to be the modern *Huwarah*.
- No. 21. *Shawadi* might be *Suweidiyeh*, as M. Maspero proposes, since the ruin seems to be ancient, but the Arabic *s* does not usually represent the Aramaic or Hebrew *sh*. I am inclined to think the real site was Shadid (Sarid in the A. V.) which is the modern *Tell Shadid*.

- No. 22. It seems to me doubtful if Shishak went over Jordan, and as no other towns are noticed beyond Jordan, I think we should not place *Mahanema* at Mahanaim—which I have identified north-east of es Salt, but more probably in the *Mukhnah* plain, near Shechem, which would agree with M. Maspero's view that No. 20 is Shechem itself—only No. 20 is unfortunately erased.
- No. 23. *Kebeana* is no doubt Gibeon as Brugsch proposed in 1879.
- No. 24. *Bit Huarun*. No doubt Beth Horon (Brugsch).
- No. 25. *Kadutim*, according to M. Maspero, is *Kademoth*, according to Brugsch. I am inclined to think that *Katanneh* is the modern site, being near the places with which this name occurs (قطنه). The Egyptian lettering does not forbid such a proposal.
- No. 26. *Aiaulun*. Ajalon, according to Brugsch, is mentioned also in the Tell Amarna texts.
- No. 27. *Makidau*. Makkedah. M. Maspero confirms the suggestion which I published in 1879, as against Brugsch's suggestion of Megiddo. The site is noticed in the Tell Amarna tablets, with topographical details which fully confirm Sir C. Warren's proposed identification with *El Mughâr*, "the caves."
- No. 28. *Adiru* or *Adilu* may, I think, perhaps be (Ataroth) Adar, which I discovered at the modern *Ed Darieh* close to Beth Horon.
- No. 29. *Yudah muluk* seems to me correctly fixed by M. Maspero. When in 1879 I proposed the site of Jehud (*El Yehûdiyeh*) I was not aware that Dr. Brugsch held such a view, as he gives no identification in his list in 1879. This opinion seems to me much more probable than the old suggestion "King of Judah," which is contrary to Semitic syntax. The name bears the sign for "country," not for "person."
- No. 31. *Haianim* (or *Haanma* according to Brugsch). I think the ruin *Hannûnah* is too insignificant to be the site of an ancient town—a few traces of ruins only remain with fig gardens—and that *Beit 'Andn* is more probable. The interchange of *Ain* and *Cheth*, which is not uncommon in the modern peasant dialect of Palestine, seems clearly to have been also an Amorite peculiarity, according to the Tell Amarna tablets, and was also a Samaritan vulgarism.

- No. 32. *Aluna* might perhaps be softened into *Elon* in Hebrew. The site I think is the modern *Beit Ello*, which comes in the proper position.
- No. 33. *Bilumam* or, according to Brugsch, *Bilema*, I should propose to place at *B'alín* west of *Tell es Sáfi*.
- No. 34. *Zaidi Putir*: perhaps the first word is the Aramaic *Sadeh*, "mountain." The names of the ancient sites often remain at springs, and I would suggest *'Ain Fatír*, a spring in the hills east of the last. The little village of *Sidún* is marked on my survey.
- No. 36. *Bit 'Alemat*. The site at *Alemeth* seems to me rather far east for the places which precede and follow, and, though the question may be one of opinion, I think *Beit 'Alam* fits better for locality.
- No. 37. *Kegali* might in this case be the ancient *Keilah* mentioned on the *Tell Amarna* tablets, as well as in the Bible: now *Kilah*. The interchange of *g* and *ain* seems, from the tablets, to have occurred in Amorite speech, which confirms M. Maspero's view as to the word, though not as to the site.
- No. 38. *Shocoh* as proposed by Brugsch in 1879 fits with the preceding.
- No. 39. *Bit Tupu*. There appears to have been a town called *Tabu* not far from *Hebron*, noticed in the *Tell Amarna* tablets, and to be placed I think at the ruin *Taiyibeh*, north-west of *Hebron*. This would fit for No. 39. The places which, like *Deir Dubban* (more correctly *Deir edh Dhibbán*) are called after a *Deir*, or "monastery," generally took the name I think in Christian ages. The caves at this site have Cufic inscriptions, and like those at *Beit Jibrín*, seem to have been excavated in the middle ages. The word *Dhibbán* could hardly represent *Tupu*, since the *Dh* is the proper equivalent of the Hebrew *Zain*.
- No. 40. *Abirau* might I think be the ruin *El Bireh* further west, which I believe to be No. 99 of the list of *Thothmes III*.
- No. 53. *Nupilu*. If this come from the root *Nup*, "to be high," I think it must be the present *Nuba*, rather further east than the preceding sites, which I identify with the second *Nob* of *Nehemiah* (vii. 33).
- No. 54. *Dushati* I should be inclined to place at the ruin of *Tauwús* south of *Núba*.

No. 55. *Pauru Kitut*. It is to be noted that the word *Pauru* for a "chief," is used in the Tell Amarna tablets, and Gath is fixed by their statements at *Tell es Sâfi*, and called *Giti*. The Gittites are mentioned in these tablets; and I would therefore advocate the view which M. Maspero mentions, and render this name "chief of the Gittite regions." The plural in *utu* for masculine and for feminine occurs in Assyrian and in Amorite, recalling the curious Hebrew form *Aboth*, "fathers."

No. 56. *Adima* (or *Adoma*, Brugsch) I think must be *Ed Duweimeh*, a village south of the preceding.

No. 58. *Magdilu* is no doubt rightly placed by M. Maspero, and the same as No. 71 of the list of Thothmes III.

No. 59. *Iarza* is also no doubt right. The name of the ruin near *Mejdel* was collected by my scribe as *Erzeh* not *Yerzeh*.

The latter part of the list, with its cartouches defining districts followed by names of places in each, is much elucidated by M. Maspero's new work. I think however a few sites may be added to those which he proposes.

Nos. 65-66. "Azmon in the Valley" carries us south of Beersheba.

No. 67. *Anari* might perhaps be corrupted into 'Omri, the name of a ruin north of Beersheba, which would fit with the next.

No. 68. *Pi Hakarau Pitiausha*. I believe M. Maspero fixes an important point in suggesting *Futeis*, which is a large ruin. I have proposed to identify it with the Pitazza of the Tell Amarna tablets. I would suggest that *Hakarau* may be for 'Akarau (the 'Ain and *Cheth* being undistinguished), and that it means the "barren" or "unproductive" district. All the places so defined lie in the deserts near Beersheba.

No. 70. Brugsch suggests Aroer, which seems not impossible. It is not the maps that are "poor" in this district, but the country which is desert, with very few habitable sites.

Nos. 71-72. *Pi Hakarau Abilama* (or *Abiroma* according to Brugsch), another desert site. I cannot understand how *ma* can be regarded as a plural in any Semitic language.

Nos. 73-74. *Shabbalut ni Gabri*. I think M. Maspero identifies this in a most probable manner at *el Jâbri*. The site is now a ruin with caves, for there is not a single inhabited village in this region. The Amorite plural, like the Assyrian, end

in *i*, even when not in the construct case. The word would therefore seem to mean "stream of giants." North of Beersheba.

- Nos. 75-76. If we are to read *Shabbalut Barakit* "stream of the tank," the reference might be to the stream at Beersheba, close to the last.
- Nos. 77-78. *Pi Hakarau-n-'Azai* should be sought further south.
- No. 79. *Addima* I should suppose to be *Adadah*, which preserves its name south-east of Beersheba. The *ma* seems to be a definite pronoun added in this and other cases, as in Assyrian and Amorite.
- No. 80. *Zapaka* suggests the word *Tubk*, common in the Syrian dialect for a "plateau."
- No. 83. *Ganat* is no doubt *Jennata* as proposed by M. Maspero. I think it is No. 70 of the list of Thothmes III.
- Nos. 84-85. *Pi Nagabu Azamut* (according to Brugsch), if correct might be connected with *Azmon*, which was in the Negeb or "dry" land.
- Nos. 86-87-88. "The canals and deserts of *Shanaia*" suggest a possible change of *n* for the Hebrew *m*, and in such case with *Shema*, or not impossibly the important ruin *Samah*, north-east of Beersheba.
- No. 89 is perhaps beyond the Survey limits on the south.
- Nos. 90-91. *Ouaruk* if to be read *Bârûk* is I think the ruin so called south-east of Hebron, which, as collected for me in 1875, is spelt with the *Koph* (باروق). It is within the Negeb, which included the desert hills in this part.
- Nos. 92-93. *Ashakati* is *Ashahathat* according to Brugsch. If this be, as M. Maspero holds, from a root *Shukkhah*, it seems probable that the village *Esh Shiûkh*, north-east of Hebron, is the site, which would fit with the preceding.
- Nos. 94-95. *Pi Hakarau Hamina*. I think that the ruin of *Ghanaim*, close to Bârûk, is worth consideration. The two gutturals are sometimes interchanged.
- Nos. 96-97. *Pi Hakarau Alagad* or *Arukad*. There is a ruin *Rakah* close to the preceding (رقة) which has the required *koph*.
- No. 98. *Adamaim* (or *Adomam*, Brugsch) might be the large ruin *Domeh*, some miles further west.
- No. 99. *Hanini*, perhaps the Biblical *Anim*, now *Ghuwein*, south-east of the preceding.

- No. 100. *Adorau* would come naturally at *Dûra*, the Bible *Adoraim*, where M. Maspero places it.
- Nos. 101-102. *Pi Hakar Tulban* would probably be the ruin of *Dilbeh*, near the next.
- Nos. 103-104. *Haidobaa Sharun ram*. The important ruin of *Hadab* ("the hump") would fit well; it is close to *Dura*, about two miles to the south. The term *Sharun Ram* seems to mean "the high plateau," which fits with the position of the site.
- Nos. 105-106. *Haidoba Diuati*, perhaps is connected with the name of *Yuttah*, an important village to the east (Bible *Juttah*).
- Nos. 107-108. *Hakarima 'Arada*, "the desert of 'Arad."
- Nos. 109-110. *Rabbit 'Aradai*, "the capital of 'Arad," as given by M. Maspero, carries us further south, into the Beersheba desert.
- No. 111. *Nebatut* might be *Inbeh*, north of *Arad*.
- No. 112. *Iaurahma* or *Ibrahma*. Whether or no *Jerahmeel* be *Wâdy Raheimah*—which may be only named from the *Rahâmeh* Arabs—I am inclined to think that the list goes back, at this point, to the region north of *Dûra*, and would suggest the ruin of *Baârneh* as a corruption of this name; in this case the defaced portion may refer to a suburb of *Dûra*; as M. Maspero proposes for No. 117, "little *Adora*."
- No. 118. *Zabia* is perhaps the important village of *Sâfa*, north of *Hebron* (صافا).
- No. 120. If this be restored *Baruk* I think it must be the *Berechah* of the Bible, now *Breikût*, which is east of the last, written with *caph*.
- No. 121. *Fretima*. There is an important spring called *'Ain Fâris*, north-west of the last. The *t* is sometimes softened into *s* by the Palestine peasants.
- No. 122. *Abil*. Perhaps *Habeileh*—the name of a ruin near the last—is a corruption of this name.
- No. 123. *Bar Loza*. There is a valley called *Lôzeh* in this vicinity further east, which would support M. Maspero's views as to this word.
- No. 124. *Bit Anati* (Brugsch) is now *Beit 'Ainûn* rather further south than the preceding.
- No. 125. *Sharhatau*, perhaps *Siâir*, near the last, or *Beit Shaâr*,

further north. The inversion of the guttural does occasionally occur.

- No. 126. *Armaten*, "the two Armahs." There are two ruins called *Er Râmeh* west of Beth Anoth, which would agree well.
- No. 127. *Galuna* or *Galena* (Brugsch) might be the ruin *Jála* further north than any of the preceding.
- No. 128. *Aroma* or *Alama* perhaps '*Alîn*, north-west of the preceding.

These suggestions would lead us naturally towards Jerusalem, which M. Maspero considers to have been last on the list, the four defaced names being in the vicinity of Bethlehem.

No. 129. . . . *lhath* might be restored *Malhah*.

No. 130. . . . *raa* perhaps Ephrath (Bethlehem).

No. 131. *Ma* . . . Perhaps Maarath now *Beit Ummâr*.

No. 132. *Ari* . . . Perhaps Kirjath Arim now '*Erma*.

No. 133. *Iura* . . . Jerusalem according to M. Maspero.

I think the learned Author is to be congratulated on having made this valuable list far more intelligible than it was, and in having set aside several misleading proposals. I would venture to add that he would find more names on the one-inch Survey than on the smaller map published by the Palestine Exploration Fund. As regards the distribution of names, many sheets of the Ordnance Survey, in the Highlands of Scotland, contain fewer than are shown on my Survey in parts of Palestine which are desert."

A communication was then read from Mr. Trelawney Saunders (who has added to that debt which English geographers are under to him by laying out the water basins, &c., on the well-known map of Palestine published by the Palestine Exploration Fund). After referring to "Mr. Reginald Stuart Poole's article in Dr. W. Smith's *Dictionary of the Bible* (3 vols., 1863), in which the then known identifications are carefully considered, and the bearing of Shishak's reign on Egyptian and Biblical Chronology is carefully elucidated," he added, "it may be worth attention that No. 58 Zaloumim is No. 57 in Poole's table, and the tabular arrangements of the latter seems to suggest its probable accuracy. Dr. Maspero's suggestion of Gath in reference to No. 55 is quite exciting, and is an instance of the prizes that the investigation of Sheshonq's list still has in store for inquirers."

Captain F. PETRIE, F.G.S.—I cannot help alluding to the debt

Bible students owe to Professor Maspero for his labours. His especial endeavour in this paper has been, to "rigorously transcribe" the Egyptian letters into their Hebrew equivalents, and thus avoid, as far as possible, all errors and chance of hasty assumptions, so as to obtain the exact names of the places to be identified. The success attending his efforts is acknowledged, and one instance of their value was recently pointed out by that well-known member of this Institute, the late Canon Liddon, who considered that M. Maspero's investigations as regards the list of Thothmes III (see Transactions, vols. xx and xxii) afforded not only "indirect confirmations of the truth of the Bible narrative," but were "an important contribution to the great fabric of Ancient Egyptian history, to which we may look with increasing confidence for the means of showing how mistaken are certain theories which, *for purely or mainly subjective reasons*, would place the dates of the earliest books of Holy Scripture so late as to be inconsistent with belief in their general trustworthiness, to say nothing of their higher claims."

The CHAIRMAN.—We have a visitor here this evening, Mr. Frederick Bliss, who, in connection with Professor Flinders Petrie, has been carrying on the explorations at Tell-el-Hesy, on the borders of Philistia.

Mr. F. J. BLISS, M.A.—I cannot help noticing the omission of Lachish from the list given by M. Maspero. It would have been satisfactory if something final and definite (I mean after the work at Tell-el-Hesy) had been added with regard to identification; of course unless you find an absolute inscription on a building, that is known to be of ancient date, and which can clearly give the name of the place, you have not arrived at a perfect and complete identification. Major Conder suggests that Tell-el-Hesy is probably Lachish, and Dr. Petrie, by his work, has made it seem more sure, and my discovery of the tablet at Tell-el-Hesy has been thought to help it on rather more still—though I am not quite sure, the only mention on the tablet being of Lachish (which has been connected with Tell-el-Hesy); and of course the finding of an inscription a thousand years hence in some town mentioning the Lord Mayor of London, would not prove that place to be London. Yet I feel pretty sure that Tell-el-Hesy is Lachish; but between the highest probability and certainty there is always a loop-hole.

The Rev. W. BAILEY, M.A.—I feel a deep interest in all that has been read this evening, for it so happens that during twenty years' residence in Jerusalem I know almost all the places mentioned, and it is only now, after many years' absence, that I have again returned from Palestine, where I lived in the midst of the places mentioned in the paper. I was with Captain (now Sir Charles) Warren, round about the Jordan, and, since then, with the discoverer of the Moabite stone, and I could not help thinking how in the present day so much is found to make us feel and realise the truth of the word of God. I have felt when a man has travelled in Jerusalem he will either go away a worse man or a better—he will have his faith confirmed, or he will go away with his mind set against God. You cannot go a step in Palestine without seeing that the word of God is true.

Mr. W. St. BOSCAWEN (F.R.Hist.Soc.).—I think Professor Maspero has done great service to Biblical geography in bringing together the monuments and the evidence of those monuments, and saying "see how these two fit."

The CHAIRMAN.—The hour being now late I will only mention, as regards the names in the paper, that finding but few references to their places in the Old Testament, and thinking that it might be of advantage to many to have the references given to those that Major Conder and others considered to be important,—I have drawn out a list, which may save trouble in future; I may mention that there are at least eighteen—perhaps more—places named in the Old Testament, particularly in the book of Joshua, the identification of which are already beyond doubt.

*Old Testament References to the Names.*

No.

11. Gaza. Judg. 16; Jer. 47; Amos 1, 6; Zeph. 2, 4; Zech. 9, 5.
12. Mageddo. Josh. 12, 21; 17, 11; Judg. 1, 27; 5, 19.
13. Rabbati (Rabbiti). Josh. 19, 20.
14. Taânaqou (Taanach). Josh. 12, 21.
15. Shaunama (Shunem). Josh. 19, 18; 1 Sam. 28, 4; 2 Kings 4, 8.
16. Bit-Shainla (Beth Shean?). Josh. 17, 11; 1 Sam. 13, 10.
17. Rouhaïba. (Rehab of the *Onomasticon*.)
18. Hapourama (Haphraïm). Josh. 19, 19.

19. Adoulmim. Bible ref. doubtful.  
 21. Shaonadi (Shadid, or Sarid ?). Josh. 19, 10.  
 22. Mahanema (Mahanaim ?). Gen. 32, 2 ; 2 Sam. 2, 8 ; 17, 24.  
 24. Bit-haouaroun (Beth-Horon). Josh. 10, 10 ; 16, 3.  
 25. Qadoutim. Bible ref. doubtful.  
 26. Aiaouloun (Aijalon). Josh. 19, 42 ; 21, 24.  
 27. Makidau (Makkedah). Josh. 10, 10 ; 10, 16.  
 28. Adirou or Adilou (Ataroth). Num. 32, 3.  
 29. Iaoudhamalonk (Jehud). Josh. 19, 45.  
 37. Qaqali (Kéilah). Josh. 15, 44.  
 38. Shaouka (Shocho). 2 Chron. 11, 7 ; 28, 18.  
 65. Aazama (Azem). Josh. 15, 29 ; 19, 3 ; (or Azmon) Num.  
 34, 4.  
 69. Fit-iaousha (Joshah). 1 Chron. 4, 34.  
 79. Adidima (Adadah ?). Josh. 15, 22.  
 99. Hananii (Anim ?). Josh. 15, 50.  
 100. Adorau (Adoraim). 2 Chron. 11, 9.  
 106. Dionati (Juttah). Josh. 15, 55.  
 108-110. Arada (Arad).  
 120. Baruk (Berachah). 1 Chron. 12, 3.  
 125. Shalhatou (Shalatin). Josh. 15, 32.  
 133. Iaourishalama (Jerusalem).

The meeting then adjourned.

#### COMMUNICATION FROM THE AUTHOR.

M. Maspero writes:—

“ Paris, Avril 2, 1894.

“ L'identification de Tell-Hesy avec une ville égyptienne dépend avant tout de son identification avec une cité hébraïque. Si le site moderne répond bien à Lakhish je ne trouve rien dans la liste de Sheshonq qui puisse être comparé à Lakhish et par suite à Tell-Hesy ; s'il répond à quelque autre ville de Juda peut-être le nom de cette autre ville se recontera-t-il sur la muraille de Karnak. De toute façon la recherche du nom sémitique doit précéder celle du nom égyptien.”

## ORDINARY MEETING.\*

THE PRESIDENT, SIR G. G. STOKES, BART., IN THE CHAIR.

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

LIFE MEMBER :—The Hon. L. Kinnaird.

MEMBERS :—J. H. Anderson, Esq., Middlesex ; Miss F. Reade, India.

COR. MEMBER :—Professor Fritz Hommel, Ph.D., Bavaria.

LIFE ASSOCIATES :—Rev. L. P. Conrad, B.D., M.S., United States ; A. E. Martineau, Esq., India.

ASSOCIATES :—Admiral H. McC. Alexander, R.N., Ireland ; His Excellency Grant Bey, M.D., Egypt ; Rev. J. D. Bryan, Alexandria ; Rev. T. Stirling Berry, D.D., Ireland ; Rev. Principal E. Elmer Harding, M.A., St. Aidan's Coll. ; W. Kirkaldy, Esq., Surrey ; W. A. Lea, Esq., B.A., B.Sc., Canada ; G. Munt, Esq., Surrey ; Rev. J. Matthews, M.A., Middlesex ; Rev. W. H. Macpherson, United States ; Rev. J. T. Pettee, A.M., United States ; Rev. Prof. L. B. Paton, A.M., United States ; G. J. Smith, Esq., J.P., Middlesex ; Rev. C. H. Stileman, Surrey ; Rev. A. Sloman, M.A., Cheshire ; Rev. R. Towers, Middlesex ; Rev. C. C. Waller, A.B., Canada ; Rev. S. M. Zweemer, M.A., Persia.

The following paper was then read by the author :—

*AN ENQUIRY INTO THE FORMATION OF HABIT IN MAN.* By ALFRED T. SCHOFIELD, Esq., M.D., M.R.C.S., &c., Chairman of Council Parents' National Educational Union.

I HAVE written this paper in some haste during great professional pressure, in answer to a request conveyed to me by the Hon. Secretary to this Society; and I feel some apology is needed, not only for its imperfections, but for the selection of a subject that is certain to raise many more questions than it answers. And my apology is this: first, that the subject is continually more or less before me in connection with the education of children on the plan advocated by the Parents' National Educational Union, with which I am connected; and secondly, because, as will be seen, no question is of greater importance in the formation of character, or has a greater bearing on the advancement of the race.

The subject is one involved in difficulty, lying as it does on the borderland of the unknown, and touching the great questions of mind and brain action. I must therefore be excused if I am found expressing the movements of the one in terms applicable to the other, or in any other way using words coined for matter with reference to that which is immaterial.

\* 1st of 1894 Session.

I would also finally ask the forbearance of any physiologists that may be present, if in order to make the subject clear to those who have not pursued these studies, I preface my remarks with a brief summary of the general arrangement and structure of nerve tissues.

*Brain structure generally.*—The adult brain in man weighs between 46 and 53 ounces, with extreme limits from 23 ounces in an idiot to 65 ounces in men of the highest attainments. In women brains weigh between 41 and 47 ounces. The brain of the highest anthropoid ape weighs about 15 ounces. The brain is in two halves, right and left, and in four portions: the hemispheres and cortex, the seat of purely intelligent and voluntary actions; the middle brain, consisting of large ganglia, whence proceed the ordinary movements of animal life, *not necessarily voluntary*; behind this the cerebellum, or little brain, co-ordinating the movements, especially those connected with the erect position; and below, the medulla, which contains nearly all the involuntary centres connected with the maintenance of passive physical life.

The cortex, which increases in size in animals in proportion to the rest of the brain, in the ratio that intelligence supercedes instinct, is covered or rather composed of convolutions which by their number and depth afford a very fair idea of the amount of intellectual development. They increase steadily in intricacy as we ascend the animal scale; they also increase in man up to fifty years of age, after which they get gradually less marked; the brain as a whole also decreasing in weight about one ounce every ten years. The brain and spinal cord are each pierced with a continuous central tube surrounded with grey or nerve cell matter, which in its turn is surrounded by white or nerve fibre matter. The cortex or surface of the brain is covered to the depth of about a quarter of an inch with another layer of grey cell matter, the superficial extent of which is obviously greatly increased by the convolutions.

The brain is continually wasting and being repaired, the new tissue always accurately reproducing all the features of the old, whether these be congenital or acquired.

*Nerve structure generally.*—The nerve centres consist of three main elements; nerve cells, nerve fibres, and the groundwork or webwork in which both are embedded, called neuroglia. In the cortex this substance looks like ground glass, and under a very high power is seen to be traversed in every direction with very fine white fibres less than  $\frac{1}{10000}$  of an

inch in diameter. The nerve cells seem to be the starting point, and the centres of nutrition for the nerve fibres. The nutrition of the attached fibres is indeed a more obvious part of their work than the projection of impulses, which was formerly thought to be their main function. Any fibre cut off from its nutrient cell soon wastes away. In early childhood the cells are of a spherical, fusiform, or pyramidal form with few or no interlacing nerve fibres. Nerve impulses, starting in infancy and increasing in numbers and complexity till adult life is reached, are believed to form intercommunicating nerve fibres between the cells in every direction, until in manhood though there are still left many unbranched cells, the greater number have fibres given off in every direction. In old age again a good many of them appear to be broken off and the cells blunted.

*Blood supply.*—The grey matter containing cells is, to a limited extent, analogous to an electric battery, of which the wires are the nerve fibres. The vitality of these nerve structures is maintained by a constant supply of fresh arterial blood. By this means when the battery has discharged its nerve force, it is speedily recharged, and as this occurs most often in the grey matter, there is about five times as much blood circulating there as in the white or fibre matter. The great proportion of blood used by the brain compared with the rest of the body is certainly remarkable. While the brain is only about  $\frac{1}{5}$  part the weight of the body, the supply of blood is about one-eighth of the whole of that required by the rest of the body. The system of circulation is arranged so as to ensure the most constant and rapid change. The interdependence of mind and body is nowhere more clearly seen than in the question of blood supply. If it be suddenly *cut off* from any part, that part can no longer be used voluntarily; if the blood be *deficient* in quantity the thoughts often get confused and senseless; if it be *defective* in quality the very disposition seems changed, and the person gets gloomy and morose; if the *temperature* gets raised, delirium sets in; if *effusion* takes place, and the blood presses on the brain consciousness is lost altogether in an apoplectic fit.

*Ordinary functions of brain.*—The brain has already been divided into four parts, and these correspond to its leading functions. The cerebrum is thus divided into upper, middle, and lower regions; or cortex, mid-brain, and medulla. The first is the seat of intellectual life, or the sphere of the activities

of the *spirit* of man; the lower, of the necessary vital functions that carry on and store life's forces—the vegetative side of our life, or *body*; while the middle region is that of the functions of animal life, or what is sometimes called the *soul*. The actions connected with the cortex are voluntary, those connected with the medulla are involuntary or reflex, while those between the two partake of both varieties of action, being at first largely voluntary in character, but becoming more and more automatic in reflex as *habits* are formed. The difference of these four divisions of the brain is well shown in drunkenness. The upper region is affected first, and noisy manifestations of animal life are displayed unruly by the spirit. If the man be drunk, the middle region and the cerebellum are paralyzed, and all equilibrium and movements of animal life are lost. If the man is dead drunk, the medulla alone remains active, carrying on the functions of passive bodily life.

That the hemispheres or upper regions of the brain, and particularly the surface or cortex proper, are the centres for intelligent brain work, is proved by direct experiment, as we shall see when we consider the various actions of the brain. But we may here remark that the frontal region is supposed to be specially connected in some way with thoughts and ideas that do not result in bodily activity; the occipital and part of the parietal regions are the centres of sensation or perception, while the intervening portion is the centre for all motor impulses, which can be readily aroused by touching the part with electric stimuli.

In idiots the frontal region is found to be very deficient, while in intelligent men it is greatly developed.

Destruction of the sensory area in the *cortex* appears still to leave the *mechanism* of sensation (a dog will see, hear, and even feel, in a sense), but the *perception* is lost (it does not know what it sees, hears, and feels).

In the middle or motor area, districts have been carefully mapped out in the right and left hemispheres, corresponding with movements in various parts on the opposite side of the body; but it has been specially observed by Foster that the size of these districts does not correspond with the size of the part moved or the number of muscles or nerves it may contain, but to the more or less elaborate and complicated and intelligent use of the part. Thus the district for the arm is enormous compared to the leg, that for the thumb large as compared with the fingers. Another proof

that the nerve fibres increase according to the complexity rather than the number of movements is found in the fact that although the number of movements of the leg must be as numerous in a dog, or an ape, as in man, the pyramidal tract in the spinal cord by which they are conveyed is twice as large in man as in the monkey, and ten times as large as in the dog.

The functions of the brain develop in a fixed order, and Sir J. C. Browne has called attention to the fact that if this natural order is disregarded in education, the result is imperfect, and the mind is never fully developed. The various senses, the motions, emotions, and intellect all come to maturity at different times.

With regard to movements, those of mastication precede those of the foot and leg, then come the hand and arm, then the proper use of the tongue and lips, later on the power of speech and writing.

Imperfectly developed motor centres produce various imperfections in the execution of the movements involved, such as stammering, twitching, an imperfect gait, &c. One point of importance remains to be noticed. The brain centres are developed by exercise of the parts they govern, and whenever fully developed, the result remains. Thus if a limb be atrophied or useless from birth, it is found that the district in the cortex remains undeveloped; but on the other hand, if the centre be once fully developed by use, and the limb subsequently lost, it is found that although the lower centre in the spinal cord may waste, the higher centre in the cortex remains perfect, being probably maintained by its inter-communication with other parts. The bearing of this on physical education is obvious.

*Nerve currents.*—The more the brain is investigated the more does its broad description as a sensori-motor mechanism appear true. If we except a certain frontal area, and even this is doubtful, it appears that apart from the hemispheres and cortex, the nerve paths in the lower parts of the brain consist of sensori-motor arcs, the nerve currents arriving at the hinder part of the brain by the posterior part of the cord, and leaving the anterior ganglia, notably the corpus striatum, and descending down the front of the spinal cord in the resulting motor impulse. To use now the words of Dr. Hill, in his paper on reflex action, read here a short time since: "On these arcs, which collectively make up the lower system, are superadded arcs, the loops of which lie in the higher grey

matter. At the same time, therefore, that an impulse flows across the spinal cord, as a simple direct reflex action, a certain part of this impulse is also diverted to the brain along fibres which ascend in the outer part of the spinal cord; and from the brain descending fibres carry the impulse back again to the lower arc. Accurate measurements of the time taken by impulses in travelling through the grey matter have done much to throw light upon the route they follow; but we do not yet know whether we ought to speak of the conversion of a sensory into a motor impulse, as its passage through the lower network under the direction of nerve currents which originate in the higher; or whether the impulse when it reaches the lower grey matter takes in some cases a direct cross path, while in others it makes its transit through a longer loop. One thing is quite certain, namely, that the routes which are most frequently used are the most open, and therefore the most easily traversed."

The functions of the nerve-cells are various and must be considered in detail; the molecules, or particles, of which a nerve-cell is built up, are in such an unstable condition that any stimulus readily excites them to change; this molecular change is believed to constitute a nerve-cell action; it may be of very various degrees of violence; it may exhaust the nerve-cell in proportion to its violence (and when exhausted the cell cannot act again until restored by nutrition from the blood); it may affect the substance of the cell, and especially of young growing cells, so as to leave an impression on the cell, permanent in proportion to the violence of the action and the number of its repetitions. When a nerve-cell acts (whatever this may mean), impulses tend to pass off from it along its various connecting fibres; the force and number of these impulses depends on the violence of the cell action; if this is gentle there may be only a slight impulse passing off through the largest connecting fibre (the freest channel); if the action is violent it may overflow through the various connecting fibres in impulses increasing in force and number with the violence of the cell action.

If the foot of a sleeping (or deeply thinking) person is tickled it is quietly withdrawn; that is to say, the gentle skin irritation sends a gentle impulse to the sensory cells, which are gently excited, and send gentle impulses to a few motor cells; but if the foot be suddenly burnt, the sensory cell action, excited by the powerful impulse from the severely irritated skin, will be so violent that it will overflow through many more connecting fibres, and almost every muscle in the body

may be thrown into violent action, causing the person to spring vigorously away from the injury.

When we speak of higher loops ascending to the cortex, and when we remember that besides these loops the brain cells send off masses of fibres that ascend to the cortex and appear to end there, and when we ask what are the sources of the impulses that control these loops and fibres that are evidently the vehicle of voluntary actions, we are brought face to face with two great questions: "Is there a mind apart from the brain?" and "Can mind act on matter; or that which is immaterial on that which is material?" This subject cannot be wholly passed by, and must be here briefly touched on.

With regard to the second question Professor Clifford settles the whole point for us by the dogmatic statement that "To say, will, influences matter is neither true nor untrue, but simply nonsense." If this *ex cathedra* statement be true, I fear a good many of us talk great nonsense, and some of us will certainly do so to-night. Before answering it, however, let us consider our first question, as to the existence of mind apart from brain.

The existence of the will, which is the supreme assertion of mind, is proved by knowledge and experience. The formulæ, "*Cogito, ergo sum*," and "I know, I am, I can, I will," both express this. Feeling and thought and will are the only things we know to be real; all else is ascertained by our senses. The consciousness of effort as well as purpose in will is strong proof of its real existence. The contrary belief, that we are actually automatic, that voluntary actions are only so called because their automatic nature has not as yet been discovered, and that the mental phenomena that follow brain actions and movements, such as sensations of pleasure and so forth, are merely the products of such movements, or at any rate associates of them, as the melody is the result of playing on a harp, or motion the result of rowing in a boat, is negatived not only by experience but by the following considerations. Are we, for instance, as Dr. Courtney asks, "to consider that mental states are merely the products of movements of material molecules?" Is thought a secretion of the brain; or are we, in the words of Mr. S. H. Lewis and others, to speak of the equivalence and identity of mind and matter, so that thought and nerve action are two sides of the same thing, or to use one of the most recent similies, "that the mental and physical sensation

correspond as the convex and concave surfaces of a hollow sphere”?

The answer to all this in the first place (but by many this will be considered of no weight), is that such an idea is subversive of all moral principle.

In the next place we *have* the power of choice, selection, memory, and attention, all of which, when carefully analyzed and considered, have no correspondence with any form of nerve action.

Consider the faculty of attention. If all mental conditions (to quote Dr. Courtney again) were simply the material result or effect of molecular agitation of the nerves, it is difficult to say why some forms of nervous agitation should produce “attention,” while other forms exactly similar should fail to get themselves registered within the brain. We are looking upon some landscape; we attend to some features in this landscape; we notice some particular tree or figure, or colour, not always because it is striking, but for some capricious fancy of ours. How can this be if there be not a mind within us with laws of its own, which has a nervous mechanism, but is not the slave or result of that mechanism? The Greeks rightly decided long since that the mind was not the music of the harp or the motion of the boat, but the player and the rower.

A great attempt has been made to prove that all actions are sensori-motor reflexes, that all organisms are merely mechanisms; but although we act often on impulse, we are equally conscious of acting against it, and of the mind conquering all the sensory solicitations of the body, and refusing to transmit the natural motor impulse that would have resulted had we had no will. The brain is certainly most carefully isolated from all external impressions—in a bony case, floating in fluid, wrapped in membranes—except those conveyed by the blood and nerve currents; and yet these totally fail to account for actions contrary to these currents, and we must superadd therefore, that it is acted on by mind.

The action of an automaton, moreover, is characterized by ease, that of mind by distinct effort, and the mental fatigue is never in proportion to the amount of work done, but as to how far that work is reflex, or automatic, or voluntary.

Again, if half the cerebrum is lost, half the powers of the body go, and yet the mind remains as a whole. Moreover the brain tissue is incessantly changing, and yet through all

our life we preserve the consciousness of the same personality. This cannot be through the medium of the body, which is not the same, but must be through an independent mind. The mind does not produce physical energy, but it guides and directs it, like a man on a horse. Dr. Carpenter says, "The influence of a great idea, conceived by a thinker in his closet in controlling the action of an entire nation, is utterly disproportionate to any conceivable play of molecular forces that can be exerted by the physical agency of the thinker putting his idea into speech or writing." There may be automatic thinkers, in whom the will is absent or undeveloped, but though the dominant power is absent, even such have mind as well as body. The existence of mind therefore and the freedom of the will may be said to be axiomatic truths.

And now to return to Dr. Clifford as to the relation of this mind with matter. Professor Ladd, in his *Physiological Psychology*, says: "The human brain is a vast collection of material molecules, whose constitution and arrangement is such as to connect them with certain forms of external physical energy.

"But they are also capable of standing in a yet more surprising and unique relation to a being of a different nature from their own, *i.e.*, the mind. These latter relations involve a causal connection, as truly as do the relations of the natural physical forces. That material molecules and a being of the kind called mind can be causally connected is indeed a mysterious fact; but because of its mystery it is not less to be acknowledged as a fact. The assumption that the mind is a real being which can be acted on by the brain, and which can act on the body through the brain, is the only one compatible with all facts of experience."

Neuroses, or nerve actions, produce psychoses, or mind actions; thus a prick produces pain. The light on the eye is a physical action, the impression on the sight centre a physiological one, the perception of it a psychical one.

The ordinary condition of the nervous system is that of a moderately charged battery that can be discharged by the completion of the circuit and re-charged by the blood. The will can complete this charged circuit. Mental causes can, as we have said, produce physical effects, and physical causes can produce mental effects. "We have every reason to believe," says Professor Bain, "that with all our mental processes there is an unbroken natural succession."

We must notice however, carefully, as to automatic

actions, that what we have power to will is not the action of certain muscles or nerves, but effects or results. The automatic machinery is all there; our will puts it in motion. The word voluntary muscle is therefore to a certain extent a misnomer, as few are under the direct control of the will. We cannot will the method but the result.

*Actions classified.*—Having then admitted that action may be originated in the body by a purely mental impulse called the will, we are now prepared to classify roughly the entire range of actions from the lowest to the highest in both body and mind. They are as follows:—

(a) Pure natural physical reflexes of three varieties:—

1. *Unconscious excito-motor actions*, generally called automatic because the exciting agency has not been discovered, such as the regulation of the size of the capillary blood-vessels, of which we are unconscious.
2. *Conscious excito-motor actions*, as the acceleration of the beat of the heart, producing palpitation, of which we are conscious.
3. *Sensori-motor actions*, such as laughing when tickled, when we are conscious of the causal sensation.

(b) Mixed physical reflexes, which are of three varieties:—

1. *Mixed sensori-motors and voluntary actions*, such as breathing, which, though generally reflex, can be controlled to a large extent by the will through the cortex.
2. *Deferred natural reflex actions*, such as the erect position, which is apparently learned artificially, but is really a reflex action not seen at birth, but of deferred development.
3. *Instinctive habits*. These are combinations of simple reflex actions for definite purposes, but without need of intelligence. They are best noticed in animals, as in the flying of birds. Pigeons can fly after the removal of the cortex. Frogs, when deprived of the cortex, can balance themselves on a board slowly turned round, and will croak when stroked, but never move voluntarily. At the same time if all the brain is taken away they can only execute simple reflex movements with their limbs. These

experiments show respectively the seats of reflex action (the cord), of complicated automatic action (the lower brain), and of voluntary acts (the cortex). It has been said by Romanes that instinct is partly due to lapsed intelligence. It may have come out of confirmed habits, and in this case mind must precede instinct and not succeed it. This carries mind a long way down the scale, and prepares us for Professor Ladd's remark that "automatism belongs to all living protoplasm." It is for this reason it is said, "an amoeba has a will of its own."

Instinct appears to culminate in the articulates, such as ants and bees, while intelligent action culminates in the vertebrata, as man. The former are like barrel organs, and can only play certain fixed tunes, however complicated, while the latter are like organs that can produce any melody at the will of the player.

(c) We come next to *psycho-physical acts*, mixtures of mind and brain. These are:—

1. Artificial, or acquired reflexes or habits; these originating in the will became automatic by use, and are the chief subject of this paper.
2. Voluntary actions acting *with* physical impulses.
3. Voluntary actions acting *against* physical impulses.

(d) Lastly, we reach *actions purely psychical*, which we will simply enumerate:—*Reflex* ideas, desires, emotions, and perceptions produced by the mind without the will.

*Artificial reflex* thoughts started by the will, continued by association; and lastly, purely *voluntary* ideas and emotions.

Before now passing on to enquire into the nature of habit, let us pause for one moment to consider the wisdom displayed by fortuitous evolution (if such, indeed, be our origin) in the great fact that all the processes in our body are of a reflex or automatic nature that are connected with the mechanism of life, and are not subject to the control of our will, but proceed in a large measure even without our consciousness; while on the other hand all the actions of physical life or the expenditure of animal force is placed in

#### ERRATA.

P. 144, line 7 from bottom.

The words *fortuitous evolution* should be within inverted commas followed by a note of admiration (!)

Two lines further on, a comma after *nature*.

the direct control of our will ; so that while we have little or no share in the accumulation of our life capital, we have a large control over its expenditure. I do not say "entire," because some is used in carrying on the natural functions of the body. Were the fact otherwise, and our will had to control the processes of physical life, life would indeed not be worth living, and intelligent existence an impossibility. The voluntary and non-voluntary systems form, as a whole, two well-marked centres of government, each having at its command the necessary nerves, muscles, and organs. In the former case the nerves are white and the muscles striped, in the latter the nerves are mainly grey or non-medullated, and the muscles plain or smooth.

What we have now to consider is how, in the evolution of higher intellectual life, we have the power at will to change voluntary into involuntary action, to an almost unlimited extent, by the formation of habits; a process important to be understood, and of the greatest bearing on the well-being and progress of the race?

*What habit is.*—Having therefore now briefly touched on a few of the leading points connected with the ordinary action of the nervous system, we proceed to consider the direct subject of this Paper, "the formation of habit in man." Let us first of all see what we mean and understand by "habit."

It is difficult to conceive of habit with reference to inanimate objects, and the word is no doubt to some extent inapplicable, and yet it is an interesting question as to what are the limits of its sphere of action.

Are the very laws of motion the result originally of habit? Are the chemical combinations of elements and the formation of different constant natural compounds and mixtures the result originally of long repeated repetition forming at last habits with cast-iron bonds that cannot be broken? Again, do we not see in an old dress, even in a room, a something that speaks of habit, an adaptability of shape and crease from constant wearing and use, or of fittings and furniture, that cannot be seen in a new coat or in lodgings? Does not an old violin that has been the property of some great master (not only made by some great maker) retain in its very fibres the habit of resounding to the grand chords he struck with far greater ease than any instrument that had not acquired this "habit" by long use? Passing on to living things. Do not trees acquire habits of growth from their environment,

and in the lower forms of animal life does not this open up the whole of the great question of the formation of natural reflexes or automatic action and instinct? Are the rhythmic pulsations of the jelly-fish or the movement of an amoeba the outcome of purely reflex action, or were they at first voluntarily acquired habits passing by long use into hereditary reflexes?

In the marvellous labours of the ant and bee instinct seems to have reached its apogee. Do they, as Romanes suggests, speak to us of a lapsed intelligence that having by long use formed all needed habits, has ceased to act when these have been crystallized into instincts? These questions, fascinating and interesting though they may be, are unanswerable in our present state of knowledge. Although the evidence in favour of lapsed intelligence increases, Prof. W. H. Thompson from the Chair of Physiology in Belfast, read only last week (Jan. 1894), "that the amoeba presented active and spontaneous movements, and that here one not only meets with a power of choice, but also an intelligent consciousness in selecting food."

Habit in man, as generally understood, means an act or thought, or sensation, or any combination of these, simple or complicated, that has been sufficiently often repeated to no longer require the same intelligence and will-power for its execution that were at first needed. It thus becomes an acquired or an artificial reflex.

Nearly all natural instincts in animals have thus to be formed as artificial reflexes in man. In man artificial habits formed at will replace instincts of a fixed character, or, if you please, voluntary habits replace automatic habits. Routine is living by habit. We sow acts and we reap habits; we sow habits and we reap character; we sow character and we reap destiny. Habit has well been called the railroad of character. Habit is physical memory. Memory is psychical habit. Character is organized habit. It is wonderful to note that even fixed habits that have passed (as we have suggested) long since into instincts or reflexes, can be modified by environment. It is the habit of all ova to build organisms in accordance with certain exact laws. But the ovum of a working bee that would produce a working bee is made to produce a queen bee by altering its food and feeding it on royal bee bread.

*The force of habit.*—The force of habit is, however, very great, and is only short of natural reflexes, which are

omnipotent in the body. No power of mind or will can stop the beating of the heart or the movement of the stomach, and a habit may be so formed as to be almost as difficult to check. Darwin found he had acquired in common with most men the habit of starting back at the sudden approach of danger, and no amount of will-power could enable him to keep his face pressed against the plate glass front of the cage of the cobra in the Zoo while it struck at him, even though he exerted the full force of his will, and his reason told him there was no danger.

The Duke of Wellington is credited with the dictum that habit is as strong as ten natures, and certainly to see what a soldier will do and is worth in a campaign when seasoned and well drilled, compared with a raw recruit, one feels that this statement is under rather than over the mark; for he owes all his value to "habit"! If an established habit is broken by the will the lower centres rise up in rebellion, so accustomed are they to the easy yoke of that which has been often repeated, that the effort of control required, as in the process of breaking a habit, over lower physical centres, often extremely painful.

*Physiology of habit. How formed.*—Referring to the description of the brain in childhood it will be remembered that it is something like a wide common over which are traces of many ancient tracks but no fresh paths. Habit strikes out fresh paths if the result of education, or re-forms old ones if they are the outcome of heredity. In all cases of true artificial reflexes or habits the will is the starting point, and a purely voluntary action takes place. This is repeated continually until, as C. Bastian and others believe, not only is a well defined brain path established between the arbitrarily associated groups of cells, but this path is physiologically present in the brain in the form of nerve threads or fibres; or in the graphic language of Dr. Michael Foster: "The will, blundering at first in the maze of the nervous network, gradually establishes easy paths. When once this is effected the slightest impulse seems to start the nerve current along the whole of the associated groups and produce the habitual action. The nerve current follows this route not now because it is guided by intelligence, but because this route offers the least resistance from habitual use."

There are one or two interesting points in the formation of a habit.

In the first place the action must never be varied even

for a day. If it be the learning of some steps in dancing they should never be changed till fixed in the brain. Again, it is of great importance, and this has a very wide application to the training of children, that the habit be taught and executed accurately. If the steps are taught in a slovenly way they will always be executed in a slovenly manner.

If a child learns sometimes that two and two make five, and at other times that they make four, there will always be confusion in the mind or brain paths as the case may be.

Again, there is a great tendency in the young for all repeated acts to become fixed habits, as in making grimaces, or the use of slang words.

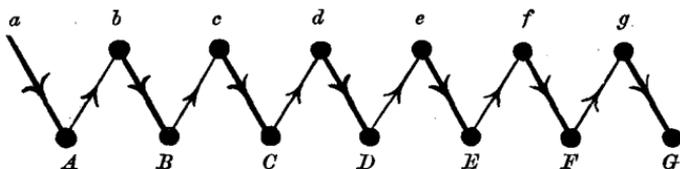
In those whose intellect is deficient this is far more marked. All such cases are creatures of strong habit and routine, and they like everything done at the same time each day. Miss Martineau tells us of an idiot who required any new thing done to be repeated at the same hour each subsequent day. His hands were washed and nails cut at 11.10 one morning, and next morning at exactly the same hour he came to have it done again, and yet he had no knowledge of time, and could not tell it on a clock. There must have been some very accurate unconscious cerebral process that told him when the twenty-four hours had elapsed. If seven sweets were given him one day, he would take neither six nor eight the next.

Again, fresh nerve paths tend to consolidate apart from actual repetition. A new task learned in the evening becomes easier to perform each morning than it was the night before, and easier still on Monday morning than it was on Saturday evening. The Germans go so far as to say that we learn to skate in summer and to swim in winter. What is exactly meant is that having been taught skating one winter, we go on learning it unconsciously all through the summer, or that we begin much better next winter than we left off at the end of the preceding one.

Attention in the formation of the habit seems greatly to deepen its impression on the brain, and make it much more easy to establish. A good memory, which is a psychical habit, is thus established by attention.

*Results of formed habit.*—A formed habit of average complication produces a sort of reflex peristaltic nerve current between the associated groups of cells. Supposing it is a question of learning the clog dance and alternately tapping

the floor with the toe and heel in rapid succession, the process is somewhat like this—



The small letters being sensory, and the capitals motor centres connected by the nerve threads of habit. The will starts the nerve for this step by placing the toe on the ground by an impulse from *a* to *A*. Before the habit was formed this would be all, but now it is but the first link in a long connected chain, along which the nerve current passes with great rapidity. The moment the toe strikes the ground, the sensation is passed to the brain along *A b*, and this is reflected as a motor impulse to strike the heel along *b B*. This in its turn producing a sensation along *B c*, starts the motion of toe-striking along *c C*, and thus the motion continues till stopped at *G* by the fiat of the will.

Once a habit is well established on such lines as these, the interference of will or mind only spoils its perfect action. Whenever knitting has become automatic, if you think about the formation of each stitch, you have to knit much more slowly, and are more liable to make mistakes. A fixed habit is thus deranged by volition.

The more fixed a habit becomes, the less of the body is required to execute it, and thus a great economy of force is effected. In commencing piano-playing, the young performer plays with her hands, and arms, and body, and legs, and head, and often her tongue. As she forms a perfect artificial reflex, less and less of the body is moved, until at last it is literally nothing but the hands and wrists that are engaged, the brain being at perfect rest, or thinking of something else altogether. Habit is thus of great economic value.

Habit which is physical memory is of such importance to character that a spinal cord or brain without such memory is either idiotic or infantile. Artificial reflexes last long if well formed. In early life Robert Houdin, the conjurer, trained himself in the difficult habit of reading aloud while keeping four balls going in the air. He did not practice this for many years, and yet after thirty years

found he could still read and keep three balls going. Any one who tries this feat will understand its difficulty.

Artificial reflex habit resembles respiration, and still more coughing, in that these occur naturally by reflex action, but can be modified or stopped by the will.

Habits, in spite of Weissmann, formed during life strongly tend to become hereditary. This is clearly seen in the love of strong drink.

*When to form habits.*—The easiest and best time to form habits is in the growing structure in early childhood, notably before fifteen years of age. The earlier the period that habits are formed the more lasting are they, and reappear at a late period of life when other habits acquired since have passed away. Plasticity of brain is essential, that is, tissues weak enough to yield to influences, and yet strong enough to retain them. After the brain is fully developed, that is, after thirty, or perhaps later, to acquire new habits or to give up old becomes alike more difficult. In old age we find, as we have said, that those habits that are acquired last, are lost first. As a rule, personal habits are acquired before twenty, professional habits between twenty and thirty.

*Physical habits.*—Let us now consider a few leading habits, physical, mental, and moral.

1. Physical habits that modify natural reflexes. Thus, one may get accustomed by degrees to digest indigestible things, or to tolerate an excess of alcohol, or to blush very readily, or not at all, or to vomit at the sight of certain articles of food, and so on.

2. Or physical habits that are new products altogether; that is, real artificial reflexes. These are innumerable; they extend through all our being, are insensibly being formed whenever an act is repeated sufficiently often, and are often only detected when it is too late to alter them.

They are amazing in their intricacy and variety as well as in the extraordinary ease they give when once firmly established in the performance of the most difficult and at first impossible tasks.

The old saying, "It's nothing when you are used to it," or the couplet—

"If at first you don't succeed,  
Try, try, try again,"

simply mean, if a thing is too hard to do, establish a habit and you will accomplish it.

I would repeat here that in what we call voluntary actions all we do is to will a result, as of raising the hand to the mouth. The ease with which we do it and indeed the power to do it at all arises, not from our will-power being able to control the so-called voluntary muscles, but in their being already associated for the purpose by long established habit. Where no such habit exists an action becomes well nigh impossible, however strongly it may be willed. By long habit, hereditary in nature, we always swing our right arm with the movement of our left leg, and the left arm with the right leg. Let any one *will* the contrary, *i.e.*, to move the right arm with the right leg and *vice versá*, and however strong the effort of will may be, they will find in the end that it is powerless to overcome this established habit, except most awkwardly, and for the shortest time. The intense difficulty of the one movement and the perfect ease of the other, both in themselves equally easy, is most striking.

Let any one *will* to play the violin, or piano, or to skate, or swim, or in short to do anything that requires the formation of habits, and they will see it is impossible; and that to do so at all a habit must necessarily be formed for the very purpose: and then behold! the thing which was impossible before is executed with almost contemptuous ease. Few of us know what bundles of habits we are, and we imagine many of our actions to be voluntary which are really artificially automatic. Let any man over forty try to wash and dress himself in any but the accustomed order, and he will see what difficulties arise. He may not know the order in which he washes his face, but the hands know. He cannot tell which arm is put into the coat first, but the arms know. He cannot tell which foot is put into his stockings first, but the feet know. Before I begin to dress, from long habit I am almost compelled to pull up the blind a certain exact height, and if I fail to do so, I feel an inward impulse that is not satisfied till it is obeyed.

Consider the habit of shooting; the perfect ease with which the trained sportsman, the moment the grouse rise, aims and fires well nigh automatically at the birds, who themselves have acquired *fin-de-siècle* habits (as Sir Joseph Fayerer told us) in learning to avoid the telegraph wires as they fly, which in earlier times they always struck against.

Look what an automaton a soldier becomes; so that the very dinner he may be carrying, as Huxley tells us, is dropped

unconsciously into the gutter if he hears that magic word "Tenshun," which in his mind is so associated with his little finger and the seam of his trousers that his hands at once fall to their allotted place. But time would fail us to describe the marvels of physical habits, and we must pass on, especially as we have still greater wonders in store.

*Mental habits.*—Habits of thought are as truly and readily and often unconsciously established as habits of body, and indeed the two are sometimes inscrutably mixed; as in character as displayed in handwriting as well as in the lines that habit has traced upon the face, rendering physiognomy a true science. We have also ideal habits, and here as elsewhere habit means ease.

*Attention* may be deliberately manufactured as a habit by the inattentive. For this is the charm and value about habit; that if we begin soon enough, and particularly in childhood, and pre-eminently before the age of ten, we can absolutely engraft into the child's character many of those valuable mental qualities which it may lack. The habit of *enquiry* is easily acquired in young life, and is invaluable in after years, and simply means going through life with one's eyes open instead of shut.

The habit of *perfect execution* is invaluable, but must be taught early. Perhaps no other mental habit leads to greater success in every calling in life. *Sloyd* is the physical means by which this habit is best taught in childhood; for the essence of sloyd is not what is made, but that it should be perfectly finished in all its parts.

*Industry* is another invaluable habit.

*Moral habits.*—But we must pass on to moral habits. Now if we wish to produce some valuable moral quality in a child, the easiest way to do it is to establish the quality as a habit; the most difficult and uncertain is to depend on direct precept. To be always telling a child to be truthful is a poor way of making him so; but to accustom him to use his words in talking exactly as a painter uses his colours in painting, so that his word picture shall be a faithful copy of what he is describing, painted in words instead of water colours; this persevered in, will give him the habit of truthful speaking as a fine art, apart from its moral value, which of course will only strengthen the habit. In a similar way most moral qualities can be formed as mental habits—deliberately, surely, and easily, as compared with any other method; and if sufficiently well established, it is harder to depart from them than

to display them. Thus decision, self-control, obedience, self-respect, unselfishness, courtesy, reverence, can, one and all, be formed by frequent repetition in early life. We know nothing of the mind tracks that ensure their permanence; all we know is that they are as sure and lasting as physical habits.

In this connection those words of Holy Writ derive an added meaning: "Train up a child in the way that he should go, and when he is old he will not depart from it."

*Value of habit.*—And now in bringing these fragmentary remarks to a close, let me point out first the value of habits as a whole, and lastly their drawbacks; for they have drawbacks.

Habit is economical. It has been well described as using the interest of nerve energy instead of the principal. The absence of fixed habits is misery, and is the source of nearly all indecision of action and of character.

Habit alone enables things otherwise impossible to be accomplished, such as playing the flute, violin, or piano. But for habit we should spend a whole day in doing one or two things with great fatigue of mind and body, such as the continued effort to balance the body in the erect attitude by sheer force of will, or to read a book, or to walk.

Habit gives speed, accuracy, and ease. The will, as we have seen, can only set habits in motion, and is powerless to act when such do not exist. The unconscious ease of a well-formed habit has been well illustrated by fixing a wafer on a looking-glass, and while keeping the eyes fixed on it, moving the head in a circle. The eyes will be seen to be moving in every part of the orbit, but cannot otherwise be known to move at all: so unconscious and without effort is the action of the complicated muscles that move them, which by the way are all so-called voluntary muscles.

Habit forms character, or at least a good deal of it. Up to a certain point our character is formed *for* us by heredity, beyond this it is formed *by* us by habit. Skill is entirely the result of habit. To seek to be ambidextrous is folly. Specialism is everything in the body, and the habits that suit the right hand do not suit the left, nor the left the right. The left hand is just as awkward with a knife, as the right is with a fork. Some callings may require a certain measure of ambidexterity, but it is against all true development, and is common in idiots.

Habit adapts us to our environment, without which we should die. A bookbinder in a little den in Paternoster Row

is as happy and healthy as a farm labourer in the Midlands. Each has become adapted to his environment by habit. Let them change places, and the chances are both will die. Sir Charles Lyell tells us of some English greyhounds exported to South America for coursing hares on a raised plateau some 6,000 feet high. They were useless on account of the unaccustomed rarity of the air, but they produced pups who could course as well as the dogs of the country from a formed habit. Some habits are the offspring of necessity, others of caprice.

*Drawbacks of habit.*—But there is another side to habit that must be alluded to in conclusion, and that is its drawbacks. An illustration will explain this. In suburban dwellings, with a garden and locked gate in front, there is often an arrangement by which the gate can be opened from the house by pulling a handle that raises the gate latch. When the gate bell rings in the hall it is equivalent to a sensation reaching a conscious brain. The maid then comes and looks out to see who is there before she pulls the handle. If it is a person she wishes to admit, she pulls the handle which lifts up the gate latch. The maid is the mind which considers the impulse received by the brain, and does not send a motor impulse until the will determines what shall be done. This is a type of a pure voluntary action.

If, however, to save herself trouble, the girl fastens the wire that should ring the bell round a pulley in the hall to the wire that opens the gate, the result will be that when a man pulls the bell handle, he rings no bell but opens the gate by a reflex action. This is the formation of an artificial reflex, only it cannot be thus made at once by the will but must be gradually formed by frequent repetition. The advantages of the voluntary action were—the maid could admit whom she pleased, and none could enter without her knowledge and consent. The drawbacks were—it took her nearly all her time to answer the bell, and the man had always to wait for a time at the gate.

When the action is changed into a reflex one, the advantage is that the man is never kept waiting, for pulling the wire opens the gate, and the servant never has to answer the bell. The disadvantage is she no longer knows or can control who enters the garden. Habits thus may become our masters. There is a story of a lady engaged to play at a concert who took too much at supper, and the result was she

not only kept on playing too long, but whenever her fingers rested on the keys she started playing like an automatic musical box, and could not be stopped. Girls who drill holes in buttons in Birmingham are said during their dinner hour as they pass along the streets to be constantly continuing unconsciously the same movements with their fingers.

Habit is often used to excess with bad results. Hammer-palsy arises from incessantly using the hammer in making knives till the associated group of cells is worn out, and paralysis sets in; writers' cramp is another illustration.

Habits that have become unconscious may be put in action by using wrong stimuli. When dressing for dinner one frequently winds up one's watch by mistake, and some in changing their clothes have gone to bed unconsciously.

A bad habit is a terrible thing when thoroughly fixed. Swearing is a good example of this, and of the tenacity of a habit when firmly established. It is a drawback when processes that should be intellectual become mechanical by habit, as when prayer is said by rote and not prayed; it is this that constitutes all forms of "cant."

Habit blunts the feeling both as to right and wrong, and as to pleasure and pain, and when purely automatic abolishes it. A man may get such an inveterate habit of lying as to lose all sense of evil. So with other sins.

A person travelling or yachting takes great pleasure in it at first, but if he is ever doing this and gets into the habit of the thing, it loses its charm.

Games amuse when occasionally played, but when they are incessantly pursued, and an automatic habit is established, a large amount of the pleasure goes.

Habit may induce error, as when at the close of the year from long habit the same date is carried on into the next year, until the new habit overcomes the old.

Such then are some of the pros and cons of this important variety of brain action, and I must now leave the matter in your hands for discussion, asking in conclusion your forbearance if I have wearied you with details which some here know far better than myself; or if in using more popular language than is perhaps general in this learned atmosphere, I may have failed somewhat in preserving the high standard of preceding papers.

The PRESIDENT (Sir G. G. STOKES, Bart., F.R.S.)—I have, in the first instance, to return your thanks to Dr. Schofield for this most interesting and suggestive paper. (Applause.) I now invite those present to begin the discussion after the Honorary Secretary has read a communication.

Captain FRANCIS PETRIE, F.G.S.—Sir B. W. Richardson and Professor BURDON SANDERSON have written regretting their inability to be present to-night. The following communication is from Dr. Alex. Hill, the Master of Downing.

“Oxford, Dec. 2nd, 1893.

“My dear Sir,

“I am much obliged to you for allowing me to see Dr. Schofield’s paper. It treats of one of the oldest of problems but one which will always be of infinite interest to the human mind. Are we free agents in selecting our actions, in forming habit and therefore in developing character, or are we instruments played upon by the forces of nature or by a Power Divine? Is the note we utter our own note or the sound evoked by circumstance or by the Deity? Unless it be our own we are puppets and equally irresponsible for harmony or discord whether the player be God or chance.

“We wish to believe that the ‘mind is the player’—nay, we can go further and say that it is good for us to believe it, and this mere statement is in itself a proof, for if our belief in our responsibility influences our actions it is clear that we *have* the power of directing them. Physiological proof is however out of the question; we can simply ‘admit (or presume) that action may be originated in the body by a purely mental impulse called the will.’ All attempts as proof are but illustrations.

“Different methods of stating the case appeal to different minds, but for myself I find that the nearest approach to a proof may be put very briefly in such form as this:—The energy received into the nervous system through the sensory nerves is redirected through motor channels into action. A condition termed consciousness accompanies or marks the passage of this force, but one cannot conceive of the consumption of force in the production of this state of consciousness. All the force received must be accounted for in chemical change within the nervous system or in outward movement. The condition of consciousness however presupposes the power of selecting action. Consciousness cannot exist without calling into existence the will, although the will may manifest itself in checking action only, not initiating it. But if

consciousness is not an exhibition of force neither is the will. It is extra-physical.

“In the paper which I had the honour of reading before the Institute (Vol. xxvi) I suggested a possible anatomical explanation of the formation of habit. It is at present but a hypothesis, and we know so little of the ultimate structure of the ‘ground substance’ of the nervous system that the hypothesis if not disproved is likely to remain for long unproved; but the highest magnifications seem to bear out the opinion that the ground substance is a network the strands of which are of almost infinite tenuity. It is possible that the passage of impulses increases the width or conductivity of these strands, beats down paths in fact along which subsequent impulses find it easier to travel.

“I am glad to find that Dr. Schofield believes in the inheritance of habit, for whether my anatomical explanation be correct or no, habit can only be explained as due to a physical change of some kind in the nerve-tissue, and if the habit be transmissible from parent to child, its transmission is due to the inheritance by the child of the alteration in the nerve-tissue acquired by its parent. We need no longer try to settle the much discussed question of whether acquired characters are transmissible by looking out for cases in which gross anatomical changes such as shoemaker’s chest or carpenter’s thumb are inherited by children not brought up to their parents’ trade, but we may assert with confidence that the central nervous system as modified by the deliberate choice of the individual tends to be transmitted to his offspring.”

A MEMBER.—May I ask the meaning of the word “sloyd” which occurs in the paper?

The AUTHOR.—Sloyd is a Swedish method of instructing children in habits of perfect execution. It was invented many years ago, and consists of a sort of carpentry and in making simple things, such as rulers and other things, neatly and accurately, according to a model given to the children. A child may spend a week in making a thing before he makes it of the exact size given; there are many classes for it now in England, formed with the view of teaching children habits of exact execution.

Dr. GERARD SMITH, M.R.C.S.E.—The question of the hereditary transmission of acquired habits seems to me most important in connection with this paper. Whether we believe, with Darwin, that acquired characteristics are transmitted to our offspring, or

with Weissmann, that habit forming simply brings out already existing tendencies in the individual, which are not transmissible, it appears to me that our responsibility is equally serious. In any case, we do know that habits are eminently contagious, if I may use the expression; and most of us will agree that in the case of some physiological modifications produced by acquired habit, it is most certainly true that the sins of the parents are visited upon the children.

Take the instance of intemperance, opportunities of studying which are only too easily obtained in professional work; if the habit has passed beyond the stage of a mere mental preference, and has become a physiological habit, actually impressed upon the brain by pathological changes, we must confess that it becomes transmissible, up to the time when the mental proclivity becomes a physiological change, the case is best treated by moral means, and after that point, by the physician.

The immense importance of this subject in the light of both physical and mental or moral education cannot be over-estimated. I have to do, in professional work, with the treatment by gymnastics of weakly and deformed children; and I could give ample evidence of the difficulty of eradicating physical habits formed in early childhood; even the habits of correct standing and breathing, being often things which have to be taught with difficulty, after eradicating incorrect habits.

In the physical education of children one sees the value of teaching co-ordinate movements, and the way in which such co-ordination is gradually attained is interesting in the light of the remarks of Dr. Schofield with regard to the formation of actual nerve paths and connections between various groups of cells.

Rev. Canon R. B. GIRDLESTONE, M.A.—I should like to say one or two words on this interesting subject, though it is really so full of matter for thought, that it is rather difficult to concentrate one's mind on any one particular phase of it. On page 140 of the paper a question is raised which is certainly a most important one, viz.: Whether mind can exist apart from body. I suppose the writer of the paper means mind in man and not mind generally, for the phrase may include beings that are various. There are some that are pure spirit and have not a body at all, but the writer means, I presume, whether the mind can be imagined as separable from the body, and I cannot help thinking that although we may view the matter rather differently, yet that

all are perfectly of one mind on this matter—that really the body is the nursery of the mind; that the brain is the school of the mind, and that they must be together in this human nature at any rate, whatever may be the case in any other state of being.

In the present day much is said about automatic action and matters of habit, but when you examine an automatic machine you find it is simply condensed mind. There is all the mind there, only by mechanical processes the mind is reduced to a small compass and the automatic machine is the embodiment of the mind. I suppose if any human being or animal performs an automatic action, all we mean is that he does what he does unwittingly. The mind is there, only it is not the mind of the automatic agent, but somebody else's mind, and so in the case of an automaton of any kind; and the great question which concerns us is, whose is the mind in the universe that causes so many things to be done so uniformly without any apparent physical agency at all?

Then in regard to the question of instinct which has been so much discussed by Dr. Romanes and others, I see the idea is suggested on page 144 of the paper, "that instinct is partly due to lapsed intelligence." I remember a little book, by Isaac Taylor, *The World of Mind*, in which he says the distinction between human intelligence and instinct is that human intelligence is free reason, and instinct is fixed reason, and I think that fits in with what has been said here; but I think in the case of lapsed intelligence, too, you cannot tell how it begins.

I rather desiderate, through the paper, the use of the word *deliberate* instead of *voluntary*. I think there is a great distinction between things being done *with* your will and *by* your will. Deliberate action is a great deal more than voluntary action. At page 145 of the paper we read, towards the middle of it, "What we have now to consider is how, in the evolution of higher intellectual life, we have the power at will to change voluntary into involuntary action." I should prefer to say "change *deliberate* action into *automatic* action"—for it is the very deliberateness of the action which makes it superior to other actions which gradually become more and more automatic. On the same page the question is asked—"are the very laws of motion" (I suppose of the physical world generally) "the result, originally, of habit?" But, by the definition of habit given above, it cannot be so, for habit is said to be the result of

voluntary action ; and I suppose nobody thinks that the first efforts in the direction, say of gravitation, were voluntary on the part of the molecules that performed those efforts ; the voluntary action does not lie in the things but in the Person who arranged the things.

Then comes a question, which has been touched upon by another speaker, which is a most interesting one—viz., the question of transmission. Some of the cases mentioned in this paper relate to the animal world and not to the human world ; and is not it the case that there is more of transmission, in proportion, amongst the lower animals than in the human race, owing to the fact that human personal responsibility is so much greater than that of any animal in the lower world ?

In the human race there seems to be a marked distinction between physiological or physical transmission and mental or moral transmission. Take the case of the Chinese children's feet ; —is not it strange that after all these centuries during which their feet have been pent up (and these little children suffer agonies for years, as a Chinese lady told me), yet that, after all, the foot is exactly the same when the child is born as it was in former days ? It seems to show that physical habit is not changed in spite of all the misery and suffering that takes place.

Then in regard to mental and moral habits ; it would be very convenient for school boys if they had transmitted to them the habit of learning. My own father, when he was over eighty years of age, could quote an ode from Horace with the greatest ease, and he was very vexed with me that I could not do it equally well ; but I should be glad if I had an instinctive knowledge of Horace and many school boys would be delighted if they had, but it seems to me the more you get into the moral and mental state the more you see that transmission has to give way to mental action, and I should like to hear discussed whether a good habit is as easily transmitted as an evil one, for instance, temperance. In fact, it seems to be hardly a case of habit being transmitted, but, rather, a strong desire, for everybody's habit must surely be formed by the individual. There is one other point that I rather desiderated at the close. Are habits destructible ? An inveterate habit—can it be done away with ? I suppose we should say that whatever the will has done it can undo. But it sometimes happens, in such a matter as drink for instance, that not only has the habit been formed but a

craving has been created which is very strong, very maddening, and very violent, which is something over and above the original habit formed. Supposing, therefore, you have the power to undo the habit, you should also have the power to undo the craving which has grown out of the habit: this is a very interesting question which is partly physiological and partly ethical. The truth is that habit may be a great blessing or a great curse. Bondage, from a moral point of view, is habit, and it is the essence of Christianity to undo bondage; but how does it do it? By the expulsive power of new affection. It is not so much by playing on the cravings as by teaching and implanting a new craving, so to say, in human nature, which the psalmist put into words when he said, "create within me a new heart:" and after all, the wish is the thing that plays on the will, and the will acts upon it, and decides whether the wish shall be accomplished or not. When the new wish comes and the new moral desire begins to tell, then there is a counteracting force which is more effective than a mere dealing in detail with a low habit—in fact the higher overcomes the lower. I think these are the chief points to which I desired to refer.

Mr. J. E. JACK.—It always appears to me to be a contradiction of terms to speak of habits formed within us. The tendencies are inside, but they must be indulged in, and given in to, to grow into habits. We have certain tendencies—we indulge those tendencies and give into them, and at last they *have us*, and they become habits. As to the point whether bad habits can be overcome, to which Canon Girdlestone referred, I have one instance in my mind which exactly meets the case just mentioned. Many years ago I knew a man who was, perhaps, the greatest slave to drink that it was possible to find; he had arrived at that state that he could not lift his hand to his mouth, and he would get the barmaid, or anybody else, to pour the brandy down his throat. He was acted on by moral influence, and he made his wife shut him in his room, and went through, I suppose, the most awful mental process that he could go through, and he overcame the propensity. I knew him sixteen years ago and he is now reformed, and there is not a more sober and upright man in London at the present day: so that it *is* possible to overcome a bad habit such as that. It seems to me that the esteemed author has rather overlooked the moral force necessary to overcome habit. Speaking of training

children in accuracy of speech and not to exaggerate in speaking, which is one of our great vices, a child may become very accurate in his language, but be very selfish, and when a temptation comes to him, to serve his own interests and not to speak with accuracy; will the mere force of accuracy in his training prevent him serving his own interests? A well trained conscience, it seems to me, is the only power that will enable him to overcome tendencies to wrong.

The PRESIDENT.—If there is no one else who wishes to speak, I will ask the author to reply.

The AUTHOR.—I have to thank my friends for the very lenient way in which they have dealt with my imperfect paper, and I will just run through one or two remarks that have been made.

I am very pleased to hear the letter from Dr. Hill, corroborating, as it does, so strongly, the view I have taken in attempting to distinguish between moral or mental habit, and habit when it becomes physiological, and I think, perhaps, it is founded on the fact that we are masters of habit up to a certain point; and after that, they become our master; but even then they can be overcome by a higher power and exercise of will. As to what has been said about children, that is very important.

I assent to Canon Girdlestone's substitution of the word *deliberate* for *voluntary* in most cases though, probably, it would not fit all. With regard to the perpetuation of the Chinese women's feet, we need not go to China, unfortunately. We can refer to the English waist as another instance. Although it has been systematically compressed for long centuries, it nevertheless remains at its normal circumference of from 24 to 25 inches; and I think artificial deformity is never perpetuated, whether it be of the feet or waist, as may be the case with a man who has been born, say, with three fingers.

I should like to say one word about moral force in connection with truthfulness, in which I yield the palm to no one; I fully recognise its importance, but it is not the subject of my paper. My idea was rather to throw it out for consideration. Every one knows that truth attains its highest value from a moral stand-point, and I simply alluded to it as giving a power where habit would fail; but the other side of the question, that it can be formed by habit, is, I think, perfectly unknown—at least it dawned on me some years ago as a comparatively new truth. We

all know that habit can be formed, and I think that perhaps I rather omitted to give full force to those admirable remarks which my friends here have given for me. I have only to return my thanks for the way in which you have received this paper (applause).

The meeting was then adjourned.

### REMARKS ON THE FOREGOING PAPER.

Dr. BIDDLE, M.R.C.S.E., writes:—

I feel convinced that all who read Dr. Schofield's paper, will agree that it gives a most lucid account of the formation of habit. It is only with a few of his incidental remarks that I crave the indulgence to differ. I cordially agree with his denunciation of the late Professor Clifford's *dictum*, "To say, will, influences matter is neither true nor untrue, but simply nonsense." For Clifford, though an excellent mathematician, was an indifferent metaphysician, and a very sorry theologian. But when, in controverting this *dictum*, Dr. Schofield announces that "we have the power of choice, selection, memory, and attention," and that these (all of them) "have no correspondence with any form of nerve action," I must record my inability to follow him. Surely, if he has not heard of that Hebrew scholar who had all the Hebrew knocked out of him by a blow on the head, but whose life was spared, and who re-acquired a knowledge of the language, he must be aware that *memory*, at least, shows itself as belonging in great part to the body, by decaying with it, and otherwise varying in power with the health of the body. I think Dr. Schofield will agree that *habit* itself is of the body and not of the spirit, and is more due to a negative than a positive influence of the latter. It is of great importance to distinguish the powers of the human spirit as being mainly those of *feeling* and *willing*; and these can only be exercised through a properly organised instrumentality. Science is here supported by the Christian doctrine of the *resurrection*, in contra-distinction to the platonic and heathen dogma of the immortality of the soul.

Voluntary actions originate in *motives*; that is, the human spirit wills from some cause which is presented to it.

Heredity and environment go a very long way in the formation of habits, and therefore of character (apart from supernatural

influence); and I am much pleased to find that Dr. Schofield does not agree with Weissmann as to the transmission or not of acquired characteristics. For once Mr. Herbert Spencer has had the best of it.

When Dr. Schofield says that "in what we call voluntary actions all we do is to will a result," he admits that our will-power is very limited; and even in regard to our thoughts this is very evident, as those like Professor Tyndall (who suffered from utter insomnia for twenty-eight days) can tell, when they try in vain to think of *nothing* and go to sleep. In conclusion, I think that most people will agree with Dr. Schofield that facility and grace belong to the automatic, and that actions which are purely voluntary (if there be any such) are, from infancy onwards, always more or less awkward. It is from trying to convert what should be automatic actions into voluntary ones, that much trouble arises to self-conscious people. But there is reason to believe that if the memory of past failures could be eradicated, such neuroses (well called *phobixæ*) could easily be cured. As it is, the memory itself enters into the circuit, and forms part of the habit, scaring the poor sufferer nearly as needlessly as the cobra did Darwin.

Professor DUNS, D.D., F.R.S.E., writes:—

Dr. Schofield in his interesting paper succeeds in making a difficult subject plain.

Surgeon-General C. A. GORDON, C.B., M.D., writes:—

The paper just read presents a carefully prepared epitome of theories current for the time being in relation to the various points touched upon therein. Taking a few in their order I notice that the subject of localised functions of the brain, whether in respect to intellectual manifestations, or motor actions, although to a certain degree as represented in that interesting communication, is nevertheless modified by conditions the ultimate nature of which has defied detection through the physical means of research heretofore employed, such as are indicated in the paper. In respect to others, conclusions arrived at by investigators differ among themselves to an extent which justifies hesitation in accepting them in their entirety.

In studying the relation of the intellectual faculties to cerebral development, various considerations must be taken into account; among them individual circumstances and surroundings, heredity, national and racial differences, for the circumstance has to be borne in mind that such differences do exist in a degree as marked as are the distinctive physical characteristics which divide them ethnically. The relation in which the aspect of the general subject as here presented stands to others connected with pauperism and criminality among populations opens up a question so extensive in its bearings that it can only be thus alluded to on this occasion.

Adverting to the subject of what have been called motor areas of the brain, I remark further that phenomena observable in disease are in many respects at variance with deductions arrived at by artificial methods of investigation. Other circumstances point to the necessity for enlarging, if not for otherwise modifying that theory. For example, at page 137 of the excellent paper before us, allusion occurs to the "mapping out" of such areas, in the apparent sense that particular muscular movements are directly connected with and dependent upon the regions so indicated; at page 143 the circumstance is mentioned that "pigeons can fly after the removal of the cortex of the brain; frogs similarly treated can balance themselves on a board slowly turned round, and will croak." The whole class of movements to which the name of "reflex" is given tend to indicate their own dependence upon cerebral motor areas.

Facts such as the following are not to be ignored in connection with those remarks, namely, the amphioxus among fishes, and all the invertebrate animals are destitute of a true brain, and yet all necessary functions take place in them. Cases of acephalous children are recorded in which the functions of respiration were performed, and various movements of the limbs took place. Cases are even on record in which though during life no characteristic symptoms were present, post mortem examination revealed extensive cerebral disease.

At page 146 such subjects are discussed as "natural instincts," "artificial reflexes," "physical memory," "psychical habit," &c. In respect to all of which, unfortunately for myself, I am unable to appreciate the precise measure of significance intended to be conveyed by them respectively. No such difficulty occurs to me in regard to the statement at page 147 having reference

to the value of *habit* in the training and efficiency of a soldier; the quality in question besides affecting his physical prowess as a fighting machine, extending also to his *morale*, including what is commonly called his soldierly bearing, as also that particular mental condition in which he has come to accept as a part of his own existence, the preparedness at any time, and as a matter of course, to face the chances of war and battle. Although personally associated with soldiers during all the years of my active life I never became acquainted with such an incident as that quoted at page 151 in respect to "what an automaton a soldier becomes."

Fully in accord with what occurs at page 152 relative to the formation of habits of attention, perfect execution of work and industry, I am convinced that he who to these rich possessions has also the inestimable advantage of having been morally trained as indicated in the quotation from Holy Writ given on the same page, starts on the active business of life, well armed and protected against enemies whose absolute conquest is a necessity for ultimate success, to say nothing of that higher aspect of existence towards which we look forward in hope.

PROFESSOR HENRY WEBSTER PARKER, Ph.D., of New York, writes:—

The paper by Dr. Schofield is one of great interest in subject and is very ably treated. I have marked a number of passages as especially felicitous in statement and to be treasured for future use as quotations. The moral of the subject might, however, have been carried somewhat further. It has been well remarked that the entire system of things, as it relates to good and evil, was designed to work out good, and only by perversion works evil. The evil working goes to illustrate how glorious would have been the right working—even lightens and thunders forth the blessed design. The locomotive engine in its ruinous crash and wreck proclaims that power in the mechanism which, under proper conditions, is grand in its beneficent service. The tremendous force of habit, ill directed, that seems finally to plunge a man helplessly downward, is the very principle that at last renders holy living free, joyous, effortless—a second nature; in a well-ordered life, it lifts and propels ever upward.

On pp. 145–146 I have noted several queries, but pass by as specially figurative the suggested question about physical and

chemical laws originating in habit; also "the habit of all ova to build organisms in accordance with certain exact laws." To me, the meaning is hardly clear. I would only protest that instincts (like those mentioned of the jelly-fish, amœba, and the ant and bee), spoken of doubtfully as "at first voluntarily acquired habits," and that may "as Romanes suggests, speak to us of lapsed intelligence," offer no evidence of so originating, and therefore no ground for the question Dr. Schofield raises, but considers "unanswerable in our present state of knowledge." It seems to me that the fatal lack of proof of any such origin, and the impossibility of it in the light of both mental and biological science, is just what our present knowledge does give. Dr. Romanes himself presents wonderful instances of seeming intelligence in protozoa, jelly-fish and star-fish, but rules them all out for the reason that in such low animals it is unreasonable to suppose intelligence, although he admits that if we depend on appearances (or analogy, as he argues in his preface) we should have to attribute conscious determination to even microscopical organisms. I have criticised his arguments at length in my work entitled *The Spirit of Beauty*, a copy of which is in the library of the Institute.

Instinct has been the *pièce de résistance* of much discussion. Far preferable to any wild notion of instincts as originating in reason and will, is Darwin's view that they began in chance acts favourable to the perpetuation of species—though of course few can believe that there is any such thing as pure chance. Understood with some qualification, his explanation may be admitted under the category of second causes, while the astounding marvels of complex instinct may still enforce the doctrine of a Divine direction. True, mind (a very general term) may be predicated of all animal life in one sense or another; and we may also favour the view of Agassiz and others that a spiritual element is the organising cause in every embryo-cell, determining its development. But intelligence in animals should be qualified as animal intelligence, or else left to the popular language that ascribes the signal-associated acts of a trick-pony to "extraordinary intelligence." Unqualified, the word is rightly defined as—the faculty of understanding—capability of comprehending facts or ideas.

The question does not turn upon definition and philosophy only. The key of it is in the simplest experiments, which anyone can perform. On the first feeding of meat to a kitten and a puppy,

accompanied by a peculiar call, the association with the call was at once and permanently established. With fish the process was slower but sure and lasting. Whether and what impressions are transmissible to offspring is a wide question. In the *Revue Scientifique*, May 4th, 1889, an account is given of the "formation d'un instinct," to the effect that every evening for ten years (beyond which the narrator's observation did not go) a flock of geese manifested wild terror at a place and twilight hour coincident with a murderous attack that had once been made on them by dogs, although all the older members of the flock had been killed off every year for market.

Aside from the subject of transmission, implied in instinct, one may affirm that all animals below man are perfect mechanisms for the instant or speedy and permanent fixation of every associated sensation and impulse. The first act thus ingrained may be regarded as accidental or as foreordained, according as one may be disposed to interpret the universe. Intelligence, higher in its proper human sphere, is lower than this principle on the plane of animal life, and is worse than superfluous in this matter. The perfection and ruling principle of developed man is intelligence proper. The perfection and operating principle of the animal is quite another thing,—simple and comprehensible as daily illustrated and also as familiar, subordinate and imperfect in our own experience, but so different from our usual, *conscious*, mental action that it will probably continue to be mysterious or misleading to most persons in all time to come.

On this side of the Atlantic, the chimney-swift (*Chaetura pelagica*), with the same habit as the chimney-swallow of Europe, is the triumphant instance put forward of intelligent formation or change of instinct. But, first, it does not appear that the original instinct was other than for any high hollow place of nesting; secondly, it is lack of intelligence to affix the nest perilously on a sooty surface, and exposed to rain if not to heat, as many a wrecked nest and dead young swift in the old chamber fire-places abundantly proved; and, thirdly, notwithstanding this, the chimney generations, not being exposed to enemies in the few remaining hollow trees of disappearing forests, may alone have survived, according to the hypothesis of natural selection pure and simple. Beyond this instance we have little except the very natural change of nesting-place by any animal when disturbed, and the crow's speedy association of danger with a gun, &c., &c., all

solvable on the principle of keen and lasting sense-association—more keen and sure than any glimmer of reason. The animals would have fared much worse with a modicum of intelligence. Half-instinct and half-intelligence would each be inadequate, and, together, would confuse and nullify each other. Painful efforts have been made to enumerate and multiply human instincts, but man is not a creature of instinct any more than a brute is a rational creature. The distinction is as sharp and total to-day as ever, although it is quite true that much of human action is on the animal plane of associated sensations and impulses (as when one without thought drops work at a customary signal)—these connections, however, never becoming instincts simply because reason disturbs and interferes with the process which in animals is as certain as machinery. And this consideration greatly emphasises the radical difference between man and brute—the one rational, the other not. Animal instinct in its very genesis and nature excludes reason. No over-interpreted or under-interpreted facts and strained argument can change the nature of oil and water or mix them. The effort has been to exalt the brute and sink man, for an evident purpose, and agreeably to a mongrel and inverted philosophy that is sensationist when dealing with man and almost spiritual when treating of the brute.

Then too, there is the germ idea which, as Dr. James Martineau remarks, has become the dominant and misleading conception. It would find in a mole-hill the origin of the Alps. There is indeed a dawn of reason in a child, but it becomes full-orbed, and until it is full-orbed, the child is dependent on others. It does not remain half developed to reappear in another being, fully developed. There is no dawn in the moon that becomes sunrise on the earth. nor a germ in the daisy that becomes full-blown in the rose. Moreover, any one element of reason implies all other elements, and is distinguishable only logically. In Dr. Romanes' curious chart of mental evolution in animals, there are fifty provisional steps or levels. On the 21st we have fish and batrachia, with "association by similarity"; on the 22nd the higher crustacea, with "reason"; on the 24th, hymenoptera, with "communication of ideas"; on the 26th, carnivora, &c., with "understanding of mechanism"; on the 28th, ape and dog, with "indefinite morality." Abstraction begins just below the 27th, generalization at the 29th, and reflection at the 34th. But every one of these is implied in the 21st, if that be a noting and notion of qualities by

comparison, in other words by abstracting these. Dr. Romanes himself, in the *Contemporary Review*, vol. iv, regards the higher cognitive powers as resolvable into abstraction. Reasoning is but the linking of general abstract notions (concepts). If any animal can note and consider whiteness, it has all the powers we have, and should be able to consider rightness, and to express in some way its general notions, that is, have language proper, which is made up of abstractions in the shape of concepts. Where is this in the animal world? If instincts be lapsed intelligence, when and where did the intelligence come in?

Returning to Dr. Schofield's paper, I would add that the love of strong drink seems rather too specific as an ingrained inheritance. Is it not rather a general degeneracy, or example and early access to intoxicants? Further, hereditary habit is made to explain the swinging of the arm forward coincidentally with a like movement of the opposite lower limb in walking. If one will try the experiment, he will at once notice that otherwise the body is inconveniently rotated; this might account for an early and independent formation of the habit in every individual. But all my remarks are incidental to the well-treated subject of the paper, though the main point on which I have dwelt is one of important bearing in other relations.

#### NOTE.

The author has seen the foregoing. He offers no further remarks.—ED.

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## ORDINARY MEETING.\*

THE VEN. ARCHDEACON THORNTON, D.D., V.P., IN THE  
CHAIR.

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

MEMBERS :—The Ven. Archdeacon Donne, M.A., Yorks ; J. P. McArthur, Esq., D.L., Surrey ; A. G. McArthur, Esq., London ; F. A. Holman, Esq., London.

ASSOCIATES :—Colonel Le Mesurier, London ; Rev. J. E. C. Welldon, M.A., Harrow ; C. King Rudge, Esq., M.R.C.S., Bristol.

HON. COR. MEMBER :—Surg.-Major W. T. Black, Esq., M.D., Edinburgh.

The following paper was then read by the Author :—

*THE ALLEGED SCEPTICISM OF KANT.* By W. L.  
COURTNEY, M.A., LL.D.

**K**ANT, says a French critic, has spread through the whole of Europe the spirit of doubt. This is the point from which I desire to begin, for, if such a statement as this be true, then it is also true that the thinker who, before all others, represents a definite turning-point, an epoch-making system in modern philosophy, is the chief agent for that entirely negative spirit which Professor Huxley has induced us to call agnosticism. My subject, therefore, though primarily dealing with Kant, is not by any means limited to him. I assume that he has made a revolution in the mental world, similar to that which was made in the astronomical world by the demolition of the old Ptolemaic methods, and the substitution of the Copernican system. I also assume that, in one way or other, a characteristic of the modern age is an attitude of suspense—not wholly of negation, but of suspense—towards the ultimate principles of the constitution of man's nature and the government of the world ; and the question which I wish to consider is how far it is due to the Kantian standpoint that the world has become sceptical, and that we

\* 6th of 28th Session.

have tacitly agreed to drop out of consideration principles and laws which do not concern the ordinary relation of phenomena to one another.

One of my assumptions I do not think that it is necessary to justify; it is that which deals with the salient characteristic of modern thought, that it shrinks from arriving at a definite, a positive, a dogmatic conclusion, with regard to those principles which, in an older age, we used to call the ultimate verities of the world. Possibly, however, it may be necessary to say in what sense the system of Kant represents a turning-point in speculation. In order to elucidate this point, I will ask you to consider that the course of modern philosophy has in one respect run parallel with the course which was taken by the earlier philosophy of Greece. You will find, I think, that of the two main questions which human beings ask of themselves, "What am I?" and "What is the world in which I live?" the second takes precedence of the first, and that, after a certain period of more or less hypothetical speculation, the discovery is made that the second cannot be answered at all, unless we have come to some conclusion about the first. Observe, for instance, what happened in the infancy of speculation in Greece. There were a series of physical philosophers who desired to arrive at definite statements with regard to the constitution of the world in which they found themselves. Is there one primitive principle, is there one underlying element, which can explain the kosmos of things? One answer is, water; another is air; a third is fire; a fourth is all the four elements taken together. And then, when philosophy has succeeded in producing a multiplicity of inconsistent and contradictory answers, there comes a man like Socrates, who bluntly declares that all his predecessors had begun at the wrong end in the attempted solution of their problems. There is no chance of discovering the nature and constitution of the world, unless certain preliminary questions are answered:—What am I, who pretend to understand the world? How can I be sure that I can know anything? How can I be certain that my so-called processes of knowledge can be trusted? What, in point of fact, am I, who desire the solution of such terrestrial and celestial problems? And then philosophy makes a pause, because a new point of view is put before it, and for a long time its special subject is the enquiry into the conditions of knowledge, and the chief study of the thinker becomes, not physics, but logic, ethics, and psychology.

And now observe that exactly the same thing is reproduced in what we call modern philosophy. Starting from Bacon onwards, we have a series of systems which, in whatever fashion, attempt to decide what matter is, what are the qualities of matter; a great series of natural and physical philosophers, who, sometimes dogmatically, and sometimes sceptically, resolve the insistent questions always pressing upon the human spirit. And then come men like Berkeley and Hume in England, and Kant in Germany, who propose a different question. The English philosophers, in their way, started the same kind of speculation which the philosopher of Königsberg attempted to answer, but neither Hume nor Berkeley realised the importance of the standpoint they were inaugurating, nor did they see quite clearly the nature of the problem whose solution they desired. It was Kant who first laid it down in his "Prolegomena to any Future Metaphysic," that what we must first determine is the conditions and limitations under which knowledge is possible at all. And this is why his own analogy with the work of the reformer of astronomy is absolutely correct. In earlier times the assumption was that the earth lay at rest in the centre of the universe, and that the sun and the stars were the satellites, the appanages, of the abode of man. Suddenly the point of view is changed; the earth is not at rest, but is revolving round the central sun. If we desire to get to the centre of our universe, we shall find it in that object in relation to which every satellite is at once attracted and repelled, held in its elliptical course by centripetal and centrifugal forces. A similar revolution occurs in philosophy. We change the point of view. Instead of attempting to determine the characteristics of the kosmos, we start with the conditions of our own human knowledge. We erect, as it were, our observatories not in the world, but within ourselves—under the assurance that it is human thought which is the measure of the universe, not the universe which is the explanation and parent of thought. Such, at least, is the standpoint of Kant; the antithesis, as you will observe, of the scientific attitude, representing a revolution which may or may not be of ultimate value, but at all events possessing a peculiar significance and importance of its own, and giving, once for all, a basis for such logic and such ethics as can be held to correspond with the powers of the human, or, perhaps, even the divine, spirit.

How does a man who inaugurated a revolution of

this kind produce scepticism? Let us first determine what we mean by the word, for, like many other of the current terms in contemporary arguments, it is used in a variety of different senses. Scepticism means, in the first place, a protest against dogmatism. A protest against dogmatism can be made from different motives; it may be that we desire to confine ourselves entirely within the range of phenomena, abjure, once and for all, any consideration of ontia, or, as Kant calls them, noumena—in which case we are adopting the principles of positivism. Or our motive may be a protest against dogmatism on the ground of the illimitable liberty of the human spirit. In illustration of the second sense observe that we are always cramping ourselves by the conceptions of an age into which we were not ourselves born. We accept our doctrines from our forefathers, and then attempt to pour into the old bottles the new wine of modern discoveries. We ought, however, to protest against any narrowing impulse of this kind; all conceptions which have upon them the stamp of human handiwork necessarily fail in corresponding to every aspect or element of the subject with which they deal. Our position is that they ought not, therefore, to be held in a rigid and immobile fashion, but should be kept, as it were, in a more or less fluid condition, capable of more than one interpretation, and with potentialities of future development. In both senses to which I have alluded, scepticism is a characteristic of our contemporary age, for, as I have already pointed out, in the first sense of the word, we become positivists and followers of Auguste Comte, while, in the second sense, as I understand the matter, we have accepted Kant as our intellectual father, although, in the spirit of his own teaching, we refuse to be bound by some of his pedantic and scholastic technicalities.

In neither of these senses, however, is scepticism used by many of those to whom it stands for all that is repellent in thought and practice. Scepticism is often taken to mean a blank denial of the possibility of knowledge, and when we contrast scepticism with philosophy, we generally mean that the second bids us hope that something can be attained of lasting and permanent value, which will throw light upon the vexed problems that have beset the mind of man, throughout the whole course of his turbid career; while scepticism erects as an absolute dogma, that, however we may strive, or whatever we may think we attain, knowledge,

in the sense of certainty, eludes our grasp—we are, in fact, the playthings of our own powers of infinite self-deception. In order still better to understand the relation in which scepticism stands to philosophy, let us put down a series of propositions which the first impugns and the second tries to establish. There is (1) the freedom of man; there is (2) the law of duty; there is (3) the distinction between good and evil; there is (4) virtue as an end in itself; there is (5) the immortality of the soul; and there is (6) the existence of a moral order of the universe, a divine providence, or, in simple language, the reality of God. These it is the business of philosophy to establish on a clear basis. Possibly not all of them may be equally clear, nor yet would a wise philosophy bind itself to lay down distinctions which should remain always and identically the same for every age of human progress, but, in some fashion or other, philosophy is concerned with their establishment, and it is interesting to observe that, with nearly all of them, we are in the domain of logic, psychology, and ethics, those sciences which Socrates asserted to be the preliminary to all further investigation, and which in the modern world are included in that region of metaphysics which pugnacious scientists are always attempting to demolish. One thing, at all events, is certain, that scepticism, in the last sense in which I have used the term, would have us disbelieve these truths, and if, from this point of view, we ask whether Kant has spread a spirit of scepticism through Europe, the answer will be a clear and emphatic negative. A sceptical attitude is one thing, a critical attitude is another. To deny the possibility of knowledge is to be as dogmatic as those dogmatists whom scepticism so much dislikes. But criticism has throughout been a friend of philosophy; an inconvenient friend, no doubt, who is always referring to uncomfortable facts, but still a friend, on whom Kant, at all events, will implicitly rely. And, as I shall hope to show, the final outcome of the Kantian system is not in reality destructive, but re-constructive, finding in another sphere the reality of those ideas which have been impugned by criticism, and suggesting the only line of proof by which we can hope to solve the supreme problems of knowledge.

The ultimate value of a man's work is not always that which it appears at first sight. To Kant's contemporaries it seemed as though he were delivering a formal attack on the office and functions of reason in man, but if, from the

purely historical view, we look at what happened to philosophy after him, we shall see that there was some doubt, some difference of opinion, as to the exact result of the system of their predecessor. On which of the two portions of the Kantian philosophy was the chief stress to be laid? Were we to begin from the standpoint of the Critique of the practical reason, or from that of the Critique of the pure reason? Are we to believe the intimations of the moral consciousness, or to accept the negative judgments of the logical understanding? As a mere matter of history, this doubt led to two absolutely different lines of philosophical thought. The culmination of the one is to be found in Hegel; an admirable treatment of the other issue is to be found in Lange's *History of Materialism*. Let us not, however, entangle ourselves to-night with the historical issues, but treat, for the sake of our own purposes, the work of Kant in relation to what I have already defined as scepticism. Observe, to begin with, two points. As you are doubtless aware, so far as morality is concerned, according to the Kantian system, we have to deal with what he called the practical reason, while in logic our business is with the pure or speculative reason. Now at one moment in the evolution of his system, Kant asks himself the question, "Which of these two is to be preferred?" It is as though he were endeavouring to determine which is to be the ultimate guide of a man in life, or which has most illuminating power, in the relations in which man stands to the universe of things. And he gives a perfectly frank and positive reply. The practical reason is allowed to have the supremacy over the speculative. The speculative is not to be allowed to carry out its destructive conclusions too far; it is, in point of fact, to adopt that attitude of suspense, or of disengagement, seeing the difficulties of the task which it has set itself, perfectly conscious of the objections which can be levelled against any and every ultimate idea, but also prepared to let the matter alone, to see whether, from any other source, greater illumination can be derived than from such intimations as it is itself able to offer. Whence is to be derived this further illumination? Here, too, the answer is plain; from the practical reason, from reason as exercised in the sphere of morals; ethics being a matter of more intimate concern to a man than logic. Let us look at the case from another point of view. In what aspect ought man to be considered? Purely as a thinking creature,

or as an acting creature? Look at him in the first light. Look at him as he allows his intellect to play round the problems presented to him on every side, and what do we find? We come across this remarkable conclusion, that the main result of the critical judgment of man is more largely destructive than constructive. There is nothing more isolating than the exercise of intelligence. On the ground of intellect man stands alone; if he uses it more or less than his fellows, in either sense, purely as a thinking being he is isolated from his fellows. Each on our strict line we move, as Matthew Arnold says. But now change the venue. Let us look at man as an acting creature, as one who has every kind of relation with his fellow beings, and whose energies are constantly altering those relations. So far as he acts, man discovers that he is a part of a great social order, and that no definition of him which refuses to consider his place in that order can possibly be satisfactory. There is no such thing as a single human unit in the world of action; it is always man, *plus* his environment, *plus* his heredity. It is man given a task of making the world better than he finds it. It is man at every step deeply pledged to those around him, bearing other people's burdens, as part of the burden which is imposed on himself. How absurd, therefore, to let our views of the world and of its government depend purely on the results of thought, instead of the results of human action. Man is, of a course, both a thinking and acting creature, but it is in his practical aspect, it is in all that sphere which is covered by ethics and morality, in which are to be found the real essence, the true definition, of his nature. It is thus that we may construe to ourselves the real lesson of Kant—a critic, if you like, but not a sceptic. Fearlessly critical so far as the work of intelligence is concerned; but also fearlessly constructive, because he feels the necessity of supplementing intelligence by the practical reason, by reason as exercised in the sphere of morals.

From this standpoint, then, let us regard what Kant has to tell us in that sphere which he calls the dialectic of the pure reason. In the short space of time allotted to me I cannot hope to cover the whole ground; I proceed at once to its most important feature, its criticism of the idea of God. How does he treat the proofs of God's existence?

Kant, as is well known, reviewed in his dialectic these proofs in order, and, one after another, showed their hollowness and insufficiency. How shall we prove God's existence?

Shall we argue *a contingentia mundi*? Shall we say that because all things in this mortal sphere are mutually dependent, we must assume in the last resource some being who is independent? Shall we say that we—looking at the fact that we can only go back from effect to a cause which is in its turn an effect of some higher cause, and so on in infinite regress,—must, for our own peace of mind, arrive at a cause which is uncaused, a First Cause, a Free Cause? Perhaps this is the most ordinary, and to most minds a satisfactory, proof of God's existence. And yet the logic of the understanding must condemn such procedure as illogical. To say that, because we only know of a ceaseless chain of causation, we must assume that somewhere or other there is a first or last link, where the chain ceases, is as though, despite our conviction that the world is round, we should yet walk to the horizon to find its extremest edge. To say that because the world is contingent, it must have an author who is absolute, is at once to deny that absoluteness we seek to prove, because at all events the world appears necessary to its author (inasmuch as it exists) and therefore sets limits to his independent and self-contained existence.

Shall we then fall back on the celebrated teleological argument, and say that because there are everywhere marks of design, there must have been a divine intelligence at work in the world's creation? Yet here again Kant tells us that our conclusion is too large for our premises. Our argument may prove the likelihood of an Intelligence, but it is merely a human one and not divine. The adaptation of means to end, in the case of a machine, proves the existence of the inventor, because with certain materials given ready to the hand—materials which possess original properties, and therefore the possibility of their own usefulness—some one must have adapted them so skilfully in their mutual relations that they work out the designed end we see. But to God, the materials with which He works are not given with certain original and unchangeable properties. He is supposed to have Himself given them, in the first instance, these natural forces and properties. Can we seriously conceive of God as having stamped certain things with qualities often contrary and conflicting, in order that afterwards He might show His skill in overcoming the difficulties of the material by skilful combination and adaptation? Or again, can this line of argumentation ever prove the existence of Absolute Goodness in the Artificer? By seeing the relation

of means to end in the wing of a bird, we may say that the skill everywhere displayed implies the existence of an Intelligence greater than ours, but not necessarily absolute. Or, once more, if I know a man to be good, I can then see how his actions are all designed to promote the triumph of goodness, but if I have only his actions to go by, shall I be likely in every case to see proofs of his goodness?

“Nature, red in tooth and claw  
With ravine, shrieks against his creed.”

There remains, then, the last of these arguments, the argument of Anselm and Descartes, which is termed the Ontological Proof. In its simpler form it asserts with Descartes that, since I know myself to be imperfect, I must have some standard of absolute perfection to measure by; to which logic answers that a belief in something more perfect than myself, not necessarily absolutely perfect, is all that my premiss warrants. In its more philosophical form it asserts with Anselm that, because the idea of God is absolute perfection, and absolute perfection necessarily includes existence, therefore God exists. To this logic has the scornful rejoinder that an idea in the mind is one thing, and existence is another, and that because I think of three hundred dollars, it does not by any means follow that I have them in my pocket. The general conclusion is that whether I rely on the cosmological, or the teleological, or the ontological argument in seeking to prove God's existence, the verdict of the logical understanding is in each case that I am trusting to a broken reed.

Such are the arguments of the logical understanding, guided by certain intellectual laws, and finding at once its strength and its weakness in the limitation which such laws impose. Even as these arguments stand, it seems unwise to lay too much stress upon them, for they indicate more than they destroy, and they convey hints of the mind's progress towards eternal truths, which are far more valuable than the merely formal proofs which they seek to destroy. Let us phrase the matter for ourselves, without paying particular attention to the historical aspects of this philosophical question, or the various ways in which Kant's successors dealt with the special conclusions of his critique. The first thing we think of is the more or less novel science of comparative religion, a discovery of the nineteenth century, which would have saved a good deal of the scepticism of the eighteenth century. For what is the main thing which is

established without a shadow of controversy by this new science? It is that in all ages of the history of human intelligence there has been an effort, conscious or unconscious, to formulate certain theories about the unseen world and the unseen God, according to the measure and capacities of the human spirit, at different stages of its development. Thus the tendency which we call "the religious tendency" is one of the inseparable concomitants of human intelligence, present to it from the first, clinging to it even through some of the more repulsive shapes of superstition, changed and altered in various ways, and now looked at under a philosophical, now sometimes even under a scientific guise, but representing always and in all places a permanent background to all the serious thought of the age. We look, in the second place, at another great nineteenth century discovery, the discovery of the law of evolution, the last and culminating point of the successive progresses of science. And here once again, if we discard the less important considerations, we find that the central fact about the world's history is the development of successively higher forms of existence, till we reach the final stage of human, conscious, and intellectual life. Each stage grows out of the preceding stage, but each stage also puts on, as it were, fresh qualities, till, at the highest point, we find gifts and capacities which contain the promise and potency, not only of an intellectual, but of a moral and even spiritual life. And when we have sufficiently estimated the results of these two enquiries, we turn back again to Kant's proofs, and a fresh light is thrown upon them, as though they, too, indicated different stages in the mind's advance towards God. The earliest feeling is one of the transitoriness of things, with which we contrast the notion of something that has been from the beginning, and that remains permanent, however much they may change. This is not an argument at all, observe; it is a mere sentiment, a feeling, which, when we seek to formulate it in precise terms, loses its emotional value, and gains no corresponding intellectual value; it is merely the *cri du cœur*, the cry of the heart, the confession, it may be, of weakness, the language of children, "crying for the light, and with no language but a cry." And then comes the higher stage, representing initial processes in argumentation, where we attempt analogically to establish the reality of an author of existence, on grounds of human industry and effort. This argument, too, fails,

although it has the support of distinguished names, for reasons which have been sufficiently indicated in Kant's treatment of the teleological argument. The position is so entirely different between the human workman, engaged with materials which he finds ready to his hands, and the divine workman, creating the materials which may be necessary for his purposes, that the analogy becomes untrustworthy and impossible. And thus, finally, we are driven to the last of the arguments, which really contains within itself the secret of the whole matter. In treating the argument of Anselm and Descartes, Kant assumes a position which the whole of his philosophical system implicitly denies; he assumes, that is to say, the entire and absolute severance between existence and thought. If Being is one thing, and our thinking about it is another, then indeed it would seem to follow that the idea of God, however definite and clear, did not carry with it the implication that such a being as God actually exists. But, as I understand the Kantian system, there is nothing higher than thought, and even though we ordinarily make a distinction between the subjective and objective aspects of any given state, phenomenon or existence, it is Thought itself which has made the distinction, and which can therefore transcend it. If there be that within us, in our own personality, which takes us altogether above the conditions of time and space—if, as I attempted to argue in a previous paper, there is a real self, or spirit, or soul, which is no longer limited, and partial, and individual, but dependent for its proper meaning and connotation on the existence of an universal consciousness—then we have a special ground on which to assert the reality of God, without whom the individual soul could have neither being nor reality.

Will it be said that to treat in this fashion Kant's critique of pure reason is to look at him through Hegelian spectacles? But he has himself authorised us so to treat him, when he wrote the *Critique of Practical Reason*. If it were only true that, side by side with his analysis of logic, there was also a treatise on the fundamental principles of morals leading to diametrically opposite conclusions, no one could say that we were historically unjust, if we elected to take our stand on the later work, and not on the earlier. But he has actually anticipated the difficulty in which we are placed; he has estimated the respective authority of the practical reason and the theoretical reason, and told us which to trust in. It

is the speculative reason which must give way in this matter, not the reason exercised in morals, to which he unhesitatingly grants supremacy. And when thus, as it seems to me, in the spirit of his own teaching, we transfer ourselves from the sphere of logic to the sphere of ethics, what is the earliest thing which we discover? We find that no consideration of man's nature can be said to be complete which does not start from the principles (1) that there is such a thing as an independent Self, free and unconstrained; (2) that this self is a centre of force, being, in its essence, Will, the only absolute cause we can come across in existence; and (3) that the consideration of man as a moral, that is to say, an acting creature, brings us by inevitable steps to the conviction that the soul is immortal, and that God exists. And here, once again, let me discard the precise formulæ, the exact language in which Kant, in the *Critique of Practical Reason*, attempts to establish verities of this kind. We can, perhaps, for our purpose, better extract what we desire by phrasing the matter in our own fashion. It can be done in several ways. We can say that the first, or rather the most important and most crucial question is not, "What is the world in which I live?" but, "What am I, who attempt to understand it?" Or else, looking at one particular aspect of the matter, we can say that natural theology is a somewhat frail and unserviceable weapon, as compared with the intimations of the moral consciousness; or perhaps, best of all, we can merely adopt for our purpose the words of Christ: "Say not, Lo here, or lo there, for the Kingdom of God is within you." Doubtless there are many indications to be gained by a purely objective investigation of natural phenomena, that the kosmos of things is incomplete without a divine intelligence running throughout the whole series from end to end. But it would be still truer to phrase the position in a slightly different manner; if, on other grounds, we have a reasonable evidence of the reality of Divine government, then we can look at nature in a different fashion, and see how the whole concatenation of causes and effects is part and parcel of a rational and intelligible idea. But it may well be doubted whether, if we began at the other end, we could ever attain to such a conclusion. If we had nothing else but nature to go by, if we confined ourselves to a purely objective examination of phenomena, there would still remain the doubt—a doubt which could not be exorcised—as to whether the results we were witnessing were due to the fortuitous

combinations of chance, or the far-seeing purposes of Divinity. That is, as it seems to me, the lesson of Kant; pure intelligence, he would say, is destructive; man does not live by logic alone. If you desire to get at the root of things, you must supplement your view of man as a thinking creature by man as a moral creature. What is destroyed, or, at all events, rendered doubtful by the first process, becomes rehabilitated by the second. The essence of man's nature is not intellect alone, but intellect *plus* feeling, *plus* practical activity.

But, you naturally ask, is it so true that moral philosophy can yield us such results? Certainly it can, on Kantian lines, and that is throughout the point of view with which I am occupied. We need only look at three points, not confining ourselves to the terminology or even the precise doctrines of Kant, but adhering, I think, to his spirit. The first is the meaning of conscience; the second is the meaning of duty; the third is the meaning of good. What is conscience? The essence of the conception, that which gives it its peculiar character, is the combination which we find in it of emotional elements and intellectual. It is the sensitive mirror on which are breathed all the shadows of our active life. It is that which lays bare with such unflinching force the relative value of all the aims and objects to which our action is directed. It steeps the intellectual recognition of what we have done or should do in a warm atmosphere of emotion. It practically denies the severance of feeling and thought, because in itself it is both feeling and thought. You may tell me that its natural history can be traced, you may say that it has arisen out of all sorts of conditions of expediency or utility. The analysis may or may not be correct, but I must remind you that explanation does not alter the value of the conception, nor does the account of how a thing came to be alter the nature of that which it is. I take conscience, as you find it in the highest, most morally developed men and women whom you know. What is this strange judging and feeling power which has guided their path in life? What can it be, except the eternal vindication of men's position as the sons of God and the inheritors of a Divine nature?

This, perhaps, someone will say, is mere rhetoric. Let us turn, therefore, to the second of those conceptions of morality to which I have already referred. What is duty? Its essence is obligation. Man feels that in reviewing possible

courses of action, there is one path which he *must* follow, that if he refuses, he has in some fashion given up his true position in nature, and that this infraction of the law of obligation will bring him under the terrible punishment of remorse. Some of us in a modern age are fond of whittling away the meaning of obligation and remorse. Remorse, we are told, is disappointment that we have made a mistake, that we have miscalculated, misinterpreted, our main interests. Remorse has nothing to do with either disappointment or miscalculation, it is not a recognition of mistakes, it is the agonised feeling that we have committed a crime. That is the imperative sanction of all morality—not an external sanction, not legal punishment, not social ostracism, but the voice, alternately pleading and threatening, of our inner moral nature. It appears then that we live under a law of obligation, and obligation implies at least two terms, the obliged, and the obliger. We understand at once who the obliged are; it is ourselves; it is we on whom is laid the difficult burden of a duty to fulfil. But it is nonsense to speak of an obliged unless the other term is equally explicit; who or what is the obliger? Is it not the Divine Spirit who rules the universe, and holds up to man the ideal at which he is, in whatever hesitating or halting fashion, forced to aim?

Turn finally to the last conception, the meaning of good. What is good? It is the attainment of happiness, says one class of thinkers. It is the subservience to the greatest interests of mankind, says another class. But good is neither happiness nor utility. If we only avail ourselves of explanations like these, we cannot unlock the secrets of man's action in the past, or read aright the historic pages which tell of many of his noblest deeds. The martyr, the leader of the forlorn hope, the preacher of a crusade, the Man who died on the cross, ask these whether good means utility or happiness, and the answer is not difficult to anticipate. But observe what follows. If good is not happiness or utility or welfare, how are we going to define it? Is it a tautological term? Are we going to say that good is that which is good? Are we to content ourselves with so vacant, so meaningless an ideal? We shall have to content ourselves with so vacant, so meaningless an ideal, if there be no God. Once grant the existence of Divinity, once grant the reality of a moral order, which is slowly being executed in all the developing series of natural existence and all the pages of the

world's history, and good is no longer meaningless; we have got the key to unlock its meaning, it is first the fulfilment of a moral order, it is next the fulfilment of the will of God. And observe how such a conception brings back to us the necessity for enlightenment, for culture, for knowledge, for thought; it is not an intuitive conception, this good; it is something the meaning of which we have to discover. We have to study science, history, in order that we may find out how the Divine Will is being fulfilled; and instead of the old arid, dry idea of being good in order that we may be happy hereafter, we have arrived at a conception whose richness and fulness are practically inexhaustible. On us is laid at once the privilege and the burden of first discovering and then helping in the fulfilment of a world-wide moral order—of being in the truest sense fellow-workers with God.

The CHAIRMAN (the Venerable Archdeacon THORNTON, D.D.).—I am sure we are all really indebted to Dr. Courtney for his very thoughtful paper, which is now open for discussion.

Mr. W. H. ROBINSON—suggested that Kant may possibly have in part derived his philosophy from that of India; after referring to the remarkable theories of the universe current there, he observed that the great difference between the Philosophy of India and that taught by Kant was, that the one said all was thought, and ended there, and the other was intended to lead us to action.

The CHAIRMAN.—There is really nothing that I can say against the paper, and therefore what I say is not in the way of discussion, but rather to profess my allegiance to Dr. Courtney in what he has said. I think he has pointed out the position of Kantian philosophy very accurately indeed. There was a period when it was not yet time for Kant to appear. We can look back to a period when it would have been too early for him to appear, but as "after the Children of Israel were sent into the brick-fields then came Moses," so Kant was raised up at the right time. He is called the philosopher of scepticism. I think those who use this phrase confound the scepticism of Kant's philosophy with scepticism in religion. A true philosopher must be more or less a sceptic; but scepticism in

religion is quite a different thing, for religion requires an assent to certain transcendental propositions ; philosophy is not the same ; it requires no such assent. Without scepticism in natural philosophy we should never have had Bacon. If people had been content to believe that the sun turned round the earth, we should have had no true astronomy. So we must distinguish between the two. The sceptical philosopher therefore, who, like Kant, calls attention to the means whereby we have investigated philosophical questions, and rather casts a shadow over the preconceived notions of men, is a true professor of philosophy, and has brought in an epoch in philosophy which I think the paper has clearly pointed out.

The Venerable Archdeacon SINCLAIR, D.D.—I should like to say that I attribute a very high value to this paper. It is very delightful to me to recognize the old truths which we heard at Oxford so clearly set forth, particularly from this point of view,—that the argument seems to me to place the different trains of thought and reasoning, which lead us up towards the existence of the Almighty and the groundwork of our religion and faith, all in a true position, and to show them in their true light. The study of Kant's philosophy has been a great comfort to myself, and his principles are what I have always rested in with regard to my own intellectual attitude towards belief. The paper looks at the relation between belief and reason from the purely metaphysical point of view ; and we cannot, in the present day of keen intellectual activity and enquiry, present our faith to a thinking, critical, and cultivated world unless it has a proper co-ordination, as far as possible, to the current of intellectual thought. I conceive that the Kantian attitude is the soundest and best. It acknowledges and accounts for the various lines of argument by which untrained minds endeavour to verify to themselves the existence of God. It does more than that ; it suggests that finally the basis of the pure and true belief must rest upon moral grounds ; and upon those moral grounds, if I may say so, from a natural point of view. It is exceedingly important in the present day that we should not proceed on grounds that are untenable. It seems to me that a good deal of the misunderstanding that exists between men of science and culture and men of faith may be accounted for by the fact that faith is not placed before them in its proper relation. For instance, agnosticism, rightly understood, is, I think, from one point of view, the legitimate mental attitude ; we can

never know *positively* the subject matter of faith. Every one will remember that there is a distinction, that is recognised in the teaching of our Lord between faith and knowledge, which embraces even the Bible itself in its application; and it is because very often, faith, or, at any rate, the tenets of faith have been presented by men as the object of positive knowledge to their fellow men, instead of realizing the distinction between matters of faith and knowledge, that faith has been rejected by those who understood not what Kant meant. It appears to me we have suffered very much from that. The only sermon I ever preached before the University of Oxford was upon that subject—the relation of scientific knowledge to matters of faith and religion, and the true function, as I conceived it, of the mental attitude of faith.

The additions that Dr. Courtney has made to the Kantian position are, I conceive, very important; and the light he has thrown on the subject from the history of religion, as well as from the theory of evolution, must help men, I think, in the direction of belief in God and in preparing the way for that moral ground which must be the ultimate source of our confidence and our hope. I sincerely trust that this paper will be widely noticed and that it will form the basis of, perhaps, more popular and simple teaching on this subject, such as shall induce men to rest their attitude on what we certainly conceive to be the true basis of faith when properly understood in its relation to other faculties of our complex mental nature.

Professor H. LANGHORNE ORCHARD, M.A., B. Sc.—I think it has been shown that the position of Kant is not that of a sceptic, but that of a critic. His great merit, to my mind, is this—that he showed man to be not merely a psychological being, but also a moral being—that he treated man as a whole, instead of in the peculiar way in which many philosophers are accustomed to look at him. Kant assigned to the moral faculty in man the supreme department in man's nature; that, I think, is the greatest benefit he rendered to philosophy. He did that not apparently on the mere ground that the moral faculty ought to be the highest, but because the judgments of the moral faculty rest on a surer basis than those of the logical faculty. Logic depends, for its conclusions, on its premises. If the premises are false, or even one of them be false, no amount of logical reasoning will lead to a true conclusion. The truths which the moral faculties give us rest on intuitions,

hence the absolute certainty of the Kantian teaching. As to the remarks at page 178 in regard to a ceaseless chain of causation, is he prepared to defend the statements in regard thereto? The conclusion of Dr. Courtney's paper is the part which I particularly enjoyed, if he will allow me to say so. The reasoning to ultimate good was most admirable,—but is not the ultimate good merely the fulfilling of God's Will? The actual attainment of a will in complete harmony with the Supreme Law—that is, likeness to God. That, I apprehend, is the ultimate good.

Rev. A. K. CHERBILL, M.A.—I was very pleased to hear the remarks of the Chairman as to the difference between scepticism in philosophy and scepticism in religion. It seems to me that a good deal hangs upon that—in fact that interesting book, *A Defence of Scientific Doubt*, is one of the soundest outworks in defence of religion when properly considered. But with regard to the argument mainly insisted on this evening, as to our knowledge of God, it seems to me that this comparison with philosophical scepticism leads us to very important considerations in the following way:—Philosophical scepticism shows us what is the nature of the argument or proof as to the real existence of matter; for Kant shows us that we only know the phenomena, but we are obliged to believe that there lies behind the phenomena a real existence, a thing in itself of the nature of which we cannot form any opinion, because it is not given to us in our senses. This seems to my mind to present a most instructive analogy to the nature of our knowledge of God. The author of the paper referred to the fact that the belief in the existence of God has, as it were, of necessity, existed in almost every nation, and Professor Max Müller in his Lectures on Physical Religion, as he calls it, shows how the idea of God necessarily arises in the mind of man from the contemplation of the phenomena of nature, because when man sees effects he, of necessity, is led to infer an agent.\* Thus it appears that our beliefs in a material and spiritual reality underlying the phenomena of nature have the same origin; we realize the effect which is produced on us. For example, in the case of the sun—we first of all see a moving thing up in the

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\* As another member, the Rev. R. Collins, M.A., expresses it: "Kant taught that though the Being of God cannot be scientifically proved, yet faith possesses a *subjective* certainty which demands the obedience of mankind."—Ed.

sky, and man interprets it according to his own view. In the early times he interpreted it as a small thing moving round the earth. Then he learnt to interpret it in other ways, but we do not suppose that we have yet got to the final interpretation of what the sun is in itself. All we perceive, to begin with, is the effect which it has upon us, and we gradually learn to interpret that effect, or rather to interpret our idea as to the cause of that effect, in a manner more and more approximating towards the truth. Sometimes scientific men even use the word "revelation" in regard to the things that they discover. They say this or that substance reveals to us its properties. That of course is metaphor, because the substance they conceive is not regarded as possessing intelligence. But when we use the term revelation with regard to God, as we regard Him as a personal and intelligent Being, the expression is not metaphorical—*i.e.*, we believe that God wishes us to discover Him and adapts and arranges things so that we may discover Him. But leaving that out of the question, the facts seem to be of the same order. The thing-in-itself has a certain effect, from which we argue as to the nature of the thing, and so we approximate towards an idea of it. God effects the whole universe and us as parts of it, and being influenced by those effects ourselves, we reason up to the idea of God.

There is one other point I would say a word upon and that is the chain of causes. It is a difficult question, but it seems to me that a little light is thrown upon it by this consideration, that if we regard phenomenal causation in time, we find that causes may be looked upon in two different ways, or in a certain sense we may say that things have two causes. There is the cause of a thing happening at a particular time, but besides the cause of its happening at a particular time, there is also a permanent cause. To take an illustration—suppose a stone drops, there are two causes—something or other dislodged it—that is the cause which causes the event to happen at that moment; but, besides that, there is a permanent cause, which conforms to the law of gravity and is always acting. The immediate cause which causes the thing to happen at a certain time no doubt may be brought into a chain of causes and so you may say it is not free. If something dislodged a stone from a hill-top then that event had a previous cause, and that again had a previous cause, and so on; but I do not admit that we can trace back such a thing as gravity to a

previous cause. That is, in a sense, it is free in its action—it acts according to its own nature, and not according to any external circumstance. When the stone is set free it does not move according to the cause which set it free, but according to the eternal law of motion. Of course the cause which set it free, if it were an impulsive force, would, to a certain extent, modify its motion, but only in accordance with those laws. And so with human will. I admit we act from motive—man does not act unless he has some motive, but when he is started into action he acts according to his own nature. So motive alone does not determine a man's action, but motive combined with the nature of the man who acts.

The CHAIRMAN.—We shall be glad to hear any other speakers. If not I will ask Dr. Courtney to make his reply to his critics.

The AUTHOR.—I thank you very much for the courtesy with which you have received my remarks on a subject which is extremely difficult, and on which various opinions can be held.

I was interested in what Mr. Robinson said in reference to his opinion that Kant derived some of his views from the Philosophy of India. My own knowledge of that is extremely small and is derived solely from the books of Professor Max Müller, Sir Monier Williams and others. I am aware that there is a parallel between Indian Philosophy and the early Greek Philosophy—so much so that several learned Germans have traced or thought that they have traced the origin of the early Greek Philosophy, both in India, Egypt and the East generally—for instance, Heraclitus fixed on fire as the origin of all matter from which the Parsees are supposed to have derived their belief. There is one thing that Mr. Robinson feels as much as I do. He stated in effect, that the great difference between a philosophy which says all is thought, and ends there, and a philosophy like Kant's, is, that one is intended to lead us to action and the other not. It is obvious that a mere contemplative theory of the universe leads to the theory that all action is indifferent, and a philosophy of quietism, in consequence, ends much as Mr. Robinson has stated. The value of the doctrine of Kant is that, having told us how far thought should go, he then proceeds in another treatise to refer us to the whole sphere of moral action and effort, to save us from the effect of mere contemplation. There are one or two things that occur to me. If I may be allowed to refer to Professor Orchard's remarks, he seems to assume that the argument I have referred

to in my paper is one that I should be prepared to defend. I mean as to the endless series of causation. I was merely putting in my own fashion the form in which Kant has treated that particular argument in the *Dialectic of Reason*, which comes at the end of the *Critique of Practical Reason*. The whole point turns obviously on whether you speak of phenomenal causes or not. But the question is complicated by this further point—that many people only use *cause* in the sense of *phenomenal cause*. There, I think, Mr. Cherrill is quite right. You cannot explain cause at all, unless there be something more than mere phenomenal cause. Phenomenal causes, such as they are, do not end the whole business, but they are for ever pointing to things that are not phenomenal but real—the ultimate laws by which the universe is governed.

I am deeply grateful for the kind way in which you have referred to what I have said, and with your leave, Mr. Chairman, I will add no more on this occasion.

The meeting was then adjourned.

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## REMARKS ON THE FOREGOING PAPER.

Professor J. H. BERNARD, D.D., writes:—

Trinity College, Dublin.

I have read Dr. Courtney's paper on *The Alleged Scepticism of Kant* with interest. As to the general drift of Kant's teaching, when studied as a whole, I am quite in agreement with him. The reason why Kant is always set down as a "sceptic" is that people, as a rule, read nothing of his save a few chapters of the *Kritik of Pure Reason*. As Dr. Courtney points out, the teaching of the *Practical Reason* is, that the practical necessities of life inevitably drive us into a recognition of the existence of God and a belief in the eternal future of the human soul, even though we may not be able to give a completely satisfactory justification to intellect of these great assumptions. And this positive side of the Critical Philosophy also appears in the *Kritik of Judgment*, a work which Kant regarded as the coping stone of his critical structure. That God exists, Kant seems to say to us, we cannot doubt, though

the manner of His existence must remain in large measure unknown.

T. CHAPLIN, Esq., M.D., writes:—

Standing, some months ago, in the memorial building erected to Kant at Königsberg, and musing on the line from one of his own works which serves for him as an epitaph—“*The starry heaven above me; the moral law within me*”—I naturally found myself asking (not by any means for the first time), What has been the practical outcome of the great philosopher's studies, thoughts, and teaching? Did he put already known truth upon a wider, firmer basis? Did he discover any truth not before known to mankind? Did he point out any new method of research by which the scope of man's knowledge may be widened, his conceptions of things unseen be made clearer, his power over the forces of Nature be increased? Or, did he lead men's minds away from the pursuit of truths which are demonstrable, into devious and obscure paths of metaphysical subtlety? It has seemed to me that the revolution in philosophy which Kant is said to have inaugurated, influences the thoughts of a few philosophical and (if I may so say) speculative minds, rather than serving as a guiding power to the army of scientific enquirers who have made this century which is now drawing to its close so remarkable—that it is in the barren waste of metaphysical speculation, and not in the fruitful field of experimental science, that its results are to be found.

We are greatly indebted to the author for putting before us so clearly and with so few technicalities the general drift of Kant's enquiries and doctrines, and I think all will recognise how ably and convincingly he has defended the sage of Königsberg from the imputation of any kind or degree of scepticism beyond that which is the normal habit of mind of every sincere searcher after truth. Yet, I confess that I cannot easily bring myself to believe that the arguments upon which great thinkers of former days were content to rest their belief in the existence of God are but “*a broken reed.*” To trace causes backwards until, with our limited knowledge, we can go no further, and then to take refuge in a great *First Cause*, still seems to my mind *not* unphilosophical: *the teleological argument*, now so brusquely thrust aside, seems to me *not* weakened by the consideration that the Almighty Himself gave to the materials with which He works their “*natural forces and properties*” (p. 178.) Would anyone be prepared to assert that a brass

lamp could not have been made by the hand of man, *because* the ingenuity of man had contrived to produce the compound metal which possesses the properties requisite for the same?

Whilst then we should be grateful for those philosophical considerations set before us, which afford "*a special ground on which to assert the reality of God,*" I cannot but think that these should be regarded as supplementary to older, and perhaps more easily comprehensible arguments, drawn from *cause and design*, and not as destructive or subversive of them. I may not, in an enquiry of this kind, quote the Apostle Paul *as an inspired writer*—philosophical investigations do not take cognizance of inspired writings—but we shall all agree that that great man had a powerful and highly cultivated intellect, and no inconsiderable knowledge of philosophy; and we find him affirming that "the invisible things of God from the creation of the world are clearly seen, *being understood by the things that are made*, even His eternal power and Godhead." St. Paul then did not reject "the teleological argument." And so also our great English philosopher: "God never wrought a miracle to convince Atheism, *because His ordinary works convince it.*" We shall not therefore err in bad company if we still keep to the old paths, whilst appreciating any new light that may be thrown upon them by the more modern thinker; and it may be well to give due weight to another saying of Bacon, namely, that "a little philosophy inclineth man's mind to atheism, but depth in philosophy bringeth men's minds about to religion."

Professor DUNS, D.D., F.R.S.E., writes:—

I have read Dr. Courtney's paper with much interest. It is an able review and criticism of several important aspects of Kantian philosophy, held by thinkers to beget and favour scepticism. A philosophic spirit, wide, yet acute and accurate, thinking, crisp "phrasing," and firm grasp of the leading lines of Kantian thought characterize the paper throughout. It is very suggestive. A worthy and full criticism would be longer than the essay itself. I limit my remarks to one feature mainly. That Dr. Courtney's standpoint is that of Kant, and that he sympathetically identifies himself with the philosopher's own attitude to, and estimate of, the subjects dealt with, will be held by some to add weight to his paper. Others will think that he thereby lays himself open to hostile criticism. What they wish to know is not

Kant's view of the bent and bearing of his own positions, but what were the views of his contemporaries regarding them? In a word, most will attach more importance to the opinions of a philosophic critic, touching the questions handled here, than to those of a sympathetic expositor and apologist. When Kant relegated belief in God, Immortality, and human Freedom to the sphere of the transcendental—the intuitional, incomprehensible, insoluble—he, no doubt, thought he was conferring a great boon not only on philosophy but on religion itself.\* But his followers refused to see this, and even hastened to employ his transcendental conceptions to buttress the fabric reared by Hume,—“Whatever lies beyond experience is incapable of proof.” The question which Hume faced was “Have we any ideas independent of Experience?” And his answer was “Experience itself is incompetent to determine absolute truth.” All, then, that Experience itself could do, was to beget scepticism. Kant asked what is the nature of the Experience which thus landed thinkers in scepticism? This led him to subject Reason to critical investigation. Discarding the views of the prevailing sensational school, he harked back on *à priori* elements of knowledge, and, sifting them, he concluded that there are two sources of knowledge, experience and understanding. All our knowledge begins with the former, but there is a knowledge independent of it—ideas that are universal and certain, not absolutely, but only subjectively true. Thus perfect knowledge, that is, knowledge of things in themselves, is impossible. Was not Lewes right when he affirmed,—“We regard the result of Kant's investigation of the elements of thought as nothing less than a scientific basis for Scepticism?” I think he was, and, if so, then the chief contention of this paper will at least be doubtful. Even throughout it, point after point occurs suggestive of the influence of Hume on Kant, and most interpreters of the Kantian philosophy to other than metaphysical experts, have directed special attention to the fact that “it was chiefly the scepticism of Hume which incited Kant to the construction of his critical philosophy” (*Ueberweg*). Indeed, Kant himself puts his indebtedness to Hume in a very graphic way. Thus, as to the conception of causality, he says,—“I confess freely that it was the exception

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\* This would suggest that there were causes operating at the time which tended to errors which Kant wrote his critiques to combat.—ED.

taken by David Hume which many years ago first interrupted my dogmatic slumber, and gave to my enquiries in the field of speculative philosophy an altogether new direction." "He brought no light into this species of knowledge, but he struck, nevertheless, a spark from which a light might well have been kindled, if it had fallen on susceptible tinder." I give prominence to this because of its bearing on the allegation against which Dr. Courtney argues, and because it raises the crucial question:—Did Kant's criticism of Hume eliminate from the Scotsman's philosophy the sceptical element with which, as all admit, it is charged? Now the answer to this was not,—“the conception of the connection between cause and effect is not necessarily (as Hume believed) of empirical derivation.” It was “the understanding conceives *à priori* connections among things.” The metaphysicians may make something of this, but outsiders will express their want of satisfaction by asking other questions: What was its outcome? What kind of fruit did it bear? What was its influence on German religious thought? Kantian philosophy is more than pure metaphysics. The leading intuitions of the speculative Reason are religious. A satisfactory refutation of the assertion of “the French critic that Kant has spread through the whole of Europe the spirit of doubt,” must take into account that scepticism is more than “a protest against dogmatism and the illimitable liberty of the human spirit.” It must deal with it as the denial of dogma in religion and ethics, a denial which soon became the *zeit geist*, the very temper of the time, when the Kantian metaphysics was fresh and influential. And, doubtless, we are warranted to trace that phase of universal scepticism which, even before Kant's death, began to prevail among the Lutheran clergy, to the influence of Kant's writings. Can we apart from them, account for the heresies of the Tübingen school—the pure and historical myths of Strauss, or the Hegelianism of Baur, who held the miraculous to be impossible, the supernatural non-existent, or only an illusion of the natural, and Christianity to be no more than the ultimate natural outcome of rational thought?

I had marked some passages in connection with which a good deal might be said as to Kant's views of the theistic argument from Final Causes, the fruits of the cosmological idea, and chiefly, the immense service to psychology and religion itself which his virtual acceptance of the Aristotelian dictum—“Intuition must be the beginning of science”—might have rendered, had he not pressed the intuitional into the shifting sphere of the Practical Reason

where it might become operative, and, as a dictate of the moral nature, supersede the teaching of Revelation, thus making an *historical* theology impossible. But even to make good any call to discuss these topics in remarks on Dr. Courtney's paper would lead us too far afield. Having in view Hume's influence on Kant, my object in these remarks was to suggest, that the sceptical outcome of the writings of both might be identical, and that a good deal might be said on the side of the French critic's sweeping statement, "Kant has spread through the whole of Europe the spirit of doubt." I think the history of religious thought both in Europe and America is strongly in his favour.

The Rev. J. J. LIAS, M.A., writes :—

The paper on the whole is a useful and a helpful one, but there are some points in it which appear to me open to criticism. I am afraid my acquaintance with Kant's *Critique of Pure Reason* is not exhaustive, but one is not disabled thereby from endeavouring to exercise pure reason upon the questions treated therein.

First of all, the statement in the second page that before we can arrive at any conclusion on phenomena, it is necessary to investigate the conditions of being and knowledge, and to study logic, ethics, and psychology, seems at least questionable. That some study of the conditions of *knowledge* preceded progress in physical science is undoubtedly the case; but it was simply a question of method, as Dr. Whewell shows in his *History of the Inductive Sciences*. The barrenness of the physical science of the ancients was almost entirely due to the fact that they used the deductive instead of the inductive method, and based their philosophy on dogma instead of on observation. But no very considerable progress had been made in psychology when Bacon laid the foundation of the inductive method, nor does he appear to have depended much upon the scientific teaching of logic or of ethics: nor, on the other hand, is physical science usually supposed to have owed much to Kant. It is a question whether its advance would not have been as rapid if Kant had never written a line.

Dr. Courtney's distinction between criticism and scepticism as applied to Kant's method is striking, and it appears to me conclusive. But I must venture to question the soundness of that method as applied to the Being of God. The necessity which an ordinary mind feels to be imposed upon it of finding some ultimate cause of things is in no sense disposed of by the illustration

of a man walking to the horizon to find the extremest edge of the world, which, after all, is admitted to be round. Illustrations are proverbially dangerous; they are almost sure to fail you at the critical point: they serve to point Bishop Butler's moral that the imagination is the source of every error that has led mankind astray. The argument should be turned just the other way. If we came to the edge of the world, we should know that it was *not* round. The very essence of the argument from design is that on all practical principles it is the evidence that a *mind* has been at work, not that a series which may go on to infinity must of necessity stop somewhere, "which," to use Euclid's words, "is absurd." But if a mind has been at work, it must have been a Mind of extraordinary grasp, depth, penetration and power. The argument from design moreover does not stand alone. It points to a Great Being, but it does not solve the problem of His Nature. Then the assumption that the argument from design assumes an author who is "absolute" (p. 178), is, I may venture to contend, disposed of in my paper ("Considerations on the Unknowable of Modern Thought") read before the Institute in 1883. (Vol. xvii, p. 98.) I have there contended that if by "absolute" we mean that which has no connection with anything else, the word is inapplicable to a Creator of the world, and if we mean that which has no *necessary* connection with anything else, it involves at least an assumption which we have no right to make, and which is at least in direct conflict with the words "God is Love." Then we are told that if there *be* an intelligence at work in the creation of the world "it is merely a human one, and not divine." This, it must be presumed, means analogous rather to a human than a Divine Mind. For a human mind most certainly could neither have conceived nor have carried out the plan of creation. And the objection moreover begs the question, for, except from phenomena, we have no means of arriving at any conclusions as to the nature of the Divine Mind. There appears to me no reason whatever why I should not "seriously conceive of God as having stamped certain things with qualities often contrary and conflicting," and as having nevertheless been pleased to "overcome the difficulties of the material by skilful combination and adaptation." That He did the one *in order that* He might do the other is an assumption of Dr. Courtney's. It is equally possible that He did so in order that He might thereby stimulate His reasoning creatures to inquiry, and provide them with material for the exercise of their reasoning powers. Dr. Courtney then further makes a rather startling

statement, namely, that the "Ontological" argument is the "last" argument in favour of the Being of God. I had thought that a powerful additional argument had been drawn from the character and constitution of man. I was under the impression that the moral character of man, his sense of justice, honesty, duty, truth, tended to imply the existence of a Being in Whom these qualities were inherent, and in Whose Image man was made. I moreover imagined that the spiritual character of man, his disposition to awe, reverence, worship, tended to indicate the existence of a Being in Whom those qualities might find a fit sphere of exercise. And lastly, I had supposed that the evidence of history appeared to point to a wise Disposer of events, who was engaged in educating man on a large scale, and apparently with a view of fitting him ultimately for existence in an order of things in which he would be able to make a fitting use of the education he had received.

Dr. Courtney, however, does at last shake himself free from the fetters imposed on him by his master. He eschews his "terminology" and "even" his "precise doctrines," though he claims still to be animated by "his spirit." In Dr. Courtney's contention that we find the solution of the question of the Being of God in the questions, What is conscience? What is duty? and What is good? there can be no difference between us. It is in the great facts which underlie the visible universe that the secret of God's Being is to be found. The revelation of Wisdom and Order in the phenomena brought to light by physical science, of goodness and purity in the history of the workings and progress of the human conscience, of Majesty and Vastness as discerned through the spiritual cravings of man after something higher and worthier than himself, of the profoundest depths of beneficence and Love, felt to be working themselves out in a moral order which at once permeates and transcends the natural—all these combine to point us to One Who is not only the Creator and Master of the world He has created, but Who, as the Apostle puts it, is the God and Father of all, eternally "above all, and through all, and in all."

REMARKS BY THE REV. KENNETH S. MACDONALD, M.A., D.D.

I do not think that there is any real justification of the idea that Kant himself was a sceptic, or that his works taken as a whole encourage doubt or scepticism in regard to the great verities of religion or morals. It is quite true, and in that alone lies the

plausibility of the sceptic's position, that Kant regarded the cognitive faculty or "the pure reason," as incompetent to *prove* or *demonstrate*, as the propositions of Euclid are demonstrated, the problems of religion and ethics. But those who regarded such demonstrations as possible have always been few among believers. Believers have rested their faith on the *probability*, the strong moral probability, of the truth of these great fundamental propositions. The support which the "practical reason" gives them is all that is necessary, or indeed desirable, to make them reasonable. To give to them a demonstrable certitude would have been to paralyse them as tests of moral character. He who wills to will the will of God will find in Kant abundant evidence in support of the truth of these doctrines.

It must also not be forgotten that if Kant has made it clear that the truth of these doctrines cannot be demonstrated, he has made it equally clear that their falsity cannot be demonstrated. The cognitive faculty is equally incompetent to disprove them. This uncertainty in which the pure reason leaves these problems is not to the Christian a matter of grief—except so far as it is wrested by the infidel to his own ruin. The Christian regards it as a special provision of God for the good of man that these problems should rest only on a reasonable probability. Kant so regarded it. This fact protects him on the one hand from superstitious fanaticism and on the other from religious self-abandonment, in addition to the moral tonic which it supplies to his whole nature. Hence the warm cordial language which Kant uses in regard to those very arguments which he regards, when tested by pure reason, as insufficient. Here is an illustration:—"This proof" (that founded on design) "deserves to be named always with reverence. It is the oldest, the clearest, and the most suited to our common understanding. It animates the study of nature, which gives existence to it, and acquires thereby ever new power. It shows ends and intentions where our own observation would never of itself have discovered them, and extends our knowledge of nature through guidance of a peculiar unity, the principle of which is above nature. The new knowledge acts back again, towards its cause, its originating idea, and exalts our belief in a Supreme Originator into an irresistible conviction." (WW) R., ii, p. 485.\*

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\* As all readers may not recognise this reference, Professor Wallace, of

Then, the tone of Kant's ethics is of the very highest kind, not that limp molluscous kind which is so common now-a-days. He finds all true morals most intimately related to the existence of God, as proved by the practical reason, the reality of a moral order and the freedom of the will of man. To him the goodness of the will is the only absolute good on earth; practical reason, the revealer of moral order, is the governor of will, constituting it good; and the human will itself is essentially free in order to goodness. This last, according to Kant, is indeed the grand essential to morality.

Recognising sin as universal and the need of an atonement and a justification through Christ, and thus a conversion from evil to good, what a beautiful picture he draws of the true Church of Christ,—“a great family under a common though invisible moral Father, acting through His Son Who knows His will, and who at the same time is bound to all the other members of the Family by ties of blood.” R. x., 121.

Then in regard to the Bible, it is instructive that he accepts what he calls “*the principle of reasonable modesty* with regard to all that is called revelation,” as established by the critically enlightened reason of modern times. “For as we cannot deny the *possibility* of the divine origin of a book which in a practical point of view contains nothing but divine truth; it is best to take the book which we find generally recognised as sacred, and make it the foundation of the teaching of the Church.” R. x., 159.

I do not mean to say that Kant was an orthodox Christian. He never looked at the questions or problems of Christianity from that standpoint; but I do mean to say that looking at them from the standpoint of a mere philosopher, his words do not justify the charge brought against him by the French critic that “Kant has spread through the whole of Europe the spirit of doubt.” The author has drawn a very important distinction, and in the case of Kant one of great practical value, between the *sceptical* attitude which men of the atheistic and we may say agnostic stamp assume, and the *critical* attitude of the philosopher.

## THE AUTHOR'S REPLY.

I have read, with attention, the remarks made upon my paper by various critics. My only object was to present, as faithfully as I was able, what seemed to me to be the intention of Kant, in his *Critique of Practical Reason*, in order to defend him from a special charge. I do not wholly identify myself with his doctrines, nor do I desire to maintain, in all their detail, his particular arguments on the being of God.

I observe, however, that one or two of those who have been good enough to send comments on my paper have fallen foul of Kant's treatment of the teleological argument. There is, of course, a narrower form of the design argument, as well as a wider one. That the whole universe bears the traces of intelligence is a proposition which, so far as I can see, no sane thinker attempts to attack. It must be remembered, however, that this is not the form of the design argument which Kant had in mind. I should think that historically there was no doubt that the attempt to explain the structures of creation in detail, solely on the ground of the purpose they were supposed to fulfil, led science and knowledge on the wrong track. When Aristotle made use of a similar argument, he was much embarrassed by the existence of such awkward things in creation as whirlwinds and morasses, and other matters. It is in reference to some such state of mind as this, I imagine, that Kant attacks the use of the teleological argument. It is clear that, when we admire any ordinary product of human skill—such, for instance, as a cleverly constructed watch or piece of machinery—our admiration is largely based on the fact that, in the case before us, the artist, engineer or workman has been able to conquer certain difficulties of his material in accomplishing his result. The fact that he has to deal with a form of matter which is not of itself either helpful or useful, is of the very essence of our admiration for his skill. This will, I think, explain why Kant believes the teleological argument to be based on a purely human analogy. The idea is that matter is one thing, and the artist or engineer another, and that the human agent has to accept the material in which he works as something extraneous to him, and

possessing qualities of its own. But now observe that, as applied to the Divine Artificer of the universe, this analogy is wholly inadequate. According to the hypothesis of creation, both the material and the form afterwards impressed upon that material come from one and the same source. We can hardly conceive of the Almighty first making an indifferent matter, and then showing His skill by bending that alien matter to His purposes. In such a case there can be no opposition between matter and form, except on a Manichean supposition that matter exists independently of the will of God, and is capable of interfering with His volitions. And there is still another point. In the case of the human artificer, we say that his adaptation of an alien material is very clever and ingenious. If we apply the same argument to the works of creation, we may be entitled to say that the Divine Artificer is extremely clever, or extremely ingenious, but hardly that He is omnipotent. All that the analogy will give us is an increase of intensity in the attribute, but not that universality of power, or that universality of knowledge, which we accept as the characteristics of Divinity. This, so far as I can see, is the meaning of Kant's attack on the ordinary use of the design argument in nature, but of course the point to which I am referring needs far more comment and illustration than I have at present space to bestow.

I would only add that there is nothing in Kant's argument, in my judgment, which militates against that large and comprehensive design in this world for which the scientific name is evolution, because the assumption on which it rests is by no means founded on human analogies, but begins by the supposition that matter contains within itself the promise and potency of future development.

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## ORDINARY MEETING.\*

THE PRESIDENT, SIR G. G. STOKES, BART., IN THE CHAIR.

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

ASSOCIATES :—R. J. Snape, Esq., M.A., London ; Rev. Kenneth S. Macdonald, M.A., D.D., India.

The following paper was then read by the Author :—

*ON THE COMPARISON OF ASIATIC LANGUAGES.*

By Major C. R. CONDER, R.E., D.C.L., LL.D., M.R.A.S.

## INTRODUCTORY.

SINCE the power of articulate speech is one of the most distinctive attributes of man, there is, perhaps, no more useful or fascinating study than that of the growth of language, nor any which is more likely to shed light on the difficult questions of prehistoric events and conditions. Yet the question which forms the subject of this paper is one of great difficulty, and which has often suffered from hasty treatment ; and it is inevitable that an attempt to enquire into the ultimate relationship of different families of speech, should meet with objections not less formidable than were those encountered by the fathers of the true comparative study of the Aryan languages, who laid the basis of our present knowledge some fifty years since.

The main difficulty lies in the continual and sometimes rapid change of language from generation to generation, which is most marked among peoples who have no literature capable of maintaining a standard, and among scattered tribes holding little intercourse. I have been told that among

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\* 9th of 28th Session.

the Kaffres, when the absence of springs and streams separates the various settlements by great distances, the change in pronunciation is sometimes so rapid that, in the third or fourth generation, the members of an isolated group become unable to understand the speech of the parent tribe; and when we consider the lapse of many centuries, it may well seem impossible that the original words of such languages should be recoverable, even by the aid of a wide, comparative study. We are often told that the condition of primitive man is best illustrated by the study of the modern savage races of Africa and of America. Yet it seems to be in these cases assumed that those whom we now know as savages can never have existed in any other state, and this although, on the discovery of America, existing civilisations were encountered, which have since been destroyed, and traces of old past civilisations (including literature and monumental writing) in Central America, which had then already perished, leaving only the great ruins of former cities. Even in Africa, when it is considered that physical and other characteristics have been shown, by men of science, to connect the wild Bushman (distinguished for his love of drawing and power of dramatic imitation) with the ancient civilised Egyptian, we may well pause before concluding that the ancestors of the bushmen were as wild and uncultivated as are their present descendants.

It is not, then, among modern savages that we can expect to find, in recognisable condition, the original languages of the world. But if scholars be correct in classing the languages of America with the Turanian family of speech in Asia, and in suggesting an ultimate connection between Semitic and African speech, the latter (as regards Kaffre languages at least) being also connected with that of Australia, it would follow that in considering the most ancient languages of Asia, we are able to get at the very foundations of the speech of man as a whole.\* The present

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\* The Mongolic character of Japanese is shown clearly by W. G. Aston ("Grammar of Japanese." Trübner, 1877). The American languages are classed as Turanian with the Euskaric and Esquimaux. They show the ordinary peculiarities of this family—agglutination, the use of post-positions, absence of gender, and formation of the verb by auxiliaries. The Berber languages show connection with Egyptian and Coptic in structure and in the pronouns. The Caucasian dialects, though much mixed and decayed, show inflection, and the case suffixes of Aryan speech. The languages of Melanesia are connected with the speech of the southern

paper is confined to the discussion of the main historic groups—Mongolic, Aryan, and Semitic—but it is generally admitted that the South Turanian dialects, and the Japanese, are ultimately connected with the Mongolic (or, as it is otherwise called, the Altaic), although the absence of early civilisation has resulted in the growth of so many dialects, that, in China alone they number nearly 400 in all, that which is generally called Chinese being radically the speech of the Mongolic immigrants from the West.

The races among whom the earliest civilisation is found—the Akkadians, the Babylonians and the Egyptians—possessed the art of writing so early that the disintegration of language proceeded among them much more slowly than among illiterate savages. The commonest words of daily life, which were no doubt at once the most ancient and the most widely used, were also, fortunately, the least subject to changes—from their simplicity and constant use. The language of the Akkadians can be traced to, at least, 2500 B.C., while monumental examples of Egyptian are equally ancient. The Aryans are the last to appear on the historic scene; yet, in Asia Minor, our knowledge is carried back to 800 B.C., in the case of Phrygian, and to 500 B.C., in Persia, while the oldest hymns of the Vedas are referred, by Max Müller, to 1500 B.C. Comparative study of later historic languages is thus, in the case of those under consideration, checked and assisted by the existence of monumental texts, of an antiquity which is equal to that of most of the prehistoric remains found in other parts of the world.

Each of the three great Asiatic groups is very distinct, and well separated by grammar, by pronunciation, and by vocabulary. Each has been, and still must be, separately studied, and internal comparisons instituted among its members, without reference to the study of the other groups. But the question now to be raised is whether we are not already able to perceive that a yet wider comparison, if based on safe principles, is possible between the ultimate

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part of the Asiatic continent, and distinguished from those of Australia and Tasmania, which are said to compare with African speech. Mr. C. Bertin connects the Bushmen with the Egyptian race. As regards the Dravidian and Kolarian languages of India, they are classed by Professor Lacouperie as Himalaic-Turanian, and he even places the Andaman and Australian in the same group. The Thibeto-Burmese forms one family of the Kienlunic group to which he refers the Chinese and Anamese, being the next to the Turkic as a Turanian group. This practically exhausts the list of human languages all connected ultimately with Asia.

forms of the various main divisions. This enquiry has often been attempted in a fragmentary manner, and very remarkable results have been noted. Thus Egyptian has been seen to present similarities to both Aryan and Semitic speech. Chinese has been said to be comparable with both Mongolic and Aryan languages in some of its words. The identity of roots Aryan and Mongolic has been indicated by Tomaschek and Donner. The similarities between certain Aryan and Semitic roots were carefully (though not always correctly) recorded by Gesenius; the connection of Akkadian and Chinese was indicated by Lenormant, while others have seen in the Akkadian an Aryan element; and others, again (following Halévy), have denied that it is anything more than a Semitic language. Are we to suppose that in each case the scholars in question—who were all trained linguists, and not mere dabblers in language—have been misled by a few chance coincidences? or, may we not rather be led to suspect that some real connection does exist, binding together languages which, however different in structure, were once spoken in parts of Asia not far distant from each other?

Against such a view two main objections are raised. First that the resemblances are accidental, or due to the same causes leading to like results in independent cases. Secondly, that the similarities are due to the interchange of foreign, or “loan” words, between various and originally distinct languages. It is certain that an apparent similarity often disappears when we trace back the words to their oldest forms, and it is also certain that from a very early time the trading relations, which bound the various civilised peoples together, led to the interchange of many foreign words for foreign objects; but while these circumstances should render us very cautious in research, they do not suffice to dispose of the main question. It becomes a matter of careful study to ascertain how far these resemblances are traceable in the earliest radical forms of the oldest languages, and how far they are concerned with common objects and ideas, which it is not natural to suppose would have been expressed by foreign words. As regards independent adoption of like words, while it is easy to imagine that simple sounds—imitative of natural ones—might so appear in languages not really connected, the same cannot be said when more developed roots, and parts of speech, are found to be common to the various great stocks.

My only claim to speak on such a subject lies in the fact

that nearly half my life has been spent in foreign lands, and among primitive peoples, and that I have been forced by circumstances to acquire the speech of those with whom I dwelt—for eight years among Italian peasants, for six among Arabs and Turks, and for one year among Kaffres and Hottentots, in regions only since that time incorporated in our Empire. The study of antiquity, at the same time, has obliged me to enquire into the dead languages of Asia; and practical knowledge of the vulgar dialects has shown me, as it has shown others, that languages are older than their written grammars, and that the archaic speech of peasants is more nervous, more simple, and more symbolic, than are the polished phrases of literary authors, and of the later standard style. But at the same time the absolute importance of recognising the distinctions, in grammar and in sound, which now divide the great groups from each other, is only the more forcibly impressed on the mind by hearing the actual conversation of various races.

And first as regards sounds. The distinction of sounds nearly akin increases with increase of civilisation, and with increased delicacy of ear. The scientific alphabets of to-day distinguish no less than 86 sounds, including 27 vowels; but the oldest Semitic alphabets, rich as they are in sounds hardly distinguished by an European ear, are limited to 22 letters; and the oldest inscriptions in these take no note of the short vowel sounds. The Akkadian was only accustomed to mark 17 sounds in writing, and when the Greeks used the Cypriote syllabary they had to content themselves with 14 sounds. With this we may contrast the alphabets of their descendants, the Turks, having 32 letters against the 17 in Akkadian, the Arabs 28 against 22 in Hebrew, and the writers of Sanskrit no less than 50 against the 14 of the Cypriote syllabary. Nor was this small amount of distinction due to want of graphic power, for the symbols have decreased steadily in number, while the precision of distinction has increased, and the additional letters are very generally distinguished from the older only by an added dot or line. The distinctions are also, in very many cases, only marked in literature, and not clearly discernable in the speech of the ignorant, so that one of two kindred sounds becomes characteristic of one dialect, and another takes its place in a second dialect of the same language. It is on this peculiarity that the comparative study of European languages rests, as on a secure basis; and it has become more and

more apparent to scholars that we cannot really call one of such dialects older than the other, or point to any one of the oldest languages as the parent of all the others.

Broadly distinguishing the sounds into four great groups—*vowels, gutturals, dentals, and labials*, we find that sounds which are uttered by the same parts of the mouth have a tendency to pass into one another; and that certain of the more delicate distinctions are not traceable to the earliest period. The guttural comes from the throat, and passes into the palatal; the dental is sounded within the teeth; the labial by aid of the lips, and in each case there is a cross distinction, according as the letter is strong, weak, or nasalised. In all cases the dentals are the most numerous, and the labials furnish the fewest distinctions of sound. But different languages differ greatly in the proportionate use of the three classes of sound; so that while nine-tenths of a Bushman's words consist of gutturals with an added vowel, the soft and liquid speech of the Bechuana Kaffres consists mainly of palatals and labials with many vowels, such as seem natural to a thick-lipped people, who have, it may be observed, adopted none of those clicks which the Zulu borrows from the conquered Hottentot.

The sounds of our own language are co-extensive with the more broadly distinguishable sounds of speech in general, although as regards both vowels and consonants there are many well-known distinctions, which we do not mark in writing. As regards vowels the older systems do not distinguish more than three or four, though the early Aryans found it necessary to have a notation for at least ten (five long and five short), and their descendants in the east have made yet further distinction. The Hebrew letters *Aleph, Yod, and Vau*, though not regarded by grammarians as vowels, have in fact the sound of the three long vowels most commonly distinguished, while the *Ain* is a guttural vowel of which the sounds (for it represents several) can only be learned from Orientals, yet which (as we shall observe later) easily pass into that of the *Aleph* or of the *Vau*.

As regards the gutturals there is, I think, not one used in Semitic speech which is not also found in European speech. In Turkish and Mongol speech, although the gutturals are even more numerous than in Semitic languages, they are nevertheless freely interchanged in the various dialects, as Vambéry has shown. In the dialects of Palestine there is

also considerable difference in the pronunciation of the gutturals, and in some the *Koph* is not distinguished from the *Kaf*, while the *Jim* has a different sound in the Arabic of Syria and of Egypt.

This interchange is yet more remarkable in the more numerous dental sounds. T and D are interchanged in various dialects, and in others T becomes S. The Z sounds also merge into S on one side, and into Dh or D on the other. Thus the Hebrew Z becomes the Aramean D. The Palestine peasants pronounce the Th as S, and the Dh as Z, and they do not always distinguish the three forms of the sibilant, which are distinct in literary language. So also on the Moabite Stone, and on the Siloam inscription, we do not find the hard T (*Teth*), which occurs in later Phœnician texts, and in Hebrew we have cognate roots in the hard and soft T and in D, and also in D and Z. Another very weak letter is N, which is euphoniously changed into M, and also into L. In Semitic and in Aryan languages alike the N is often introduced into the middle of a root, which in other dialects exists without it. In the Cypriote Greek the N is often absent from words of which we are accustomed to regard it as a radical letter, as, for instance, *Anthropos*.

The L and R are of all letters those which appear to have been the latest to be specialised. In Egyptian there is no distinction between them. In Chinese there is no R, and no L in Japanese. In Mongolic languages they are both at times interchanged with T or D, and in Turkic the native roots never begin with L or with R. The L of the Finnic dialects becomes T in Turkic; thus the word *lil* "ghost" becomes *tit* in some dialects. The same is remarkable in the Bechuana language, which makes no distinction between L, R, and D.

The labials are equally liable to merge into one another. The Galileans and Samaritans appear to have been reproached with the confusion of these and of other letters. The Arabs have lost, or never possessed, the P sound, which they cannot distinguish from B. The Mongolic languages show us the interchange of P, B, and V, and the B becomes V in modern Greek. Aryan roots in B have also cognate roots in V or W, and in all languages to be considered this softening occurs, while M and V are also little distinguished, as we see, for instance, in the Cypriote syllabary.

These changes are due to euphonic laws, which arise from the attempt to render pronunciation easier, and which we

see well exemplified in Zend, when S becomes H\* before *a*, and *Sh* before *i* and *u*, and where *T* and *D* become *S* before another *t*, and *Sh* before *é*. K is also softened to *é* before *t*, and *j* becomes *h* before *t*. If we wish to represent the most distinct sounds, of the many which shade into each other, they may be classified in a simple table of nine consonants, as follows:—

	Gutturals.		Dentals.		Labials.	
Strong	....	k	....	t (= r = l)	....	p.
Weak	....	g	....	s	....	v.
Nasal	....	ng	....	n	....	m.

and under these headings all the more ancient and widespread roots in the Asiatic languages might easily be classed.

Before considering the relationship of these languages we must briefly glance at each of the three groups in turn, and at the present condition of comparative study of their internal relationship; and in so doing it is convenient to begin with the Aryan, as the most carefully studied group. But a few words are necessary in the first place as to the distinction made between what is called "agglutination," and what is known as "inflection" in language generally.

If it be admitted (as is generally taught) that languages spring from certain roots, which contain ideas of actions, and that words are formed by the putting together of such roots, it will appear that what are called monosyllabic languages have no real existence. The oldest roots are monosyllables, probably in every language, but even Chinese is not really a language where these monosyllables stand alone. Its verbs are formed by the prefixes *ching* and *tso*, and its nouns in their oldest forms are seen to be built up from more than one syllable, though in modern Chinese they have been recontracted to a single sound, by the general decay of the language. In all Asiatic tongues we find words in various stages of decay, due to the natural attempt to make conversation easier and more rapid, which has for centuries tended so to wear them down. In some cases the combinations are easily resolved into distinct roots, in others the original form is difficult to perceive, or even lost. The first condition is *agglutinative*, or "glued together," the second is *inflexional*, or decayed agglutination. No language is entirely free from one or other form, but in

\* The interchange of S and H also occurs in Semitic languages. The Assyrian and Hadramaut S (in the personal pronoun and voice of the verb) becomes H in Hebrew and in Himyarite.

Mongolic speech inflexion is little marked, and in Aryan or Semitic languages it has proceeded very far. In English and in Persian we find a yet further stage of advance, in which the old inflexions are discarded as cumbersome, and new agglutinations take their place as being simpler. For instance, the word "shepherd" is clearly soluble into *sheep* and *herd*, but the origin of "shearer" is forgotten, though the *er* comes from an old word for "man," and the compound was once understood to mean a "man who shears." The noun cases of the German have been relinquished in English, because the prepositions gave a simpler method (sufficient in itself) for the distinction of case, and the verb in like manner is for the most part easily aided by auxiliaries, and discards the old inflexions of tense and mood, which themselves arose from older auxiliary additions. Turkish is a language dear to the grammarian for its simplicity, due to the regularity with which its case suffixes (taking the place of prepositions) and its complete system of auxiliaries (for moods and tenses of the verb), are applied to every root; while in German we have an instance of inflections which have decayed and lost their original value, and which now form impediments rather than aids to speech, from which encumbrances the English language has set itself free. Such peculiarities, therefore, denote various stages of growth and decay, and of new growth; but they do not fix a barrier of complete distinction between the various great groups. The differences, in short, are differences of degree, and not of kind. Some languages stop short at a certain stage, or advance very slowly. The Egyptian is an instance in which inflexion never seems to have developed very completely; the Chinese is an instance of a language which has greatly decayed. It would seem that when races of one group came in contact with races, equally civilised, of another group, and remained in intercourse, the result was an advance in language; but that when the civilised race is isolated among more savage populations, speaking in archaic and varying dialects, the tendency is to decay. This is in our own times very remarkable in the degradation of the Dutch language in the Transvaal, where for several generations the descendants of civilised Europeans have been isolated among native tribes, Hottentot and Kaffre. The advance of language is, on the other hand, well marked in the case of the Finnic peoples, who have long dwelt in contact with the European Aryans.

## ARYAN LANGUAGES.

The study of the comparison of Aryan languages was placed on a sure foundation, not much more than half a century ago, by the band of great scholars, among whose names those of Bopp and Grimm are perhaps the most widely famous. Of late years, however, great advance has been made in the true appreciation of their connection; and the name of J. Schmidt will be remembered as that of the writer who has substituted for the older idea of a genealogy of languages, that of a parallel growth of dialects, developing with the growth of the tribes of Europe, in their various centres. This change of method has two results. One that it requires a much less extended period of time to account for the variations of the dialects, and the other that it recognises in Aryan speech the same mode of development which had already been recognised in Semitic and Mongolic languages.

The fierce controversies (full of political *virus*), which raged of late as to the home of the Aryans, appear to have been laid at rest by the calm and moderate exposition of Dr. O. Schrader, whose interesting volume is remarkable for its bold confession of the uncertainties which still surround its subject. His conclusion that the cradle of the race (as a distinct stock) is to be sought on the Southern Steppes near the Volga, seems destined to be generally accepted; but it in no wise conflicts with the contention of Max Müller, that the parents of the race came from Asia. Although the various Aryan tongues form a complete chain, starting from the Volga, and meeting again in Armenia, yet a very marked division into two great groups—European and Asiatic—exists,\* and the migrations from the Volga centre

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\* A certain number of Phrygian words are known, and are all Aryan, of the European section. Aryan words, given by Greek writers as Lydian and Carian, are also known. Armenian, though it has many Turanian and even some Semitic words, has been shown to be an Aryan language between Slavonic and Zendic; many Armenian words compare with Georgian. The language of Lycia, which I have specially studied, proves to be an Iranian language comparable with Zend and Sanskrit, but influenced by Greek (see "Journal Royal Asiatic Society," where I have treated the question at length). I believe the Vannic dialect to be clearly akin to Lycian and Persian. The names of Medes and other Asia Minor and Armenian chiefs, encountered by the Assyrians, are clearly Aryan, and belong to the Iranian group. Herodotus speaks, however, of a Phrygian colony in Armenia, whose language was no doubt the old form of the present Armenian.

were in two directions, westwards and eastwards, the ancestors of the Asiatics having, before their languages diverged, possessed a considerable amount of civilisation. Dr. Max Müller has shown that in the interval of less than 5,000 years, the whole growth of Aryan speech may have proceeded from the separation of the descendants of some two or three original families; and unless it is contended that these were first created on the banks of the Volga, there is no linguistic reason for denying that these families may have migrated thither from some Asiatic country. The condition of these original families has been very variously estimated, but the evidence is indisputable which shows that they already possessed a certain civilisation, being not only a pastoral people, but also growing grain, and probably travelling in rude waggons. They could count and could build, they acknowledged rulers and family relationships, though it would seem that they had no method of writing until they learnt the art from other races. However much their culture may have been over estimated, it is impossible to show that they were mere savage hunters, scarcely superior to the wild beasts that they encountered. Their condition was similar in short to that which has independently been established by linguistic evidence, for the early ancestors of the Semitic and Mongolic races.

The labours of such scholars as Fick, Curtius, and others, have reduced the Aryan languages to a list of about 450 original roots, but it has been perceived by Max Müller that this enumeration errs rather on the side of excess than of the reverse. In an interesting paper on the "Simplicity of Language," he claims that the list may be yet further condensed to an original enumeration of not more than 150 roots, which, by subsequent variation, and by the building up of words, has produced the enormous totals of modern vocabularies. It is inevitable that differences of opinion should exist as to the attribution to the true root of many difficult words; but the roots as a whole are so well established that they may safely be used for the purposes of a wider comparison; and many of the doubts and contradictions which are due to an exclusive study of Aryan speech will, in the future, be cleared away by such wider comparison with the other Asiatic languages.

The Aryan roots are of three kinds, namely: 1st, those consisting of a single consonant with a single vowel; 2nd, those with two consonants and one vowel; and 3rd, those

with three consonants forming two syllables. This last group is very generally recognised to represent the early building up of words, by the combination of two monosyllabic roots; but, as regards the second category, they have been variously looked upon as original efforts of speech, or as inflexions which result from an original combination of the first or simplest class of monosyllables. As regards this point it is remarkable that we have many series of roots having the same beginning, but ending in a guttural, a dental, or a labial; and they can therefore be arranged as species of a single genus, of which the original form is the simple syllable of the first category. As an instance we may cite the root BHA, "to shine," with the extended forms BHAK (guttural), BHAS (dental), and BHAN or BHAM (labial). From the first comes the Sanskrit *bhá*, "to shine"; from the second the Latin *fax*, "torch"; from the third the Sanskrit *bhas*, "to shine," or "appear," and from the last, the Greek *φαίειν* "to appear," the Irish *ban*, "white." The same extension of the root is very generally observable, as in WA, "to breathe," WAK, "speech," WAR, "speech:" or WA, "to weave," WADH, "to weave," and WABH, "to weave." From such instances we may perhaps conclude that the original roots are those of the first or simplest class.

When we come to consider these simplest roots we find that they also exist in several forms, according to the position and character of the vowel. Thus we have both AW and WA, "to breathe"; and both WA and WI, "to weave"; AR and RA, "to roar"; MA and MI, "to diminish." But what is still more remarkable, we have often the same idea conveyed by a guttural, a dental, or a labial, as DA, "to go," GA, "to go," and PA, "to go:" DA, "to say," KA, "to call," and BHA, "to speak." In some of these cases the extended form only is found in Aryan speech, but the simple form still survives in Mongolic languages. Such arrangement of the Aryan roots seems to show that the original speech of the race must have been extremely simple, and included very few sounds. The meaning was probably emphasised and assisted by the use of gestures, and of various tones of voice. This we notice among all primitive peoples. The gesticulations of an Italian peasant, or of an Arab, are so systematised as often to render speech quite unnecessary; and the dramatic powers of the Bushman are so remarkable as to be materially important in the explanation of the meaning conveyed by his very limited vocabulary. It is indeed to this imitative faculty in man

that we owe the early attempts at pictorial representation, whence proceeded picture-writing, and from it hieroglyphics, syllabaries, and alphabets; each stage rendered necessary by the growing power, volume, and complexity of speech.

It is not here proposed to enter into the question of the origin of these simple sounds. It is clear that many of them suggest the imitation of natural sounds, and not improbable that this is the true origin, wherever such an explanation is possible. The names of many animals are clearly imitative of their cries, and when we find in Egyptian the words *Ba*, for "sheep"; *Mau*, for "cat"; *fufu*, for "dog" (the old historic bow-wow); we are surely approaching very near to the origin of language. The word *Shu*, for "wind," is very suggestive of what we call the southing or sighing of the breeze. And when we turn to Chinese and discover *Maau* to be also the cat in that language, we see that it is quite as possible that it arose independently, as that it marks a connection of language at such a great distance in Asia. But this "bow-wow theory," though it is indisputably the explanation of many roots, encounters a difficulty when we come to consider certain ideas, like those of light, height, &c., which are unconnected with sound. Nor does the recent suggestion that certain acts were accompanied by certain sounds appear to recommend itself as a natural explanation.

To return to the Aryans: although the simplicity of the roots of their speech is so great, its advance had also been great in the earliest times to which we can trace them; and we shall find that they share not only the first and the second category of their roots with other Asiatics, but even in many cases the third. Before attempting to consider this important question, we must, however, turn to other groups of languages.

#### MONGOLIC LANGUAGES.

The Mongolic races are often depreciated as stolid and unimprovable. The civilisation of China and Japan is forgotten; and the adaptability of the Turkish race, as shown by the inclusion of many foreign words in their language, which in this respect resembles our own. The advance of knowledge shows that this conservative character is due, not to original barbarism whence the race has never emerged, but rather to the fact that the Mongolic peoples were the first to attain to civilisation of a very advanced type. They were the rulers of Asia, while the Hebrews were still shepherds,

and while the rude Aryans had as yet not appeared on the page of history. They were probably the first to use metals, and to possess weapons superior to the flint knives, hatchets, spears, and arrows, of other races. They were the teachers of Phœnicians and Babylonians, and probably the earliest artists of Italy and Syria.\* Vambéry, whose career originated in the desire to trace the Hungarians to their home in Asia, has uttered an eloquent protest against the Aryan prejudice on this subject, and the discovery of the Akkadian language, by Sir Henry Rawlinson, has placed the question of Mongolic civilisation in a new and truer light. In speaking of Akkadian as Mongolic, I am aware that its vocabulary has been found to present very remarkable resemblances to both Aryan and Semitic speech; but it is by grammar rather than by vocabulary that languages are best classified, and judged by this test we must accept the conclusion of the great scholars who have followed Sir Henry Rawlinson, and the latest contributions of Lenormant and of Hommel to the question.

Three great divisions of this group of languages may be recognised (1), the Mongol proper, spoken over a wide extent of Asia; (2), the Turkic in the steppes of Central Asia; and (3), the Finnic and Ugric in Europe; but all these divisions are intimately connected, by vocabulary, by grammar, and by the identity of suffixes and pronouns; they are all remarkable for agglutination, and for the almost entire absence of inflexion, save when Aryan influence has tended to cause such an advance. The labours of Castren, Donner, Böhntling, and

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\* It is to this group that I refer the Hittite language. Since reading a paper on this subject to the Victoria Institute, a letter has been published from a Hittite Prince to Amenophis III. It proves, as I supposed, to be in a dialect closely akin to the Akkadian. Another long letter, by the King of Mitani, called Dusratta, to his relative, Amenophis III, is in a similar language. Its case endings are the same as in Turkish, and many of the words are Akkadian. Mitani was the country of the *Men*, a tribe who invaded Egypt in the Hyksos period, and they lived in Commagene, east of the Euphrates, close to the Hittite country. I think, also, that Dr. Isaac Taylor has proved by numerals and other words that the Etruscans were Mongols from Asia Minor, but the Umbrians, Oscans, and other early Italian tribes were Aryans, akin to the Latins and Celts. An even older race akin to the ancient Egyptians and Berbers is believed, in prehistoric times, to have existed in Italy, and on all the Mediterranean shores, in its islands, in France and Spain, and even on the south shores of England.

Vambéry, and of many other distinguished scholars, have established a comparative study of dialects and languages, reaching from Siberia to Hungary, which, though less perfect than that of the more-studied Aryan languages, is equally based on sound scholarship and research. The number of roots to which the vocabularies are reduced is even smaller than that of the Aryan system, because they are more easily divided from their added suffixes, and are found to be almost entirely monosyllabic. Vambéry enumerates about 200 roots for Turkic speech, and these recur in the other divisions of the group. The third category of Aryan roots, which are bisyllabic, appears to be almost entirely absent, and the distinction of letters and of vowels is much less perfect in Mongolic languages than in those of our own ancestors.

Another peculiarity which marks these languages, and which is distinctly traceable in Akkadian, is that of "vowel harmony," by which is meant that the vowel of the weaker root in a compound varies in accordance with that of the stronger root to which it is attached. We may, perhaps, conjecture that the same harmony once existed also in Aryan speech, and that it is still discoverable in the parallel instance of roots having the same meaning but different vowels (as in the case of WA and WI, "to weave," already cited); but if so it ceased at an early period to be a law of language.

The fact already cited that a simple root may be reversed, as in the case of AR and RA, is also important for comparative purposes. The modern Turkic dialects generally prefer, in such cases, to put the vowel first, as easiest of pronunciation; but in Akkadian we constantly meet with both forms. Among the peasantry of Palestine this inversion of the syllable is very clearly to be remarked. Thus, for instance, the word which means "wells" is at pleasure *Biyâr* or *Abiâr*; and in the same way the Hebrew *Ben*, "son," becomes *Ibn* in Arabic. It is well known that both Arabs and Hindoos find it difficult to begin some words with the letter S, so that, in the mouths of both, Mr. Smith invariably becomes *Esmî*.

We must touch in passing on the relation of Chinese to Mongolic speech, though the question is one full of special difficulties—Chinese being a very decayed language, in which sounds originally distinct have become much confused. Its vocabulary, however, still represents a recognisable connection with that of its western neighbours; and attempts have even been made to compare Chinese directly with Akkadian. We suffer, however from the fact that we have

no early information. The oldest inscriptions are not referred to a period older than the ninth century B.C.; and the ancient civilisation of China (in which Voltaire believed) has been shown by the labours of many scholars to be a baseless boast due to national vanity. The Cantonese dialect, which is said to spring direct from the oldest known Chinese, when compared with the Mandarin language, shows us how rapid the decay has been; and the *tones* which are now so important for the distinction of words of like sound, have been proved to be of comparatively late origin, and to have been gradually elaborated, increasing in number as time went on. This device is analogous to the Hottentot device of clicks, to distinguish the similar sounds of an African language. Among the great civilised races such systems of distinction have been unnecessary, since compound words present a sufficient variety for purposes of distinction. It is evident that great caution is necessary in the treatment of Chinese; and that the comparison of the existing sounds with those of such a language as the Akkadian, may sometimes be very misleading, unless the steps by which the modern word came to be formed can be traced to a sufficient antiquity.

#### SEMITIC LANGUAGES.

The Semitic languages form a very small and compact group of dialects spoken within a comparatively small area of Asia, bordering on Egypt; and they present many peculiarities, which unite them to each other so very closely, that they might almost still be regarded as dialects only.\* It seems at the outset very improbable that so small a group can be independent of others; but the tendency of late has been to suppose that they are to be connected rather with African than with Asiatic speech. This appears to me to be a reversing of the true problem, for reasons to be presently

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\* The Marquess of Bute read a valuable paper on the "Language of Tenerife," to the British Association this year (published by Masters and Co., London), and on studying this I find that it was clearly an old Berber language. About 180 words of this ancient language are known. Some of the sentences of the Tenerife language are preserved, and are of great interest, such as their proverb: "May he live and feel the evils of fate." This subject I have also treated in full, in the *Scottish Review*, and have indicated the Semitic connection of the language. Inscriptions have been found in the Canaries, in an alphabet said to be similar to that of Carthage and Numidia. The Canary islanders had the interesting custom of making mummies, like the Egyptians, and used the same word, *Kha*, to express the "corpse" or "mummy" that was used in Egypt.

explained. Meantime the answer given to all who have attempted to compare Semitic and other Asiatic languages is, that a radical distinction exists in the structure of the Semitic languages, because they spring, not from monosyllabic, but from bisyllabic roots. When, however, we consider the number of very ancient monosyllabic words in Hebrew, such as *Ab*, "father"; *Ben*, "son"; *Gub*, "pit"; *Gu*, "middle," &c., &c., when we hear in ordinary Arab conversation that monosyllabic words play much the same part as in other languages; we may begin to doubt whether the strict insistence on trilateral roots is not rather a learned system, than a peculiar feature of the genius of the language. And this doubt continues when we inspect Hebrew grammars and dictionaries, and find that Semitic languages have indeed some monosyllabic roots, though these are treated as due to contraction.

A Hebrew dictionary contains nearly 1,500 roots, but out of these not a third in all are *perfect*, that is to say, consist of three consonants forming two syllables. The rest, called *quiescent*, *defective*, and *double*, are either formed with a vowel, or are monosyllabic in the imperative, which is the true root in every language. The perfect roots are similar to the third class of Aryan roots, and they represent an advanced stage in language, such as will not be denied to be that reached by Semitic speech. These perfect roots are, in some cases as we shall see, the same in sound and meaning found in Aryan languages; and in many cases they can be resolved into an original monosyllable with a suffix, much as in other languages. Thus we find *Bad*, "separate"; *Badâl*, "separate"; *Badûk*, "cleave"; where the suffixes *l* and *k* have evidently been attached to the old original root *Bad*, which may be compared with the Aryan root *Bhid*, "to divide." In other cases the roots are formed by prefixing *N*, which, however, disappears in the imperative, as for instance the verb *Nagash*, "to draw near," of which the imperative is *Gêsh*. This prefixed *N* occurs in parts of the verb in languages not Semitic, and forms the *Niphal* form in Hebrew, with passive signification, appearing to be an ancient auxiliary attached to the real root. Such indications, and others which need not now be detailed, may incline us to suppose that the original roots of Semitic languages were monosyllables, and that the present structure arises from the preference for secondary roots, as more distinctly conveying a special signification; and the fact that many of these secondary roots

occur also in Aryan speech seems to indicate a connection, which still existed when language had advanced from its most primitive stages.

But we are able perhaps still further to advance the study of the origin of Semitic languages, by a comparison with one of the oldest forms of human speech—namely, the Egyptian. The labours of Birch, Brugsch, Renouf, and Pierret, have furnished us with a very copious vocabulary, and a complete grammar of the Egyptian. It is indeed said that Coptic alone can be properly considered comparable with its immediate ancestor; and the classing of Egyptian with any one of the great Asiatic groups is still regarded with disfavour.\* About 150 Egyptian words are very similar to the Akkadian, and a smaller number are very close to Aryan roots, and at least 200 are almost identical with Semitic words. Yet Dr. Birch, whose knowledge of Chinese and of Semitic languages gives great authority to his words, was, I believe, of opinion that Egyptian should be classed with Semitic languages. The same opinion was held very strongly by the late C. Bertin, who possessed a wide, linguistic knowledge, and the reasons given appear to me to be very strong ones: for not only the grammatical structure and syntax are similar, but the terminations of masculine and feminine, the pronouns, the prepositions, and other parts of speech, are almost identical. It is naturally objected that Egyptian is not an inflected language; but this seems to render the comparison the more valuable. The old language stopped short, while that of the early Semitic peoples advanced; and for this reason is the more capable of assisting our search.

So for instance, in both Aryan and Semitic speech, we find an *s* prefixed to the old root, and forming secondary roots. In Egyptian this *s*, which is an ancient auxiliary, is recognised as being the sign of the causative. In making such comparison it should be understood that I speak, not of the many nouns which seem to be loan words borrowed directly from Semitic peoples, but of the common roots of the language, concerned with the most ordinary human actions. In Egyptian and in Akkadian alike we find common words

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\* The Berber or Libyan languages, as Champollion perceived, are connected with ancient Egyptian, and many words indeed remain almost unchanged as well as the forms of pronouns and particles.

which recall in turn each of the three great Asiatic groups. The reason may be that these very ancient languages go back beyond the time of the special and separate growth of Mongol, Aryan, and Semitic speech. To compare the nouns of one language with those of another will generally be unconvincing, but when we are able to compare the roots, whence such nouns are formed, and from which the verbs and other parts of speech also spring, we are following a method safer, and more likely to lead to real conclusions. It is now therefore proposed to attempt such a comparison, and to draw such general deductions from it as may serve to cast a light (however dim) on the earliest conditions of the human race in Asia.

### COMPARISON OF ROOTS.

The table appended to this paper may perhaps serve to call attention to the possibilities of such a method, though it cannot claim to be more than a preliminary sketch. It appears to me legitimate to suppose that changes in vowel sound, such as we find in all dialects, occur also in the roots of the three groups, and that the letters which we know to be only distinguished with difficulty are not original distinctions, but the result of a constant specialisation of sound, due to the increasing power of language in distinguishing shades of meaning. But it will not be found that any very ingenious process is necessary, since the comparisons are much easier than would at first be expected. Nor will it be found, I think, that I have been misled by foreign words, which have been carefully excluded from consideration as affording no evidence of the true connection.

About 170 roots, all connected with the most ordinary ideas of action, serve to connect together the various groups of Asiatic languages, and of these about 50 are still traceable throughout the entire number, that is to say in Akkadian, in Egyptian, in Aryan, in Semitic, and in Mongolic speech alike. It appears to me that the number alone is sufficient to prove that these resemblances are not accidental, and especially so, since the more advanced languages—the Aryan and Semitic—in a great many cases agree not only in the monosyllabic, but also in the derived bisyllabic roots. But beyond such a comparison of roots it is difficult, if not impossible, to proceed. In grammatical construction, in pronouns, and in syntax, the various groups are separated by cardinal differences which must not be overlooked. Two

great groups are thus distinguished; first, the languages which place the genitive before its nominative, and use the pronouns M "me" and T "thee," that is to say the Mongolic and the Aryan (the one agglutinative, the other advanced far in inflection); and second, the languages which place the genitive after the nominative and use the pronouns ANK "I" and ANT "thou," that is to say, the Egyptian and Semitic tongues (the one agglutinative, the other advanced far in inflection). This division does not indeed forbid us to suppose a remote common origin, such as the list of common roots indicates, but it forbids us to make such comparisons as that of Irish and Hebrew, which disregard the structure of the two languages; and it shows us that the separation of the northern and southern families of Asiatic man must have occurred at a very early period.

The personal pronouns are very distinct in the various languages under consideration, because (as we are usually taught) they grew out of old demonstratives, and were differently specialised among different peoples. These old demonstratives in turn grew out of yet older roots, which had the meaning of "being" or "moving," and from which various names for man were formed. In the same way the terminations of case, or the prepositions forming the same distinctions, had a similar origin. The roots and some of the demonstratives have the same value in all the languages under consideration; but the later use of these differs exceedingly. The commonest of all are MA, SA, and KA, which deserve a special notice. In Akkadian *ma* means "this" and "I," and in Aryan speech we have *ma*, "this," while in Assyrian *ma* is also a demonstrative. It probably comes from the old root MA or AM, "to be." In like manner SA, which means a "man" or "person" in Akkadian and Egyptian, becomes the demonstrative *sa*, "he," in Aryan speech, in Assyrian, in Egyptian, and in Mongolic. It probably comes from the old root AS, to "breathe." In some languages, like Greek, Zend, and Hebrew, the S becomes H, and thus we get the demonstrative ó "the," and the Hebrew *Ha*, "the"; *Hu*, "he"; and the English "he," all from the same root, SA or HA. The general meaning of the third root KA is "who" in all the languages under consideration. In Egyptian we may perhaps find its origin in *ka*, a "man" or "male." It is also remarkable that the pronoun ANK, "I," in Egyptian and Semitic speech, may be compared with the Akkadian *an-ag*, meaning "this same": and the second

pronoun, ANT, may have arisen in the same manner from the demonstrative *Te, Ze, Se*, which is common to Aryan and Mongolic speech, as meaning "thou."

The particles which form the cases of the noun, are in like manner very widely distributed with small variation of meaning, and their origin is traceable in Akkadian and Egyptian. The commonest come from the roots BU, "to be"; AL, "to rise"; RA, "to go"; NA, "to walk"; AN, "to breathe," to which the Aryan and Semitic, with the Egyptian, add the less common TAR, "to pass" or "reach." The particle AD, "to" or "at," whence the Assyrian *adi* and the Akkadian *ta*, may arise from the old root DA, "to move." On such simple foundations the system of particles, which form so material an element in civilised speech, appears gradually to have arisen, with innumerable modifications and changes in various languages. The early demonstratives alone enable us to see that such words do not of necessity involve a primary separation, but rather indicate a primary connection of all the great Asiatic groups.

There is, I believe, nothing very new or heretical in such a proposition. The method of development, which is the same throughout, has been separately followed by scholars in the various languages, and the similarities of both roots and particles has often been pointed out. Dr. Isaac Taylor has been the first boldly to claim an ultimate connection between Finnic and Aryan languages, and has given many cogent reasons for his view which have not been met. Quite recently, I believe, at the Oriental Congress of 1891, the similarities of Egyptian to Aryan and Semitic speech have again been pointed out, and though I have not had the advantage of reading what was then said, these comparisons are so evident that they must strike every enquirer. But what is more interesting is that Egyptian often supplies the link between words which might otherwise be thought to have no connection. Thus, for instance, MAR means "to die" in Aryan languages, but in Semitic speech the root is MAT. At an early period when R and T were not distinguished, these roots might be the same. In Egyptian we find both *mer* and *met* for "to die," and it is not conceivable that for such an idea a foreign word would be used. The root MAR means "to crumble" or "decay," and in this sense is not unknown in Semitic speech.

Dr. Isaac Taylor's proposition is, however, capable of greater development than that of his original publication.

Not only do the roots which he observes in Finnic languages, as well as in Aryan, exist also in Turkic and Mongol speech, when they are beyond suspicion of Aryan influence, but they are very often traceable also in Akkadian, back to at least 2000 B.C.; and as shown in the table of common roots, they can further be traced to Egyptian and Semitic vocabularies. In the same manner the comparisons which Gesenius hazarded, when as yet the comparative study of Aryan speech was in its infancy, are confirmed by that study, since the roots have been extended from the Greek, on which he mainly relied, to the whole circle of European speech. The Semitic languages are singularly rich in distinctions of meaning, and in the addition of new roots formed from the old, but those which remain clearly traceable to one old common form are so numerous as at once to reduce the vocabulary by considerably more than half, and in the end it would appear that the original roots are not more numerous in Semitic than those of other families of speech. The traditional pronunciation of Hebrew will often mislead us in such enquiry, since it is no more reliable than in our modern conventional pronunciation of Latin or Greek, but we are fortunately able to attain to some certainty as to the real pronunciation, by means of the Assyrian syllabary, as compared with the living languages of Syria and Arabia. The Hebrew points which now guide us were only invented in the sixth century A.D., but that it was possible to read without them is clearly shown by the existence of Hebrew, Moabite, and Phœnician unpointed inscriptions. The simple elements of the original Semitic grammar did not in fact depend on those distinctions which are now indicated by the points and diacritic signs.

In making such comparisons we may well feel astonished, not that such wide difference should have arisen, but rather that the original connection should remain so clearly traceable. It has been often said that the similarities of language are more valuable as evidence than are the dissimilarities. We do not doubt that our Aryan ancestors had mouths because we call it "mouth," while the Italian uses the word *bocca*; but when we turn from *bocca* to the French *bouche*, we at once recognise an original connection. Various words have been used by various sections of a people of common original vocabulary, and many old words have died out in various degrees among various peoples. It is remarkable that though the Aryans lived by rivers, their original word for "fish" has been lost, and in this manner the common

names for a flora and fauna are only valuable as regards *positive* results: the *negative* results cast little light on the subject, because in the course of migration the names of beasts, birds, and trees (once well known to their ancestors), may have been forgotten, in lands where they were not found, or transferred, as we know to have been the case to other animals in the new home. A curious instance of such renaming occurs in the case of the Boers in Africa, whose ideas were very limited and founded on second-hand information. Thus they called the giraffe "the camel," and the jackal, "the wolf," and the leopard "the tiger," in countries where neither camels, tigers, nor wolves really existed, while for the *gnu* they could find no name appropriate, and consequently called it only "the wild beast."

In this connection it is worth noticing also that the original distinction of various animals is very imperfect. Those which are useful to man, or those which are conspicuous or dangerous, are the first to be named; but many which interest the educated student are overlooked by the ignorant. Thus in Syria I found it almost impossible to collect the names of any of the smaller song birds, no agreement existing among my informants. Only a very few kinds of fish are distinguished, and plants and flowers are often unnoticed. The names for ox, sheep, camel, and other important animals are, on the other hand, remarkably numerous and distinctive.

Turning from such questions to consider the simple roots consisting of one consonant and one vowel, which run through all the Asiatic languages, and from which it would seem probable that the second and third classes of roots are built up, we find that they are easily arranged in seven classes, according as they refer to the sensations connected with various organs, 1st, life or breathing with the nose; 2nd, light, sight, and fire, with the eye; 3rd, sound, with ear; 4th, movement, with the leg; 5th, swallowing, eating and drinking with the mouth; 6th, holding and striking, with the hand; and 7th, work, which however is not very clearly distinguishable from the preceding class. A final class of roots which, with two exceptions, are secondary (having two consonants) refers to love and desire. In each class there is a cross division, according as the sound is a simple vowel, or a guttural, a dental, or a labial. The list which follows will be found to be supported by the results of the comparative table of nearly 200 common roots.

## PRIMARY ROOTS.

Vowel.	Guttural.	Dental.	Labial.
CLASS I.—BREATHING.			
AW, "to blow" ...	GA, "to be born" ...	SU, "generate" ...	PU, "to generate."
WA, "to blow" ...	... ..	AS, "breathe" ...	BHU, "to breathe."
		AN, "to breathe" ...	MA, "to be."
CLASS II.—LIGHT.			
AJ, "bright" ...	AK, "to see" ...	DA, "see." ...	
	KU, "bright" ...	IS, "light" ... ..	BHA, "shine."
		US, "burn."	
		SAI, "see."	
		AR, "burn, shine."	
CLASS III.—SOUND.			
A, "ah" ... ..	KA, "cry" ... ..	RA RU, "roar" ...	BHA, "speak."
O, "oh" ... ..	GU, "cry" ... ..	NA, "speak"... ..	MU, "bellow."
CLASS IV.—MOVEMENT.			
YA, "go"... ..	AK, GA, "go" ...	DA, DU, "go" ...	PA, PAD, "go."
		SU, "blow."	
		SA, "go."	
		IS, "speed."	
		RI, LI, "flow."	
		RA RU, "go."	
		AL, "rise."	
		NA, "go."	
CLASS V.—SWALLOWING.			
YA, "go"... ..	GHA, "swallow" ...	AD, "eat" ... ..	PA, "feed."
	AG, "choke"... ..	AS, "eat" ... ..	PI, "drink."
CLASS VI.—TOUCHING. HITTING.			
YA, "go"... ..	... ..	TA, "beat."	
		AS, "throw."	
		DA, "put" "take."	
CLASS VII.—WORK.			
WA, "bind" ...	GA, "bend" ... ..	SU, "join" ... ..	AP, "join."
		AR, "join."	
		NA, "join."	
CLASS VIII.—DESIRE.			
AW, "love" ...	KAM, "love" ... ..	RA, "delight" ...	(BAS, "kiss"?)
WAN, "honor" ...	KUBH, "desire" ...	LAS, "desire."	
	NAD, "pleasure" ...	LUBH, "love."	

These very simple roots can, in many cases, be recognised as natural exclamations, or as imitations of animal and other natural sounds. Some remain in the nursery vocabularies of our own times, such as *Moo*, "to bellow." The word *puff puff*, for a train, has been created within the last half century from the old root PU, "to blow," and is an interesting instance

of the reduplication of a root representing continuous action. In many grammars, such as the Akkadian, Egyptian, or Sanskrit, the reduplication has such a force, and it appears to have been the very oldest way of expressing the plural. Many animals appear to us to utter cries, expressed by such sounds as *Mu* and *Mau*, *Ba*, &c., and the names for crows and similar birds are taken from their *caw*. A parrot can utter such sounds, and some we hear from a dog. But the great dividing line between human speech and animal cries seems to lie in the power, which no known animal has been proved to possess, of putting together, with an intelligible object, two distinct sounds, uttered with different parts of the mouth, and conventionally received as expressing a definite sense. And these double sounds we encounter in human speech in all the earliest languages to which we have access. Thus from *DU*, "to go," we obtain *DUK*, "to lead"; from *BHA*, "to shine," are formed *BHAS*, *BHAK*, *BHAN*; from *KA*, "to call," we obtain *KAR*, *KAK*, *KAL*, and *KAN*; from *RA*, "to roar," *RAG*, *RAS*, *RABH*; from *PA*, to "go," *PAD*, *PAR*, and *BHAG*. In some cases we can still trace the origin of the secondary root, as in *KAK*, to "cackle," which is a simple reduplication of *KA*, "to call." The Chinese method of joining two roots in what is called a "clamshell" word, for the greater distinction of the sense intended, seems to cast light on the formation of the secondary roots, so that *RAG*, for instance, might have been originally made up of *RA*, "to roar," and *KA*, "to cry." Whatever be the truth as to such speculation, it can, I think, hardly be doubted that the evidence will be found strongly in favour of an original community of true *speech* for Asiatic man.

We are often reminded that questions of race and of language must be separately treated, since changes of language have occurred in various parts of the world. But it cannot be forgotten that in Asia, as far as we are able to speak of either a pure language or a pure race, even in the earliest ages, the great families of speech are found to be co-extensive with the great races which have used them throughout the course of history. When languages change or die, it is usually because the old stock also changes or dies. When conquerors hold a country they do *not* succeed in imposing their speech on their more numerous subjects, but themselves absorb into that speech words from the vocabulary of the native. Thus English has grown out of the mingling of the Latin and Teutonic and Celtic races,

and has absorbed words from each vocabulary. The Anglo-Indian vocabulary absorbs Indian words, and the Kaffre language has contributed to the Boer vocabulary. In Syria, Greek was the official tongue for nearly a thousand years, yet the native language, though absorbing many Greek words, remained but little changed, when the Moslem conquest restored its predominance; and this tongue was always spoken side by side with Greek, throughout these thousand years.

When we go back to the dawn of history we find the same. Egyptian is full of foreign loan-words, so is Assyrian, so, too, are the early Aryan languages. The populations of Western Asia, from 2000 B.C., were much mingled, and intermarried, as we know from the history of Egyptian kings wedded to Babylonians and Hittites. It seems probable, therefore, that, even in very early times, it would have been difficult to point to a perfectly pure stock, and we are not astonished to find skulls of very various characters mingled together in prehistoric graveyards. If it be difficult in Eastern Europe to distinguish a type as that of the original speakers of Aryan dialects, it is not the less certain that Aryan and Mongol languages, from very early times, were spoken by the mingled populations of this region, as they still continue to be spoken. In Egypt itself we find both the round-headed and the long-headed man, as well as in Italy or Asia Minor. But on the complexity of such study of race it is not necessary to say more, since the publication of the cautious opinion of Professor Virchow in your "Transactions."

Taking, then, fully into account the difficulties so noticed, it still remains roughly the case that the speakers of Aryan and Semitic languages are long-headed, and those of Mongolic languages, round-headed. It is also remarkable that Aryan and Semitic speech has, in common, bisyllabic roots not found, as a rule, in Mongolic vocabularies. One would, therefore, be inclined to think that the Mongolic races were the first to separate from the rest of the great stock; but, as we shall see in the sequel, the Semitic peoples were in contact with Egypt much more closely than with any other group, and remained so in contact to a much later period of civilised development. The relations of the various races, seem, in short, to reproduce exactly the relationship of the Aryan dialects. There is no genealogy which can derive one class of languages from another, but rather a shading

into each other of dialects, in accordance with geographical situation—the Aryans to the North, the Turanians towards the East, the Semitic peoples on the West, joining on to the Egyptians.

#### GENERAL RESULTS.

The utmost variety of opinion exists as to the homes of the various stocks, showing that the linguistic argument is at best a weak one. The Aryan has been transferred from Central Asia to Norway, and brought back again from thence to the Volga. The Semitic ancestor has been placed in Central Asia, in Arabia, and in Egypt. The Mongol has been traced from the Oxus, or from the Medic highlands. In each case the argument is based exclusively on the study of one class of languages. But if it be really true that these have a common origin, it is to a common centre that we must seek to trace the Asiatics. To me it seems clear that the linguistic requirements would all be met by supposing that the original home was in the healthy highlands, near the source of the Euphrates, whence we may conceive the first Aryan family to have migrated to the Volga, the first Semitic family to have followed the great rivers towards Arabia, and the first Mongolic family to have gone eastwards towards Central Asia. At a later period the returning currents brought them again towards the centre. The Egyptian and the Semite came up from the South, the Akkadian Mongol poured down from the highlands into Chaldea and Syria.\* The pure Aryan came from Persia, and from Greece, to meet in Asia Minor, and the mingling of the peoples (with exception of the Aryans) is traced from about 2500 B.C., and continued in Western Asia from that time forwards. But meantime the great classes of language had been formed, and no subsequent borrowing of words affected very materially the grammatical structure of the distinct groups, which had grown up at separate centres.

We are led, therefore, to inquire if any light is thrown by language on the condition of primitive Asiatics, and of the early races when they came again into contact, through the growth of population, from the various centres. The positive

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\* The Akkadians, as shown in Mr. Pinches' recent paper, had reached the Lebanon and Sinai in 2500 B.C., and the Egyptian mines in Sinai are equally ancient.

evidence is very small, and the negative is (as has been observed) not very reliable; but the subject is of such interest that an attempt to throw light upon it, however imperfectly, will perhaps be considered of value. The points to which attention is usually called by linguists, in such enquiry, concern the knowledge of metals and weapons, of animals and plants, of cattle and agriculture, of dress and food, of the computation of time, of dwellings, crafts, family, and religion. A few words may therefore be devoted to each in turn.

It will be generally allowed that the discovery of the use of metals was not made by primitive man. The Egyptians had native words for metals, and borrowed others from the Semitic traders. The early Aryans had their own words for gold, silver, and copper, and in later times the Armenians borrowed words of Mongol origin, and the Greeks used both Akkadian and Phœnician terms. The Semitic peoples also borrowed Mongol words, through intercourse with the civilised Akkadians, who knew not only gold, silver, and copper, but early distinguished lead and tin, and had iron and bronze at a very early historic period. There is no word for any of these metals that runs through all the languages, nor are there any common names for weapons; for even the bow, though its name in each case comes from a root meaning "to bend," is separately named in each class of language. It has been observed in Aryan speech that the word for knife, coming from the root SAK, to cut, is connected with the word for stone which is found in the Latin *saxum*, whence Schrader supposes that the early knives were of flint. This root is common to the other linguistic classes, and in each there is a word for stone which may perhaps be connected. In Mongol speech we find TAK and SIK, "to cut"; and in Akkadian TAK, "a stone," which becomes *Tash* in modern Turkic dialects. We also have the word *Sañ*. for "stone" in the same group. In Egyptian we find *Sekh*, "to cut," and *Sen*, "a stone." In Semitic speech we have *Shak*, "to divide," and *Suwân*, for a "flint stone." Possibly these indications may point to a common use of flint knives, such as we now find to have been known in Palestine and in Egypt as well as in Europe.

Turning to the question of the earliest animals named by man we find from the root LA, "to roar," the name of the lion which is the same in Semitic, in Aryan, and in Egyptian speech. It has been considered to be a loan word from the Semitic, but the root is apparently common to all the

languages, as well as the derivative. It occurs in the forms AR and RA, as well as LA and UL, meaning to "roar" or "howl," and from it are also formed the Akkadian *ur* for the dog and lion, the Semitic *Ari*, and the Mongol *ars-lan*, for "lion," the latter having a termination said to mean a "beast." The lion was widely spread over the west of Asia, and in Greece, but was unknown in colder countries. If it was known to the primitive Asiatics it would naturally be because their home was in Asia.\*

For the dog there is a widely spread term which comes from the root HAN or KAN, "to make a noise." It is the Latin *canis*, the Greek *κων*, the Armenian *shoun*. In Egyptian we have the word *huns* for some kind of dog, and in Chinese *huen*, for "dog," which are not likely to be loan words. But in Mongol speech *kono*, is the "wolf," which becomes *komp* in Finnish. In Semitic languages the word *kelb*, for "dog," seems to be derived from another root which appears in the Aryan GALP, to "yelp." Such as it is the evidence points rather to the wild than to the domestic dog.

For the ox we have many terms which agree in being derived from roots meaning to "bellow," but it is remarkable that the Aryan *Taurus* is apparently the same as the Semitic *Thor*, and the Mongol *Shor*, which it is difficult to suppose was a loan word. The Egyptian *am*, for cattle, appears to be the Akkadian *am*, for the bull, and the Tartar words for the ox are derived from the root *oñg*, "to bellow." The word *car*, for a sheep, in Semitic speech recurs in the Greek *καρ*, and in the Finnic *Kari*; but the Mongol word is *Kos* or *Koch*. The former word seems to mean a "flock" or "herd," rather than a special animal, and may perhaps be compared with the Akkadian *Khar* and the Egyptian *Kher*, for "cattle." The Semitic name for the goat is *az*, which resembles the Egyptian *at*, and the Aryan *ais*, *aix*, and *aja*. According to Delitzsch there is also an Akkadian word *asi*, for an animal with horns, and another word *uz*, for "goat," is mentioned by Lenormant as belonging to the same language. The ass has also been supposed to bear the same name in Aryan, Semitic, and Tartar speech, the Latin *asinus*, Semitic *athon*, and Tartar *esek*, which has been compared with the Akkadian *anshu*. On the other

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\* I have not forgotten that the bones of men are found in the European caves with those of the lion, as well as of the mammoth, rhinoceros, bear, horse, and reindeer, but I doubt if man shared the cave with the lion, who had probably preceded him.

hand the names for the horse are very various, being, however, all derived from its speed. That the horse was tamed much later than the ass is too generally admitted to need any lengthy consideration.

Among birds the names for various kinds of crow are clearly taken from their croaking, and like that of the cookoo (which is the same in Aryan and Semitic speech), they give no true linguistic evidence. It is remarkable that the duck seems perhaps to have the same name in languages widely separated, as in the Semitic *but*, the Egyptian *apt*, and the Chinese *aap*; but as a rule the names of birds are very different in different languages. Fishes also are variously named, sometimes from roots meaning "to swim"; but the Egyptian *Kha*, "fish," is the same as in Akkadian, and perhaps connected with the Chinese *qu*, and the widely spread Mongol and Finnic word *Kala* or *Kol*, and the Chinese *kwan* for a "large fish."

The names of common trees do not assist our enquiry, except that the Aryan and Semitic words for a "forest tree," seem to come from the root *AL*, "to rise up," or to be "high." The Aryan *dru*, for "wood," may perhaps compare with the Akkadian *tir*, for "wood" or "tree," which again may be the same as the Finnic *tel*, "wood," and the Hungarian *derek*, for a "tree trunk." Another word, the Semitic *etz*, occurs as the Greek *oços*, "a bough," and the Finnic *oks*, for "wood."

Other words which may be suspected of being borrowed are the names for "camel" and for "wine." It is usually held that the first is of Semitic origin. It occurs in Egyptian, and was adopted in Aryan speech, but the curious fact remains that it is not traceable to a Semitic root. In Mongol speech we have the words *Kam*, "to be bent or humped," and *el*, for "a beast," and it appears possible that the true origin is here found, as being the "beast with a hump." The camel is not solely an Arabian animal, since it has from a very early period existed in Central Asia and in Asia Minor. If it be a borrowed word it would seem more probably to be of Akkadian than of Semitic origin. The word for wine, on the other hand, is derived by Gesenius from a root meaning "to ferment," in Semitic speech. It appears to have been borrowed from the northern Semites by the Aryans, but it is not co-extensive with the whole range of languages under consideration.

The question of agriculture is one of high interest, and on which perhaps language throws light. There is a widely distributed word for seed from the root *SA*, "to sow,"

found in the Akkadian *se*, the Egyptian *su*, "seed," Mongolic *is*, and the Aryan *sa*, "to sow." In addition to such indication the old root KAR, "to enclose," forms words for an enclosed field in a great number of languages, as in the English *acre*, the Akkadian *agar*, the Finnic *aker*, the Turkic *akyer*, the Sanskrit *ajra*, the Greek *'αργός*. The Egyptian however is *har*, "a field," and the Semitic *car*, "a pasture." From the same root, perhaps, words for "town" appear to be formed as mentioned in the list appended. It appears not unnatural to suppose that some sort of enclosure is connected in these words, either with the sowing of seed or with the pasturing of cattle.

The question as to the seasons and the computation of time is of importance, but not easily elucidated. The word for "cold," from the root GAL, appears to be common to all the Asiatic languages, which would indicate an original climate at least not tropical. In the Aryan languages we have SNIGH as a root for words meaning "snow," and in Semitic speech we have *Sheleg* (שֶׁלֶג), which might possibly be the same word. Again we have the Aryan PRUS, "to freeze" or be "frosty," and the Semitic *bârad* (בָּרַד), "to be cold," and "to hail." Both originally signify "to pour down," with reference to their atmospheric origin.

As regards time it is generally held that the measurement of the month by the moon is older than that of the year by the seasons. All Asiatic races have, from early times, used lunar months, and have called them from the moon. The name of the moon comes from a root to "shine," which is common to Aryan, Mongol, and Semitic speech; but the names for the sun are very various in the different early languages. The words for the "year" are equally variable, though there would seem to be some connection between the Semitic *Senneh*, or *Shanah*, and the Aryan *asan*, "harvest,"—whence the Latin *Annus*. "the year," according to Schrader. Another common root is SAR or SAL, whence various words for "year" are formed, such as the Zend *Saredah*, and the Turkic *Sal*. The meaning is apparently a "series," and the root occurs also in Semitic speech with the same signification, forming the name of the *Saros*, or Babylonian cycle.

Concerning dress it need only be remarked that the Aryan *su*, "to sew," is apparently the Finnic *sovo*, "to

weave," and compares with a Semitic root *sawa*, "to join," or "make equal." The root WABH, "to weave," appears also to be common to Egyptian, Aryan, and Semitic speech, and an early clothing of something more than the skins of beasts thus seems indicated in the primitive period. That fire was known is certain, and that it was used in cooking food appears also to be indicated by the root BAK, occurring in all the various groups with the meaning of "cooking" food. As the root TOK seems possibly to be an original one with the meaning of "daubing," or "moulding," it is possible that language indicates at this early period the use of some kind of pottery. Even in the European prehistoric cemeteries rude pottery is found, and the earliest vessels before the discovery of metals must have been of clay.

The question of the dwellings in which these primitive Asiatics lived, is one of very considerable interest, and there is perhaps some reason to suppose that in addition to caves and tents such as are still used by Oriental peasants and nomads, there may also have been huts in the primitive period.

In Egyptian we have the words *ab* and *bu* for a house, which appear to answer to the Mongolic *oba*, softened in some dialects to *ova* and *ev*. The meaning appears to be "a dwelling." In Sanskrit *Bhu* means "to build," or "dwell," whence *Bhavana*, "a building" or "habitation." In Akkadian we find VA, and in the Cognate Susian dialect UA for "abode," and in Hebrew we have *Bua* (בוא), "to enter into a house," whence it is conceivable that the word *Beth*, "house," might originate. A second root connected with dwelling is found in the Assyrian *uru* or *alu* for a "town," which appears to be the same as the Akkadian *vuru*. It has been compared with the Hebrew words *er* for "city" (ער), and *ohel*, "tent" (אהל), and with the Tartar *aul*, for a "camp," the R and L being indistinguishable. This again is found in the Hungarian *varos*, "town," and in the Aryan *var*, "enclosure," and perhaps the Sanskrit *alaya*, "tent," the root in each case meaning some walled or enclosed dwelling. The third ancient word also having the meaning of an enclosed place is the Egyptian *atra*, a "house," which recalls the Latin *atrium*. In Semitic speech we have *Eder*, for "a fold," and *'atar*, "to surround." That such buildings or enclosures were roofed we might perhaps deduce from the

fact that the root DAG, "to cover" or "roof," is common to Aryan, Semitic, and Mongol speech.

On the question of family life all that can be said is that the roots PA and MA for "father" and "mother," are universally used in Asiatic speech, and recognisable also in Egyptian. For all other relationships the names are very various, though it is remarkable that the Hebrew *Akh*, "brother," is very like the Mongol *Aka*, "brother." This latter is connected with the common Mongolic word *og* for a "child" or "boy." The parental relationship meets us in the earliest languages; and such evidence tends at least to show that those who contend that marriage is one of the oldest of human institutions have more in their favour than those who suppose the "clan" to be older than the family.

The words used to denote deity are very various, the oldest perhaps being the Egyptian *Aas*, and the Mongolic *Es*, perhaps like the Aryan *Asura*, meaning a "living spirit." If Lenormant be right in supposing an Akkadian word *Elim*, for "Lord" or "exalted person," to exist, we might compare it with the Semitic *el* or *elohim*, "the mighty one," from a root common to all Asiatic languages. The evidence of language at least tends to show that the early believers did not regard their deities as being ghosts, since the word for ghost signifies in most cases what is "feeble,"—a shade or vapour—and not that which is strong and undying. In Egypt the "power" which was conceived to be the source of all life was hymned as early as 1400 B.C., and the name of Jehovah has the same significance that is to be remarked in the Aryan or Mongolic words for a deity. Many other titles, such as "the helper," the "life giver," the "eternal," or the "Lord," became specially used by different races, but the underlying conception is the same in all.

Briefly to sum up the possible results of our enquiry into the condition of the primitive Asiatics, we have noted that they appear to have lived in the pastoral condition, having perhaps a little corn and enclosures for their flocks. They possessed as yet no knowledge of metals, but hewed wood with flint instruments. They knew the ass, the ox, and the sheep, and possibly the camel and the dog, and were afraid of the lion. Their home was a cold or temperate climate, such as is best fitted for the development of the human race; and their simple arts of weaving, and moulding clay, enabled them to construct dwellings, either tents or huts covered

with roofs. The great discovery of fire was already made, but not applied to the melting of metals. The family already existed, and a belief in a spirit (or many spirits), not subject to the death which caused man to speak of himself as "mortal." It is a condition similar to that which scholars have independently concluded to have been the origin of the civilisation of each great stock, and similar to that of the prehistoric villages of Italy, as known by their remains. How long ago this primitive life was lived by the first ancestors of Asiatic races, we may judge by the fact that already at least as early as 2500 B.C., there were distinct civilisations and languages clearly divided into various groups; but of such life we have no evidence save that of speech, since writing was as yet unknown. Nevertheless there is some evidence that pictorial representation was already attempted, from which in time the great hieroglyphic systems were to arise. The word for "drawing" is common to Egyptian, Mongol and Semitic speech, in the root SUR or SAR, from which come the Mongol *Sor*, "to draw or write," the Egyptian *Serr*, and the Semitic *Sura*, "a drawing." The Aryans had a somewhat similar root SKRI, whence come words for sculpture and inscription. Nor must it be forgotten that the commonest signs denoting action are the same in all the hieroglyphic systems, and it is possible that even before the separation of Egyptians and Mongols some rude system existed for recording primitive events, by pictures such as the Red Indian still uses. The Aryans, however, did not apparently possess this art, and the Semitic peoples borrowed their written characters from the older Akkadians and Hittites, but even in 2500 B.C. (as shown by the statues of Tell Loh), there was already in Chaldea a system very fully organised, which has preserved for us the events of the days when the Akkadians ruled from the Persian Gulf to the Mediterranean, and cut down cedars in Lebanon.

In conclusion of the present paper it is proposed to say a few words as to the connection which exists between the civilisation of the Egyptians and of the Semitic race, in order to show more clearly that these people must have been in contact in a time subsequent to that of the original dispersion of the supposed primitive stock.

The grammatical connection between Egyptian and Semitic speech has been already mentioned, and the fact that some 220 words in the Egyptian dictionary are very closely similar to Semitic words of the same or similar meaning.

Out of this total it seems difficult in half the cases to suppose that we have to deal with loan words, because the terms are those belonging to very common objects or actions, and in many cases found also in Aryan and Mongolic speech. In about 80 cases they are bisyllabic words, agreeing in all the consonants with the Semitic. It is no doubt the case that when a Semitic population settled in the Delta, under the Shepherd Kings, a great many foreign words were added to the Egyptian vocabulary. Thus we have the Semitic *rasau*, "head," side by side with the old Egyptian word *ta*, for "head," and numerous nouns, such as the words for horse, chariot, iron, gold, well, enclosure, town, village, pool, chief, lord, noble, officer, acacia, honey, vineyard, tamarisk, cypress, unguent, butter, oil, pillar, wall, valley, river, bank, clay, son, daughter, and even for stick and salutation, appear to have been borrowed; while other terms seem to indicate possible borrowings from some people akin to the Akkadians. But there is another class of words—mainly verbs—which it is more difficult to suppose could have been so borrowed, and which connect the Semitic and Egyptian languages more closely than other Asiatic tongues.

Such are the words for think, hear, bind, envelop, embrace, walk, defend, lament, blow, pant, travel, kneel, work, avenge, understand, extend, glow, kindle, pull, shut, wall up, undress, and wander, also the nouns for water, lightning, finger, lip, and the words for hole, grief, and nakedness; one would scarcely expect such words to be borrowed unless the population was mainly Semitic, in which case the structure of the Egyptian language would have been no longer agglutinative. In some cases such nouns run into other languages as well, such as *Karn*, "a horn," which is Aryan as well as Semitic and Egyptian, or *au*, a "shore," which appears to be the Mongol *Yau*, and also occurs in Hebrew as *au* or *ai*.

The names of colours are very various in different languages, though their derivation is generally to be accounted for in the same way. Thus red is the colour of blood or of flame, white is the colour of light, black the colour of what is burnt, blue the colour of the sky, and yellow of the sun, while green and purple are little distinguished till later. Now, it is remarkable that the Egyptian and Semitic languages have in common words for white, black, and red, and that the Egyptian language also shows the derivation of these colour names from words meaning "light," "burning,"

and "blood." If we are to suppose that these words were borrowed, it would seem to follow that the Egyptians, who were so remarkable for their love of colour, had no native words to express black, white, or red. On the other hand these terms were widely used by Semitic peoples, since they occur in Arabic as well as in Hebrew. The Aryan words, and the Mongol names, for these colours, though of analogous origin, come from very different roots, and the names of colours give perhaps as good evidence of connection between languages as can be found. In this case we see that not only the simplest words, but others which denote a considerable advance in thought, serve to connect the Egyptian and the Semitic tongues.

Having thus briefly sketched out the results which seem to me to arise from a study of ancient languages, which has occupied many years of my spare time—results which presented themselves from time to time without at first suggesting any general principle, or appearing to me to be more than fortuitous resemblances—I have only to add, in asking for a merciful treatment of my imperfect attempts, that the present paper was not penned with any ulterior object, to support any particular theory as to the origin of mankind, but merely grew up out of the constant inspection of various grammars and dictionaries, undertaken for quite other purposes. I have been gradually led, however, to the belief that the evidence of language favours the supposition that Asiatic man as a whole was descended from a single original stock; and if what we hear stated as to other languages be provable, it would seem that from Asiatic man sprang the entire population of the modern world.

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#### COMPARATIVE LIST OF COMMON ROOTS.

N.B.—Akk., *Akkadian*. Egt., *Egyptian*. Ar., *Aryan*. Heb., *Hebrew*. Ass., *Assyrian*. Arab., *Arabic*. Tk., *Turkic*. Fn., *Finnic-Ugric*. Mon., *Mongol*. Ch., *Cantonese, dialect of Chinese*. Med., *Proto-Medic*. Sus., *Susian*.

#### CLASS I.—BREATHING.

1. AW. Egt., *aw*, "to blow." Ar., *aw, wa*, "blow," "breathe"; *aw*, "desire." Ass., *aw*, "wind." Arab., *hawa*, "breeze." Tk., *oi*, "fancy." Ch., *oi*, "love."

2. GA, GAN. Akkad., *gan, gin*, "exist," "be"; *gun*, "grow." Egt. *kha, khe*, "to be born." Ar., *ga, gan*, "beget," "produce" *gi*, "live." Heb., *cun*. Ar., *can*, "exist." Tk., *kin*, "to do" *kil*, "to make." Ch., *ching*, "to make." Mong., *ke, khe*, "make."
3. NAS. Eg., *nesai*, "ill." Ar., *nak, nas*, "perish." Heb., *násas* "sick."
4. AS. Eg., *us*, "create"; *aas*, "spirit." Ar., *as*, "breathe." Tk., *is* "blow"; *es*, "spirit."
5. ISH. Ak., *us*, "man." Ar., *ish*, "vigorous." Heb., *esh*, "man." Tk., *is*, "live."
6. SU. Ak., *sak*, "son." Ar., *su*, "generate." Finn., *sakko*, "offspring." Cf. SA, "man," Egt., Akk. (p. 49).
7. PU. Akk., *ba*, "create." Med., *Pe*, "make." Eg., *pu*, "to be"; *fua*, "child"; *fau*, "beget." Ar., *pu*, "beget"; *bhu*, "be," "dwell." Heb., *Pah*, "blow." Arab., *Fah*, "exhale." Tk., *bot*, "to be." Finn., *puu*, "child." Hung., *fu*, "son."
8. PAR. Eg., *per*, "sprout"; *fer*, "pregnant." Ar., *par*, "produce"; *bhar*, "bear." Heb., *bar*, "son." Ass., *ablu*, "son." Heb., *Párah*, "to be fruitful," "to bear"; *Párahk*, "sprouts," "offspring."
9. MA, MAK, MAGH. Sumer., *men*. Susian, *en*, "to be." Akk., *umma, ana*, "mother"; *makh*, "great." Egt., *men*, "create." Aryan, *ma*, "measure"; *ma-tar*, "mother"; *mak*, "be able," "make"; *magh*, "great." Heb., *am*, "mother"; *'am*, "people"; *makh*, "fat," "noble." Arab., *mukh*, "fat," "marrow." Assy., *makhkhu*, "great." Tk., *am, an*, "to be"; *am, an*, "mother"; *aim*, "people," "tribe"; *makh*, "high," "noble." Fn., *aim*, "family." Mon., *aimak, aiman*, "tribe." Ch., *mu*, "mother." Tunguse, *ama*, "father"; *eme*, "mother." Hung., *anya, mama*, "mother." Basque, *ama*, "mother."
10. DUR. Akk., *tur*, "remain." Egt., *tera*, "time." Ar., *dur*, "to endure, last." Heb., *dor*, "age," "generation"; *dur*, "abide," "dwell." Arab., *dar*, "dwelling." Tk., *tur*, "habitation," "tribe." Fn., *tar*, "abode"; *tur*, "tribe." Mongol., *turu*, "village."
11. LUD. Egt., *tut*, "flourish." Ar., *ludh*, "grow." Hebr., *Yálad*, "to bring forth." Ass., *littu*, "offspring." Arab., *weled*, "a boy."

## CLASS II.—LIGHT AND FIRE.

12. AI, YA. Akkad., *i*, "bright"; *ya*, "glorious"; *ai*, "moon." Egt., *aah*, "moon." Heb., Arab., *ain*, "eye." Tk., *ai*, "moon." Ch., *yueh*, "moon."
13. AK. Egt., *ka*, "see." Ar., *ak*, "see." Heb., *ha*, "behold." Arab. *ha*, "behold." Tk., *ak*, "bright," "white."
14. KU. Akk., *ku*, "bright," "precious." Egt., *kha khu*, "shine." Ar., *kwi*, "shine." Heb., *cavah*, "burn." Arab., *cui*, "burn." Tk., *kui, kov*, "to burn," "gleam," "shine." Fn., *koi*, "bright." Ch., *kau*, "bright."

15. KAR, KIL.\* Akk., *khil*, "splendour." Egt., *hru*, "day." Ar., *kar*, *ghar*, *gla*, "burn," "shine," "glow." Heb., *khārāh kharr*, "burn." Arab., *harr*, "burn." Tk., *kar*, "to see," "shew"; *kara*, "burnt," "dry," "scorched," "black"; *kil*, "bright." Mong., *kara*, "to see," "to shine"; *gal*, "fire"; *hair*, "gleam"; *kalun*, "hot." Fn., *kar*, "burn"; *kaila*, "flame"; *kil*, "shine."
16. KAM KAN. Egt., *khemt*, "fire"; *kem*, "black." Ak., *gun*, "bright," "red." Heb., *kānā*, "very red." Arab., *kana*, "bright red." Heb., *khamah*, "warmth"; *khamm*, "hot"; *kham*, "black." Arab., *hammah*, "heat"; *hamm*, "to heat"; *hamm*, "black." Assy., *camu*, "burn." Tk., *kun*, *gun*, "brightness," "daylight," "sun," "fire." Ch., *kan*, "sun-rise."
17. KIZ. Ar., *kit*, "perceive." Heb., *khāzāh*, "behold." Turk., *köz*, *khiz*, "burn," "shine."
18. DI, DIK, TIN. Akk., *te*, "flame." Egt., *tai*, "burn." Ar., *di*, "shine"; *idh*, "kindle"; *tith*, "burn." Egt., *teka*, "perceive." Ar., *dik*, "shew." Heb., *dik*, "perceive," "observe." Akk., *tin*, "life." Turk., *tin*, "life"; *dini*, "day"; *it ot*, "hot," "fire"; *tañ*, "light"; *din*, "brightness." Ch., *tim*, "light."
19. IS, SI. Akk., *is*, "bright"; *si*, "see." Medic, *siya*, "see." Ar., *us*, "burn"; *was*, "shine"; *si*, "see"; *skaw*, "perceive." Egt., *sai*, "see." Heb., *esh*, "fire"; *shah*, "behold." Fin., *azo*, "see"; *si-n*, "eye." Hung., *se-m*, "eye." Siberian, *saen*, "eye." Turk., *yas*, *yis*, *is*, "light," "sunshine." Mordvin, *si*, "sun."
20. SUT, TUT. Egt., *sut*, "fire"; *tset*, "to roast." Ar., *sus*, "dry"; *tith*, "burn." Heb., *tsūth*, "burn"; *yatsath*, "to kindle." Ostiak, *tut*, "fire." Hung., *sut*, "bake."
21. AR, UR. Akk., *ur*, "burn," "light," "heat." Egt., *ra*, "sun"; *aur*, "eye." Ar., *ar*, *ur*, *war*, *wal*, "to burn," "to be hot." Heb., *ur*, "light"; *rah*, "see." Assy., *urra*, "light." Arab., *awar*, "to kindle"; *raa*, "to see." Turk., *al*, "to burn," "to be bright, red, golden." Akk., *el*, "bright," "pure"; *ri*, "bright." Turk., *or*, "to be bright," "hot"; *ver*, "red." Fn., *ver*; Hung., *veres*, "red."
22. RUK, LUK. Akk., *lakh*, "bright," "pure." Egt., *lekhru*, *rekhru*, "fire." Ar., *luk*, *ruk*, "light," "shine"; *luna*, "moon." Heb., *lavakh*, "to shine." Arab., *lah*, "to shine." Heb., *yarakh*, "to shine"; *yerekh*, "the moon," "month."
23. SAR, SAL. Akk., *tsir*, "light." Egt., *tsar*, "to see." Ar., *swar*, "shine." Heb., *shārāh*, "to shine," "glitter." Tk., *zil*, *cil*, *yi*, "to shine," "to be warm." Mong., *sar*, *sel*, "clear"; *sara*, "gold." Fn., *sar*, "white"; *sel*, "shine."
24. MAR, MIL. Akk., *mil*, "shine." Ar., *mar*, "shine" (cf. AR). Assy., *amar*, "see."

\* Ar., *gal*, Heb., *karr*, Turk., *kar* means "cold" (cf. KAR, "scrape," Class VII). Probably GAL, "to fall," is connected and KAR, KUL, "to hurt," or "be evil," and "to die."

25. BA. Egt., *ba*, "illumine." Ar., *bha*, "shine." Heb., *yapha*, "to shine."
26. BAK. Egt., *bak*, "see." Ar., *bhak*, "shine." Heb., *bāhak*, "to be white." Turk., *bak*, *bek*, "to see," "shew."
27. BAS. Egt., *aps*, "shine"; *abs*, "white." Ar., *bhas*, "shine." Heb. *bavatz*, "to be white"; *abetz*, "white." Arab., *bad*, "to be white"; *abiad*, "white." (Arab., *d* = *ts*.)
28. BAR. Akk., *bar*, "bright." Egt., *berber*, "heat." Ar., *bhur*, "to burn." Heb., *bāhur*, "to shine"; *pavar*, "to be hot." Arab., *bahar*, "to shine"; *far*, "to be hot." Tk., *bor*, "white," "yellow." Akk., *bil*, "fire." Mong., *bulan*, "hot." (Ar. *bkalg*; Heb., *balag*, "shine.")\*

## CLASS III.—SOUND.

29. A. A cry of joy or grief in all languages.
30. O. A cry of grief. (See AW.)
31. KA, GU. Akk., *ka*, "mouth"; *gu*, "speak," "word." Egt., *ka*, "cry"; *ka*, "bull." Ar., *agh*, "speak"; *gu*, "bellow"; *kau*, "bull," "cow"; *kak*, "call." Heb., *akh*, "alas"; *akhh*, "to cry." Ar., *aḥah*, "to cry out." Heb., *ga'h*, "to bellow"; *goah*, "bellowing, lowing"; *cakhah*, "pant." Turk., *aikh*, *haikh*, "to call." Mon., *agui*, "mouth"; *ge*, "to say." Fin., *kak*, "to cackle," "call"; *kai*, "cry"; *ki*, "speech." Ch., *kiu*, "call."
32. KAN. Egt., *kma*, "singer." Ar., *kan*, "sound," "sing," "bark." Heb., *kon*, *kin*, "sing." Arab., *kin*, "sing." Tk., *kiung*, "to make a hollow sound." Ch., *cheung*, "to sing."
34. KAR, KAL. Akk., *kir*, "word." Ar., *kar*, *kal*, "call"; *klu*, "hear"; *krus*, "proclaim"; *skal*, "sing." Heb., *kārā*, "to cry," "call"; *kol*, "call," "voice"; *ceraz*, "proclaim." Arabic, *kera*, "call"; *kal*, "say"; *karaz*, "preach." Assyr., *karā*, "invoke." Tk., *kur*, "sound"; *kar*, "answer"; *khol*, "hear." Mong., *kur*, "word"; *kele*, "speak." Fn., *kar*, "call"; *kal*, *kol*, *kil*, "noise"; *kur*, "ear." (Hung., *nires*, "a herald," perhaps a loan word.)
35. DHAN. Akk., *tun*, "strike." Egt., *ten*, "hear." Aryan, *dhan*, "strike"; *tan*, *stan*, "thunder." Heb., *uzzen*, "ear"; *azan*, "listen." Ass., *uznu*, "ear." Arab., *adhan*, "hear"; *alen idhen*, *izn*, "ear."
36. DHUP, DUM. Akk., *tum*, "dark." Egt., *tem*, "to shut." Ar., *dhup*, "to make dark, dim, deaf, and dumb." Heb., *dom*, "silent." Tk., *tum*, "dark."
37. SAK (cf. KAK). Ar., *sak*, "say." Heb., *shikh*, "to speak, sing." Tk., *lag*, *zig*, "call," "noise"; *sav*, "call"; *soz*, "words." Finnic, *sau*, "say."

\* The Aryan, *bhram*; Heb., *baram*, "to burn," and the name of the *pramantha*, or "fire-stick," may tend to shew that BAR means fire by rubbing.

38. SUR. Ar., *swar*, "speak"; *sru*, "hear." Heb., *shir*, "song." Tk., *sur*, "speech," "word." Hung., *söl*, "speak," "call."
39. SIB. Egt., *seb*, "flute." Ar., *sib*, "whistle," "hiss"; *spu*, "spit." Heb., *tsáphaph*, "to twitter"; *tzephá*, "serpent." Arab., *shifán*, "snake."
40. AR, RA, UL, LA, RU. Akk., *ur*, "dog"; *ur-makh*, "great dog lion." Egt., *labu*, "lion." Ar., *ar*, *ra*, *ru*, "roar"; *ul*, "howl"; *leo*, "lion." Heb., *rád*, "to roar"; *ari*, "lion"; *labi*, "lion." Turk., *ars-lan*, "lion"; *al*, "savage"; *er*, "mighty." Mongol., *ule*, "howl." Basque, *or*, "dog."
41. RAS, RAK, RUG, LAK, LUG. Ar., "rage, roar, croak, speak, cry." Heb., *laissh*, "lion"; *rag*, "stammer"; *rágá*, "terrify"; *rágash*, "rage"; *ruk*, "wind." Arab., *rág*, *ráj*, "tremble," *ruh*, "wind."
42. RABH, RAMBH. Ar., *rabh*, "rage," "roar"; *rambh*, "bellow." Heb., *rám*, "to make a noise," "to thunder."
43. NA (see MU). Med., *na*, "say." Egt., *nas*, "say." Ar., *nam*, "count." Heb., *nám*, "murmur." Arab., *nám*, "murmur." Tk., *oñg* "bellow."
44. BHA, BHAN (cf. PU, Class I). Egt., *ba*, "sheep." Aryan, *bha*, "speak"; *bhal*, "resound"; *bhan*, "speak." Heb., *peh*, "mouth"; *pih*, "speak." Arab., *fih*, "mouth"; *fáh*, "speak." Tk., *bañk*, "voice."
45. BUK, MU, MUG. Akk., *mu*, "call," "name"; *am*, "brill." Egt., *am*, "cry"; *am*, "cattle." Aryan, *mu*, *mug*, "bellow," "low," "mutter"; *buk*, "bellow," "snort"; *bos*, "bull"; *bok*, "mouth"; *hum*, "hum"; *muk*, "mock." Heb., *mok*, "mock"; *hámáh*, "to hum." Arab., *mak*, "mock"; *hamham*, "mutter lament." Tk., *on oñg*, "groan," "bellow"; *enek*, "cow." Mong., *aner*, "sound"; *uncñ*, "cow" (cf. AN AM); *buku*, "bull." Akkad., *am im*, "wind." Egt., *un*, "breathe," "exist." Aryan, *an*, "breathe." Heb., *ánan*, "lament"; *ána*, "speak"; *ánáh*, "mourn," "sing." Arab., *an*, "groan"; *ána*, "sing" (cf. MA, Class I, "to breathe").
46. MAR (cf. AR). Ar., *mar*, "speak." Heb., *ámar*, "to say," "command."

## CLASS IV.—MOVEMENT.

47. YA. Egt., *i*, "go"; Ar., *i ya*, "go" (see YAL).
48. AK. Akkad., *aka*, "raise." Egt., *akha*, "raise." Heb., *gáh*, "exalt." Tk., *akh*, *ag*, "high." Mong., *ike*, "great." Ch., *ki*, "upright"; *kue*, "elevate." Perhaps Ar., *ak*, "sharp"; *ki*, "sharpen."
50. GA, GAM. Akk., *ga*, "send"; *gi*, "return." Med., *ça*, "go." Egt., *ga*, "remove." Ar., *ga*, *gam*, "come"; *ak*, "haste," "drive." Heb., *aga*, "flee." Arab., *aga*, *aja*, "flee." Tk., *khom khim*, "move."
51. KAR, KAL, YAL. Ak., *khar khir*, "round" (cf. Class VII). Egt., *ker*, "circle." Ar., *gar*, "assemble"; *agar*, "collect"; *kar*, "to roll," "be round," "to run." Heb., *gor*, "turn aside"; *gálat*, "roll"; *khol*, "circle"; *cárar*, "to go round." Arab.,

- kâr*, "to turn." Akk., *kar*, "speed"; *khal*, "swift"; *gal*, "go"; *kurra*, "horse"; *kharran*, "road." Egt., *her*, "road." Ar. *kar*, *kal*, "move," "run." Heb., *agal*, "to skip"; *agal*, "to flow together." Arab., *agl*, "to hasten, hurry." Tk., *kir*, "pass by"; *kel*, "come near." Mong., *kar*, "go out"; *kara*, "gallop," "spring." Finn., *kal*, "go," "flow"; *kars*, "spring," "run"; *korna*, "road"; *kar*, "circle." Tk., *yel*, *sal*, "swift."
52. KUR. Akk., *kur*, "mountain"; *kar*, "fortress"; *khir*, "strong," "enclosed"; *kal*, "strong"; *gal*, "to rise"; *gal*, "great." Ar., *kar*, *kal*, "rise," "top," "hill." Heb., *kariah*, "city"; *khelon*, "strong." Tk., *kar*, *kur*, *kol*, "might," "hand"; *kor gur*, "make strong," "fasten"; *kal*, "great." Fn., *kor*, "to be high"; *kul*, "hill"; *kal*, "high." Basque, *kora*, "high."
53. KUK. Akk., *kuga*, "high." Ar., *kuk*, "bend," "bow out." Tk., *koch*, "mighty"; *kokkuz*, "the breast." Fn., *kukka*, "long"; *kok*, "high," "proud," "bent." Hence, Egt., *kes*; Heb., *kush*; Arab., *kos*, "the bow"; Gr., *yávros*, "bent"; and Tk., *kueuk*, "the vault of heaven," whence "blue." Akk., *kuk*, "blue."
54. KAS. Akkad., *kazinna*, "hare." Egt., *khes*, "speed"; *hes*, "go." Ar., *kas*, "speed"; *kazen*, "hare"; perhaps also *kwas*, "pant." Heb., *khâsâh*, "flee"; *khosh*, *khish*, "to haste." Arab., *khâsh*, "flee"; *hazz*, "speed." Tk., *kec*, "to go forward." Fn., *kos*, "to run."
55. KAD. Akkad., *gid*, "go," "distant." Egt., *hat*, "hasten." Ar., *kad*, "go," "fall." Heb., *khâtâh*, "stray," "stumble." Ar., *khata*, "stray." Tk., *ket*, "to go," "go away."
56. GID. Ar., *ghid*, "skip"; *kid*, a "kid." Heb., *gedi*, "kid." Ar., *jedi*, "kid."
57. DU. Ak., *du*, "go." Egt., *tu*, "go." Ar., *du*, "go." Heb., *tâah*, "to wander"; *âdah*, "to go by." Arab., *taghi*, *tii*, "wander"; *âda*, "go forth," "attack." Tk., *ot*, "to stride."
58. TAK (see LIK). Akk., *tak*, "to fail." Ar., *tak*, "to flow," "melt," "pine." Heb., *dâg*, "to be afraid." Tk., *takh*, "to slide," "be shallow."
59. TAR, TAL. Akk., *tal*, "pass," "rise"; *tur*, "enter." Egt., *ter*, "the end"; *tara*, "door." Ar., *tar*, "stretch," "pass over," "reach," "enter" (hence "door"). Heb., *thor*, "travel"; *terâ*, "gate." Arab., *tar*, "travel"; *turdh*, "gate." Ar., *tal tol*, "rise," "fall," "balance." Heb., *tâlâl*, "rise"; *tell*, "heap"; *tâlâh*, "hang"; *tâlâh*, "extend"; *dâlâh*, "hang down." Arab., *tall*, "rise"; *tala*, "hang"; *dela*, "hang down" (hence *delu*, "bucket"); *talâh*, "ascend." Egt., *ter*, "to drive." Ar., *dra*, *dram*, "run." Tk., *tal*, "go down"; *tal*, *sal*, "toss," "hang"; *tur*, "to be high"; *ter*, "to be swift" (derivative, Akkad., *dara darag*, "deer." Heb., *dalag*, "to spring." Mong., *turgun*, "swift"). Fn., *tar*, "high." Mong., *darga*, "chief."
60. TARP, DRAP. Egt., *terf*, "dance." Ar., *tarp*, "dance." Ar., *drap*, "run," "flow," "drip," "drip." Heb., *dâlaph*, "drop," "drip." Ar., *delef*, "drip." Heb., *talaph*, "to perish." Ar., *talaf*, "to perish."
61. TOP. Egt., *tep*, "top." Ar., *topa*, "top." Heb., *tebar*, "to be

- lofty." Tk., *tob*, "hump"; *tepe*, "hill." Fin., *tup*, "high"; *tüppüra*, "hill." Mong., *do*, "hill" (*cf.* TAB, Class VI).
62. SAD. Akk., *sud*, "extend." Egt., *sati*, "go out." Ar., *sad*, "travel." Heb., *tsäd*, "step," "go," "mount up" (hence Egt., *sati*, "mountain country." Assy., *sadu*, "mountain." Arab., *säddän*, *sidd*, "mountain"). Tk., *sat*, "to lounge." *Cf.* SAT, STA. Egt., *set*, "establish"; *set*, "a bank." Ar., *sat*, "fill up"; *sta*, "stop," "stand," "set"; *sad*, "sit." Heb., *sit*, "place," "erect." Arab., *sidd*, "bank."
63. SA. Akkad., *se*, "seed." Egt., *su*, "seed." Ar., *sa*, "to strew seed." Turk., *as*, "seed." Mong., *sasa*, "to sow" (*cf.*, SU, Class I). Perhaps Heb., *yatzä*, "to spread out."
64. SU. Akk., *sa*. Medic, *ça*, "go." Egt., *tse*, "go"; *sau*, "drink"; *shu*, "wind." Ar., *swa*, "to sway." Heb., *shh*, "to run"; *yatzä*, "to issue." Arabic, *shäi*, "to run," "rush" (of water and wind). Tk., *su*, "flow," "river," "water." Mong., *oso*, "water." Ch., *shui*, "water."
65. IS. Egt., *as*, "speed." Ar., *is*, "speed." Heb., *auts*, "to hasten." Tk., *as*, *es*, "to stride."
66. SAG. Egt., *skhen*, "to settle." Ar., *sag sank*, "to sink." Heb., *sacan*, "to settle." Arab., *sacan*, "settle."
67. SUK. Akk., *suk*, "swamp." Egt., *sekh*, "go." Ar., *sug*, "flow"; *swag*, *skag*, "sway," "shake." Heb., *shavak*, "run"; *shok*, "leg." Arab., *sak*, "leg." Mongol., *sokoï*, "swamp." Ch., *tsuuk*, "foot."
68. SUR. Akk., *sur*, "flow." Egt., *sert*, "flood"; *sura*, "drink." Ar., *sar*, *sru*, "flow"; *swal*, "swell." Heb., *shavar*, "to go." Arab., *setl*, "a stream." Fn., *zer*, "to rain." Tk., *sil sal*, "wind," "rain," "winter." Deriv., SARB. Aryan, *swarbh*, "to drink." Heb., *säraph*, "to drink." Arab., *sharab*, "to drink."
69. SUB. Akkad., *sub*, "flow." Egt., *sabu*, "drink"; *sefi*, "damp." Ar., *swap*, "to move swiftly"; *swam*, "swim." Heb., *tsavaph*, "to overflow," "to make swim." Tk., *sub*, "flow." Ch., *shaap*, "damp." Fn., *sup*, "to drown."
70. SAB. Akk., *sibir*, "gathering," "harvest"; *sub*, "to collect." Egt., *sap*, "gather." Ar., *swip*, "to sweep." Heb., *äsaph*, "to collect." Fn., *sap*, "to gather."
71. SALP. Ar., *sarp salp*, "slip." Heb., *zalaph*, *dalaph*, "slip," "drop" (*cf.* TAL).
72. RA. Akk., *ru*, "go." Egt., *rer*, "go." Ar., *ra*, "go." Sansk., *ru*, "go." Arab., *ruh*, "go." Turk., *ora*, "foot." Mong., *ire*, "come"; *ula*, "foot."
73. AR, AL.\* Akkad., *il*, "rise." Egt., *ar*, "go up." Ar., *ar*, *al*, "go," "go up." Heb., *äl*, "high"; *el*, "strong." Arab., *älä*,

\* Hence probably Akk., *er*, "man"; Armen., *ayr*, "man"; Ar., *arya*, "man," "noble"; Tk., *er*, "man": meaning "erect," "tall," "strong," *i.e.*, full grown man.

- "high." Tk., *al, ol*, "high," "great"; *ar*, "strong"; *or*, "high." Mong., *alut*, "over."
74. RI, LI, LIK. Akk., *raa*, "irrigate"; *ari*, "flow." Egt., *aru*, "river." Ar., *ri, li*, "go," "flow"; *lik*, "pour," "melt." Heb., *yar*, "river"; *ruh*, "drink"; *ruk*, "pour"; *lakh*, "moist." Tk., *ir*, "flow." Mong., *ilu*, "overflow." Fn., *yur*, "flood." Ch., *lau*, "flow."
75. RAS. Egt., *rsau*, "head." Sk., *rij*, "stretch." Heb., *rosh*. Arab., *rás*, "head." (Akkad., *rikkh*, "to rise.")
76. RAG. Akk., *rakh*, "walk." Egt., *rehen*, "move." Ar., *rag, rangh*, "run." Heb., *arakh*, "go." Arab., *ruh*, "go." Heb., *yalak*, "to walk."
77. RAD. Akk., *radu*, "go." Ar., *radh, ladh*, "to quit." Heb., *yárad*, "to go down"; *ravad*, "to wander." Arab., *rád*, "to ramble." (Aryan, *lad*, "to let go.")
78. LAG. Ar., *lak*, "depress"; *lagh*, "lie down"; *lag*, "lax"; *lik, rik*, "to go away," "leave." Egt., *lakai*, "soft." Heb., *lag*, "cavity." Arab., *lagg, lajj*, "to be deep" (of water).
79. LIG (cf. LIK). Ar., *ligh*, "lick." Heb., *lákak*, "to lick." Arab., *laklak*, "tongue." (Akk., *lakh*, "pure." Egt., *lekh*, "wash.")
80. LAB. Aryan, *lab*, "droop." Heb., *ráph*, "to drop water." Arab., *ráf*, "shed." Ar., *lap*, "to lap." Heb., *láhab*, "to lick" (cf. lambent flame); *lab*, "to thirst." Arab., *lahab*, "to burn."
81. NA. Akkad., *na*, "go forward." Egt., *na*, "go." Ar., *nas*, "go to"; *nak*, "reach." Heb., *nága*, "reach to," "come to."
82. NAB.\* Egt., *nef*, "wind"; *nebi*, "lord"; *nebab*, "inundate." Ar., *nabh*, "to swell" (hence "clouds"), "to burst." Heb., *nib*, "sprout"; *nábá*, "to swell up," "bubble"; *nábá*, "gush out." Arab., *nebá*, "a spring." (Hence perhaps also *anf*, "the nose." Cf. Latin, *nupta*, "made pregnant." Heb., *nabi*, "inspired.") Ch., *nup*, "grain." (Egt., *nefr*, "prosperous"; *nepra*, "corn"?)
83. PA, PAD. Medic, *putta*, "to go." Egt., *bu*, "go"; *peh*, "arrive"; *pet*, "foot"; *bes*, "go." Ar., *pad*, "go." Heb., *báz*, "to be swift"; *abad*, "to wander." Arab., *báid*, "far." Tk., *pa*, "foot"; *but*, "foot." Akk., *pu*, "long." Egt., *buai*, "height." Heb., *buá*, "enter." Tk., *boi*, "long."
84. PAT. Egt., *pet, ptah*, "spread," "open"; *peses petes*, "extend." Ar., *pat*, "spread," "flat." Heb., *bát*, "trample," "tread." (Akk., *bat*, "to die.") Egt., *pet*, "to fly"; *betes*, "to fall." Ar., *pat*, "fly," "fall." Heb., *abad*, "perish." Arab., *bád*, "perish." Heb., *pásas*, "to end," "pass." Tk., *bat*, "to go down." Ch., *foot*, "broad."
85. PAR. Med., *pori*, "go." Ar., *par*, "travel." Heb., *ábar*, "to mount up." Tk., *bar*, "walk."

\* The Egt. *nub*, "gold," compares with the Akkad., *nap*, "light," and Mongol., *nup*, "sun," as meaning "yellow."

86. PAL, PLU. Akk., *bela*, "completion"; *bur*, "river." Ar., *pal*, "fill up"; *pru*, *plu*, "jump," "fly," "flow," "swim"; *bhla*, "flow," "blow." Heb., *párd*, "to run"; *áphal*, "to swell." Tk., *bar*, "completion"; *ber*, "pour"; *bar*, "cover"; *ber*, "rain." Mong., *huri*, "all." Heb., *bálal*, "to pour." Arab., *bel*, "wet."
87. BAG. Egt., *beka*, "fly"; *beha*, "flee." Ar., *bhag*, "to flee"; *bhug*, "to wave about." Heb., *bavac*, "to turn about"; *pavak*, "to move to and fro"; *bakak*, "to pour out."
88. MU. Egt., *mu*, "water"; *iuma*, "the sea." Ar., *mu*, "move"; *mi*, "go." Heb., *mí*, *mu*, "water"; *yam*, "the sea." Arab., *ma*, *moia*, "water." Heb., *máh*, "flow down."
89. UD. Ar., *ud*, "to be wet" (cf. *wal*, "to roll.") Heb., *ad*, "vapour"; *avad*, "to turn." Arab., *ad*, "to bend" (cf. *aval*, "to roll"; *dval*, "to turn away"). Cf. AW, Class I; WA, WAD, Class VI.
90. UP. Ar., *wip*, "to vibrate." Heb., *áuph*, "to fly."
91. MAR, MUT. Egt., *mer*, *met*, "die." Ar., *mar*, *mal*, "dissolve," "crumble," "melt," "die." Heb., *maveth*, "death." Arab., *maut*, "death."

## CLASS V.—SWALLOWING.

92. GA. Ak., *ka*, "mouth"; *gu*, "door"; *ku*, "eat"; *ge*, "abyss." Egt., *hu*, "food"; *kha*, "corpse." Ar., *gha*, "gape." Heb., *gavd*, "expire"; *garu*, "inside." Tk., *ag*, "open," *agui*, "hole." Ch., *hau*, "mouth."
93. AG. Ar., *ang*, "to choke." Heb., *ának*, "to compress"; *koa*, "vomit." Ch., *au*, "vomit"; *ang*, "press."
94. GAB, KUB. Ak., *gab*, "open." Egt., *kab*, "vault." Heb., *gob*, "pit"; *gavaph*, "to be hollow." Arab., *gab*, *jab*, "hollow." Heb., *kábab*, "to be hollow," "vaulted." Arab., *kabu*, "vault." Tk., *kab*, *kub*, "hollow." Fin., *kap*, "valley," "hollow."
95. GAR. Akk., *gar*, "food." Ar., *gar*, "swallow." Heb., *acal*, "eat." Arab., *acal*, "eat." Mong., *karu*, "greedy."
96. AD, AS. Ar., *ad*, "eat." Tk., *í*, *as*, *is*, "eat."
- 96A. DA, DAD. Egt., *tet*, "suckle." Ar., *dha*, "suck,"  $\Theta\eta\lambda\acute{\eta}$ , *dud*, "teat." Heb., *dad*, "breast."
97. PA, PI. Ak., *abba*, "water"; *bi*, "drink." Egt., *af*, "food." Heb., *pek*, "mouth" (cf. BHA, Class III). Ar., *pa*, "feed"; *pi*, "drink"; *ap*, "water." Tk., *ab*, "water."
98. PAS. Egt., *pes*, "bite." Ar., *bhag*, "eat." Tk., *bis*, "cut" (see PIS, Class VII). Cf. Ital., *bocca*, "mouth."

## CLASS VI.—TOUCHING, HITTING.

99. AD, AS. Egt., *ut*, "fling"; *aas*, "javelin." Aryan, *as*, "throw." Tk., *at*, *it*, "throw," "sling" (cf. IS, "speed," Class IV).
100. TA. Akk., *ta*, "drive"; *de*, "beat." Egt., *ta*, "beat." Ch., *ta*, "beat."

- 100A. TAK. Akk., *dugga*, "make." Egt., *takh*, "beat"; *tekes*, "cut." Ar., *tak*, *taks*, "hew," "make," "produce." Heb., *dakkak*, "break in pieces." Arab., *dakk*, "pound." Tk., *takh*, *tik*, "cut." Fn., *tak*, "strike" "make." (Ar., *dak*, "bite," is probably connected.)
101. DA. Akk., *ti*, "take." Egt., *tu*, "give." Ar., *da*, "give." Heb., *yad*, "hand." Ass., *idu*, "lay." Mong., *te*, "lay."
102. DAK. Akk., *tuk*, "have." Ar., *dak*, "hold." Tk., *tag*, "touch."
103. TAR. Akk., *tar*, "split." Egt., *ter*, "split," "beat." Ar., *tar*, "penetrate." Tk., *tir*, "break." Mong., *tar*, "cut." Fn., *tar*, "divide."
104. DAN (see DHAN, Class III). Akk., *tun*, "strike." Egt., *athen*, "strike"; *aten*, "pierce"; *ten*, "cut." Ar., *tan*, "cut." Heb., *azen*, "weapon"; *ʔan*, "pierce."
105. TAM. Egt., *tem*, "cut." Ar., *tam*, "cut," "gnaw." Heb., *tám*, "eat." Fn., *tam*, "stamp."
106. TEP. Egt., *tep*, "drum." Greek, *τύπος*, "blow." Sansk., *tup*, "hurt." Heb., *taphaph*, "strike"; *toph*, "drum." Arab., *daff*, "strike." Tk., *tep*, "kick." Fn., *tap*, "strike."
107. SAP. Egt., *aspu*, "cut." Sk., *shap*, "grind." Heb., *šáph*, "divide." Tk., *sap*, "hew." Mong., *saba*, "beat." Fn., *sap*, "hew."
108. SAR, SKAR. Egt., *sker*, "cut"; *serr*, "engrave." (Akk., *sar*, "write.") Ar., *skar*, *skri*, "shear," "write." Heb., *shár*, "cleave." Arab., *sura*, "a drawing." M., *sor*; Tk., *ser*, "to write or draw." Fn., *sor sal*, "split." (Aryan, *skarp skarbh*, "cut." Heb., *shálab*, "to notch.")
109. RAP. Egt., *arf*, "seize." Ar., *rap*, "snatch"; *rip*, "rend." Heb., *áraph*, "seize."
110. RUP. Ar., *rup*, "break." Heb., *ruph*, "pound."
111. RIK. Egt., *rega*, "separate." Ar., *rik*, "tear"; *rug*, "rend." Heb., *rákak*, "separate," "spread."
112. LIP. Ar., *lip*, "adhere." Assyr., *libu*, "cleave to."
114. KAR. Akk., *gir*, "split"; *kur*, "to separate." Egt., *kher*, "enemy"; *herpu*, "sword." Ar., *krit*, "cut"; *gar*, "grind"; *kar*, "destroy"; *ghar*, "grasp" (cf. Medic, *kar*, "hand"). Heb., *garar*, "scrape"; *cur*, "dig." Arab., *kur*, "dig"; *jur*, "hollowed out." Tk., *kir kil*, "break." Mong., *kiro*, "saw"; *kure*, "file."
115. KAT, KAS. Akk., *kut*, "cut"; *chas*, "split." Egt., *het*, "sword." Ar., *ghas*, "strike," "wound." Sk., *chid*, "slay." Heb., *gadar*, "cut"; *kadad*, "cleave." Arab., *jedd* and *kadd*. Tk., *kes*, "cut." Mong., *kadur*, "sickle"; *kazi*, "bite." Fin., *kat*, "cut"; *kas*, "divide." Ch., *kat*, "pierce"; *koht*, "cut"; *kwut*, "dig."
116. KAT. Akk., *kat*, "hand." Egt., *khet*, "to close." Ar., *kat* "close"; *ghad*, "grasp." Heb., *akhad*, "take"; *khatah*, "seize." Arab., *akhadh*, "take." Tk., *kat*, "join." Fn., *kat*, "fasten." (N.B., Mongol., *gar*, "hand," see preceding root.)
117. KAN. Ar., *ghan*, "strike." Heb., *kin*, "strike." Tk., *sun*, "hew."
118. KAP. Akk., *gub*, "fix," "hand." Egt., *khafa*, "seize"; *kheb*, "fist."

- Ar., *kap*, "hold." Heb., *cap̄h*, "hollow of hand." Arab. *kaff*. Tk., *kap*, "grip." Chin., *chup*, "hold"; *kup*, "cover."
119. PAR. Ar., *par*, "give." Heb., *phāl*; Arab., *fāl*, "make." Tk., *ber*, "give."
120. BAR, BAL. Akk., *bar*, "cut"; *pal*, "cleave." Egt., *berk*, "open." Ar., *bhar*, "cut," "bore"; *bhrag*, "break." Heb., *bar*, *par*, "dig," "bore"; *parakh*, "burst"; *parak*, "break." Tk., *bal*, "split." Mong., *balta*, "axe." Fn., *pel*, "divide"; *pir*, "split."
121. BAD. Akk., *bad*, "open." Egt., *pit*, *fut*, "divide." Ar., *bhid*, "cleave," "bite." Heb., *badad*, "divide"; *padad*, "cut up." Arab., *badd*, *fadd*, "separate." Tk., *bit*, "cut."

## CLASS VII.—WORK.

122. WA, WI. Ar., *wa*, *wi*, "wind," "bend," "bind." Heb., *avah*, "inflect." Arab., *awa*. (Ch., *wai*, "fence" ?)
123. WAR. Egt., "war," "cord." Ar., *war*, *wal*, "wind," "roll." Heb., *awal*, "distort." Arab., *dal*, "turn." Tk., *al*, "grip"; *el*, "hand"; *or*, "rope."
124. WAB. Ar., *wabh*, "weave." Heb., *avb*, "wrap." Tk., *ip*, "bind."
125. AK ANK. Ar., *ak ank*, "bend"; *ag ang*, "choke" (cf. AG, Class V). Egt., *ki*, "choke"; *ag*, "cord." Heb., *avag*; Arab., *avj*, "bend." Tk., *eg*, "bend." Ch., *hav*, "hook."
126. KAK KUK (see KUK, Class IV). Ar., *kak*, "bend," "surround." Heb., *khagag*; Arab., *hajj*, "to go round." Fn., *kak*, "bowed."
127. KAR. Akk., *gar*, "make" (see KAR, Class VI). Egt., *ger*, *kher*, "have." Ar., *kar*, "make," "act," "work," "produce"; *ghar*, "seize." Heb., *avara*; Arab., *cara*, "dig." Tk., *kar*, "hand," "power"; *kil*, "to do," "make." Ar., *karp*, Heb., *garaph* "grab."
128. KAT. Akk., *kat*, "gather," "shut." Egt., *huta*, "cover." Ar., *kat*, "cover," "gather." Heb., *akhad*, "unite"; *casah*, "cover." Tk., *kat*, "fasten." Fn., *kat*, *kant*, "cover" (hence "house," as in Aryan); *kat*, "hide."
129. KAS. Ar., *gas*, "heap up." Heb., *kashash*; Arab., *kashsh*, "gather." Tk., *kot kos*, "heap up." (Egt., *hesb*; Heb., *khashab*; Arab., *hasab*, "to add up," "calculate," "think.")
130. KAM. Ak., *gam*, "bend," "subdue." Egt., *hams*, "bend." Ar., *kam*, "bend" (Heb., *kamāh*; Arab., *kama*, "to collect" ?). Tk., *kom*, "round," "humpy." Ch., *kuung*, "bow."
131. KAP, KUP. Akkad., *gab*, "breast." Egt., *gab khab*, "bent," "crooked." Ar., *kap kamp*, "bend," "vibrate"; *kubh*, "bend," "vibrate," "swell up." Heb., *gabā*, "swell up round"; *kabab*, "round and hollow"; *guph*, "hollow" (Arab., *jaba*, *kabb*, and *jūf*). Tk., *kob*, *kab*, *kou*, "hollow." (Cf. Aryan, *ku*, "hollow." Heb., *gu*; Arab., *ju*, "interior.") Finn., *kap*, "hill," "valley," "sphere." Mong., *gube*, "hill" (cf. GAB, Class V, "to gape.")

132. DAG, STAK. Egt., *steka*, "to cover." Ar., *tag, stag*, "to roof or thatch." Heb., *degah*, Arab., *daja*, "to cover." Tk., *tag*, "cover"; *tuk*, "stretch," "sew."
133. DAG, TOG. Akk., *dag*, "to make." Egt., *takh*, "beat." Ar., *dhigh*, "mould," "form," "knead," "smear." Heb., *tavakh*, "daub." Arab., *takh*, "smear." Tk., *tog*, "smooth" (Akk., *tag*, "turn." Ar., *tak*, "weave").
134. TU, DU. Akk., *du*, "make." Ar., *du*, "toil." Heb., *tuah*, "to spin" (Arab., *tui*). Fn., *tu*, "to make."
135. TA, TAN. Ar., *ta, tan*, "stretch." Heb., *tana*, "to weave." Tk., *ton*, "to cover." Ch., *taai*, "band."
136. TAK, TANG. Akk., *tuk*, "to have." Ar., *dak, tang*, "take hold." Tk., *tak*, "touch." Fin., *tan*, "hand."
137. TAR (see Class VI). Akk., *til*, "to complete"; *tar*, "fix." Ar., *dar*, "to do," "effect"; *tar*, "to turn," "rub," "bore" (Ar., *drap*, "beat." Heb., *darab*, Arab., *darab*, "beat"). Akk., *tur*, "settle," "abide." Egt., *atr*, "stop," "prevent." Ar., *dhar*, "hold," "maintain." Heb., *davar*. Arab., *dur*, "remain," "abide." Tk., *tur*, "dwell." Fin., *tar*, "abide." Mong., *turu*, "village."
138. DAM, TAM. Akk., *dim*, "cord"; *tum*, "fear." Ar., *dam*, "tame;" *daman*, "rope"; *tam*, "fear," "choke"; *tank*, "squeeze." Heb., *atam*, "shut," "stop." Tk., *tam*, "to seal."
139. DAM. Akk., *dim*, "create" (Egt., *tem*, "building"?). Ar., *dam*, "to build." Heb., *tamam*, Arab., *thumm*, "to complete." Tk., *tam*, "to build."
140. TAB. Akk., *tab*, "to form," "establish." Ar., *stap, stabh*, "to make firm." Heb., *dabab*; Arab., *dabb*, "to tread." Tk., *tab*, "basis." Ch., *taap*, "to tread."
141. SAR. Akk., *sar*, "period." Egt., *tsar*, "calculation." Ar., *sar*, *swar*, "to arrange in order," "to string." Heb., *sardh*, "to put in a row"; *asher*, "straight." Arab., *sar*, "to set in order." (Egt., *sar*, "chief." Heb., *sar*. Ass., *saru*, Akk., *sar*? "chief," "arranger.") Zend, *çareda*, "year." Tk., *sal*, "year." Medic, *karata*, "time." Tk., *ser*, "to arrange," "rule."
142. SAD, SAT (See SAD, Class IV). Egt., *set*, "establish"; *saat*, "throne." Aryan, *sad*, "sit"; *sta*, "stand"; *sat*, "full." Heb., *sâd*, "prop up"; *shadad*, "strengthen." Arab., *shidd*, "pull"; *shaddîd*, "strong." Tk., *süz*, "to stand still."
143. SAM (cf. DHUP, Class III). Egt., *sam*, "dark"; *sem*, "butter," "grease." Ar., *sma*, "to smear." Ass., *sama*, "dark." Heb., *shaman*, "fat." Arab., *semen*, "butter." Fin., *ham, sam*, "dark," "cloud." The idea is "to cover or smear over." Hence, Heb., *shema, shemim*, "the sky," "the clouds."
144. SU. Akk., *su*, "tie." Ar., *su siv*, "sew." Heb., *shava*, "to make level, equal, or fit," "to put." Arab., *sawa*, "equally joined." Fn., *sovo*, "to weave."
145. NAG. Egt., *nuh*, "cord." Ar., *nagh*, "to bind."

146. RA, AR, LU. Akk., *ra*, "take"; *ru*, "make," "found"; *ur*, "foundation"; *lu*, "yoke." Egt., *ra ar*, "make"; *ar*, "foundation"; *lai*, "bend." Ar., *ar*, "to fit," "to acquire"; *ra*, "to fit"; *lu*, "to acquire." Heb., *alal*, "to join," "bind"; *arah*, "take," "pluck"; "collect," "gather." Arab., *ghal*, "to put in," "to yoke" (gh in Arabic = d in Hebrew, always). Heb., *lavah*, "to be joined." Tk., *al*, "hold"; *el*, "bind"; *or*, "cord." (Heb., *er*. Assyr., *uru*, "city," *i.e.*, "foundation.") Ch., *lau*, "keep"; *laam*, "rope."
147. AP (*cf.* WAB). Akk., *pa*, "fibre." Egt., *abti*, "net," "spin"; *naf*, "squeeze." Ar., *ap*, "bind," "hold," "work." Heb., *aphaph*, "to surround." Tk., *ip*, "gather," "bind," "string." Ch., *pau*, "bundle"; *ipi*, "clothes."
148. PAK. Ar., *pak*, "fix." Heb., *aphak*, "hold fast." Tk., *bag*, "bind." (Hence Medic, *pikti*, "to aid." Tk., *pokti*, "to strengthen," "support.")
149. PAS. Egt., *pes*, "cook." Ar., *pak*, "cook." Heb., *aphah*. Arab., *aft*, "cook." Tk., *bis*, "cook."
150. PIS, PIK, PUK. Egt., *fekau*, "cut"; *basa*, "cut." Ar., *pik*, "prick"; "cut," *puk*, "pierce," "prick," "strike." Heb., *bakah*, "cleave"; *pagah*, "strike." Tk., *bis*, "cut" (*cf.* BAD, Class VI).
151. PARD. Ar., *pard*, "explode." Heb., *parad*, "to crack," "expand." Arab., *fered*, "crack."
152. BUG. Akk., *bav*, "bow." Ar., *bhugh*, "to bow," "bend." Heb., *bavac*, "turn," "roll"; *pavak*, "to move to and fro"; *pavac*, "to wave" (hence *fucus*, "seaweed." Heb., *pac*).
153. BAD, BAND. Akk., *bat*, "a walled town." Egt., *bant*, "to bind"; *pet*, "bow." Ar., *bhad*, *bhid*, *bhand*, "to bind"; *banda*, "fortress" (Sk., *pid*, "to hinder, vex." Heb., *peed*, "calamity.") Heb., *abad*, "to incline" ?; *bada*, "to fashion," "mould." Tk., *bot*, "enclosure," "fortress." (The radical meaning is bend and bind.)
154. MAR. Ar., *mar*, "to grind" (*cf.* MAR, Class IV), "to rub"; *mare*, "the sea." Heb., *marar*, "to be bitter" (*i.e.*, "to sting"); *malakh*, "to be salt." (Ar., *mark*, *malg*, "to rub." Heb., *marah*, "to rub.") Ar., *mar*, "to make dirty." Heb., *mahal*, "to spoil."

## CLASS VIII.—LOVE, DESIRE, THOUGHT.

155. AW (*see* AW, Class I). Ar., *aw*, "desire." Tk., *oi*, "fancy." Ch., *oi*, "love."
156. WAN (*cf.* AN, "to breathe," pp. 37-40). Ar., *wan*, "honor," "success," "desire" (hence *Venus*). Heb., *awn*, "ability," "power," "wealth." Tk., *on*, "power" (*cf.* Akk., *un en*, "lord." Assyr., *enu*, "lord.") Ch., *uen*, "desire."
157. KAM. Akk., *gaam*, "grace," "kindness" (*cf.* KAM, "bend," Class VII). Egt., *khemt*, "desire," "inclination." Ar., *kam*, "love." Heb., *camah*, "to long." Arab., *jamā*, "to embrace." Fn., *yem*, "good."

158. KAB, KUB. Akk., *kab*, "honor." Ar., *kubh*, "to wish," "covet." Heb., *khbab*, "to love," "be friendly." Tk., *keb*, "fancy."
159. NAD. Ar., *nad*, *nud*, "profit," "enjoy." Heb., *nid*, "comfort."
160. SAL. Ar., *sal*, "save," "keep." Heb., *shalah*, "to be safe," "secure."
161. RA, RAS. Ar., *ra*, *ras*, "rest," "love." Heb., *rai*, Arab., *rai*, "a friend." Heb., *arash*, "to long for"; *aras*, "to espouse," Arab., *warash*, "to long for"; *arús*, "a bride."
162. LAG. Egt., *lakai*, "soft." Ar., *lag*, "lax"; *lagh*, "lie down." Heb., *leah*, "exhausted," "weary." Arab., *rah*, "rest."
163. LAS. Ar., *las*, "lust," and *layyos*. Heb., *lékhen*, "to be greedy," "to lust" (cf. LIG, Class IV).
164. LUB. Akk., *lib*, "interior." Ar., *libh*, *lubh*, "love." Heb., *leb*. Arab., *lub*, "the heart." Tk., *lap*, "good." (Heb., *alaph*, Arab., *alf*, "to be familiar." Heb., *aláph*, "a friend.")
165. MAN. Akk., *munu*, "beneficent." Ar., *man*, "to think," "to heal." Heb., *mán*; Arabic, *mán*, "to think," "purpose."
166. BHID (cf. BAD, Class VII). Ar., *bhidh*, "to trust." Tk., *böt*, "to trust"; the original meaning being "to bind," "make firm."
167. BAS (cf. PAS, Class V). Ar., *bus*, "to kiss." Arab., *bás*, "a kiss"; probably connected with *boc*, "mouth." It is not an universal custom to kiss.
168. DIK, DA (cf. DI, Class II). Akk., *da*, "say"; *dik*, "word"; *dug*, "order"; *dil*, "speech"; *tuk*, "know." Egt., *teka*, "perceive"; *ta*, "head." Ar., *da*, "know"; *dak*, *dik*, *dig*, "shew," "teach," "deceive." Sk., *dhi*, "intellect." Heb., *dák*, "knowledge"; *dál*, "observe," "look out"; *din*, "judgment." Tk., *til*, "speech"; *in*, "learn." Mong., *tane*, "know." Fn., *tan*, "learn."
169. MA, NA, NU, negative. Akk., *na*, *nu*, "not." Egt., *em*, *an*, "not." Ar., *nu*, "not." Heb., *ma*, *an*, "not," "lest"; *la*, "not." Tk., *neh*, "nor." Ch., *mo*, "not."
170. MA. Akk., *ma*, "this." Egt., *ma*, "of." Ar., *ma*, "this." Assyr., *ma*, "this." Heb. and Arab., *m*, "that which." Tk., *m*, "my."
171. SA. Akkad., *sa*, "man." Egt., *saa*, "man"; *su*, "he." Ar., *sa*, "this"; *sama*, "same." Ass., *su*, "he"; *summa*, "like." (Heb., *ha*, "the"; *hu*, "he." Arab., *a*, "the"; *hu*, "he"; like Greek *ho*, "the": *h* for *s*.)
172. KA. Akk., *khu*, "man"; *ka*, "who." Egt., *akh*, "who." Ar., *ka*, *ki*, "who." Heb., *ci*, "who"; *c*, "as." Tk., *ki*, "that which." (Fn., *ku*, *khu*, "man.")

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The PRESIDENT (Sir G. G. STOKES, Bart.).—Our thanks are certainly due to the author of this elaborate paper, but I may say you have anticipated me by your applause. Perhaps Dr. Legge will kindly open the discussion.

Professor J. LEGGE, D.D. (Oxford).—I understand the President desires that I should say something on the admirable paper that we have just heard. I am hardly prepared to do so; not from want of attention to the subject, because it is one that for many years has been very much in my thoughts and at my heart; and although, unfortunately, as years have gone on, I have become less capable of catching the language that has been used or spoken, yet I have had the privilege, through the kindness of the Honorary Secretary, of being in possession of the printed paper, and I must say I have read it many times over and tried to comprehend it, tried to learn from it, and tried if it would help me to focus many of the ideas that at different times have flitted through my mind: yet when I have tried to come to definite conclusions concerning the points that the author has endeavoured with so much pains, and often with so much success, to bring before us, I have found it is very difficult to arrive at any definite conclusion.

We have much in the paper about a great many different languages with some of which I am, or have been at different times of my life, tolerably familiar, and one of which has been the great study—shall I say bugbear?—of my life for about sixty years. I mean the Chinese. What the author has said about the Chinese has interested me. Sometimes he has astonished me. It is not the first time that I have heard that Chinese is a very decayed language, and I have never been able to understand what is meant by thus characterising it. Does it mean that it is a very broken down language? Well, it has never admitted of much breaking down, because in all the thousands of years of its existence it has never been but a monosyllabic language, and it seems to me to be very difficult to break down monosyllables and to speak of them as falling into decay. The language, moreover, as it is written at the present day, is very much as it was written and in construction about 1900 years before the Christian era, and it really places me in a difficulty to understand what philologists mean when they speak of the decayed language that has been cultivated in China for so many thousand years and which has as many writers in it at the present day as many of our alphabetic

tongues, and an acquaintance with which has been and is the passport to distinction in the Empire, introducing to all positions of general culture and official rank.

Now with regard to the conclusions to which the author comes, I am happy to agree with him to a very great extent. There are the different families of languages to which Major Conder has referred: the Semitic languages, the Aryan languages, and the Mongolian languages; and that there is a close connection between the individual languages constituting those different families there is no doubt. Their affinities are many and they may be derived from one source, and one centre; the Semitic speech, the Aryan speech, and the Mongolian speech; but, when we advance further than that and say that all the varieties of human speech belong to these families, and that other divisions of the human race are from one source connected together by links which we hope by-and-by to understand, there I am unable to follow. There I am left as much in the mist, behind the shadow of the mystery, as ever I was; and the fact is that I have often resolved to have done with the study of languages: but then there has come in this thought, that all the treasures of human thought—all whereby man has endeavoured to enunciate what he is capable of—are only to be ascertained by a study of them. Suppose the Aryan languages of all kinds to be blotted out of the world, how poor it would be; so with the Semitic languages, and so, in a less degree, with the Mongolian languages; and shall I say so, also, of the Chinese language? But it so happened, when I was quite a young man, some sixty years ago and more, my attention was directed to the study of Chinese and, as I said, that has been my recourse and mental food, and very often my bugbear, all through life. So let men give their time and energy to the study of all those languages that have a literature, and are capable of instructing other races, and bringing out treasures that in time, in their own language, or in other languages, shall be unfolded to the study of other races; and I conceive that by-and-by, through these philological studies, we shall come to a better understanding of one another all over the world, and possess more of brotherly feeling, more of mutual consideration, more of mutual helpfulness and co-operation in what is good, than ever we have yet attained to, and we shall gradually, perhaps, find that ultimately we have one race of human beings in the world bound together by the com-

monest and closest ties of mutual consideration, deference, and love.

In one word let me thank Major Conder for all the information that he has brought together, and, by-and-by, if we meet again before a great many years, I hope we shall find ourselves nearer to a common view in regard to the curious points to which he has directed our attention this evening. (Applause.)

MR. THEO. G. PINCHES.—I must say that, after listening to what Dr. Legge has said, I feel very diffident in speaking; for I have not had his wide reading, being, in fact, very much of a specialist, and bound down to that speciality by routine work. I have listened with a great deal of pleasure to Major Conder's very instructive paper. I was unable to read it right through before I came here, and, consequently, I have not so perfect a knowledge of its contents as I should desire. On reading such a paper as this a great many isolated points naturally occur to one, and among them there are such questions as this: why is it that the Akkadians, when speaking of the precious metals, generally say "gold and silver," whilst the Assyrians and Babylonians, amongst whom they lived, always say "silver and gold?" Then there is a very interesting point in connection with another word—the name of a well-known animal, the horse—why do the Akkadians write the name of that animal with three characters rather than with one? They call him, apparently, "the animal of the country"—(the words have been translated "the animal of the East," but that I do not believe to be the correct rendering). Then, again, among other questions, there is that of the Akkadian name for God. This, in that language, is a word of two syllables, namely, *Dingir*, of which the Sumerian form is *Dimmer*. Some time ago I formed the opinion that the first syllable, *din* or *dim*, was none other than the word for *spirit*, and *gir* or *mer*, means, in Akkadian, *strong*. Therefore it would seem as if the Akkadians regarded the greater Gods as "the strong spirits." In this connection I may mention that the greater part of the polytheism of the Assyrians and Babylonians seems to have been of Akkadian origin, and that is a question that I hope to have the pleasure of touching upon before this Institute. It is one of considerable importance and worthy of a certain amount of research. Of course, in a great many other isolated points in this paper, I have seen things with which I could hardly agree, and which seem to me to want improvement. But

still, on the whole, it is exceedingly good, and it falls in, in fact, with what was stated at the late congress of Orientalists, by Professor Hommel, the Rev. C. J. Ball, and others (who spoke on that occasion in the Semitic or Babylonian sections), viz.: the connection that must have existed between ancient China, Egypt and Babylonia. I think we may regard this connection as exceedingly probable, and further researches will, no doubt, give us more light upon the subject. I hope that Major Conder will continue his interesting researches and will give us some further information from his wide experience at some future time.

Rev. KENNETH S. MACDONALD, D.D.—I cannot speak with authority upon this subject; but there is one little point I should like to receive light upon, or throw a little light upon, if I can. It is with regard to the question of vowel harmony (treated on in the section on Mongolic languages). Major Conder, in his most admirable paper, is not able to throw any light on the subject as far as the Aryan languages are concerned. Now Max Müller tells us in his Gifford Lectures of 1890, that there is a law in accordance with which the vowels of every word must be changed and modulated so as to harmonize with the keynote struck by its chief vowel; he finds this law pervading the Tungusic, Mongolic, Turkic, Samoyedic, and Finnic classes of languages, and even in dialects where it is disappearing it has often left traces of its former existence behind—nay, more, “the same law has been traced in the Tamulic languages also, particularly in Telugu, and in these languages it is not only the radical vowel that determines the vowels of the suffixes, but the vowel of a suffix also may react on the radical vowel.” But he adds: “No Aryan or Semitic language has preserved a similar freedom in the harmonic arrangements of its vowels, while traces of it have been found among the most distant of the Turanian family.” Such is Professor Max Müller’s opinion.

Now all scholars are agreed that Gaelic, the Celtic language of the Highlands of Scotland, and Irish, the language of our fellow subjects in the Emerald Isle, are Aryan, indeed the oldest branches of the family. Here are extracts from two or three of the Gaelic grammars accessible to me:—

1. Forbes, at p. 9 of his grammar, gives two rules on the spelling of Gaelic words, a knowledge of which, he says, makes Gaelic orthography extremely easy:—“1. When the last vowel in

the preceding syllable of a word is a broad, the first vowel in the following syllable of the same word must be a broad." "2. When the last vowel in the preceding syllable is a small, the first in the following syllable of the same word must be a small also."

2. Stewart, in his Gaelic grammar, p. 30, speaks to the same effect, but briefer:—"The rule has long obtained in Gaelic orthography, that in polysyllables the last vowel of one syllable and the first vowel of the subsequent syllable must both be of the same quality." In Gaelic "Leathan ri leathan is coal ri coal." To the same effect are the words of

3. Armstrong. "Though to the ordinary English reader they be unintelligible, such and such words are more commonly written so and so to 'preserve the rule *coal ri coal is leathan ri leathan*,' " which means simply "broad to broad and small to small." It will be observed that Gaelic grammarians do not say which vowel acts, and which is acted on, but the rule is emphatic—there must be a "vowel harmony" in every case. So this is another link in common between the Aryan and non-Aryan languages tending to prove that they have "descended from a single original stock."

Rev. S. W. KOELLE, Ph.D.—Perhaps in connection with the last speaker's remarks I may mention that what the learned author has called "the harmony of vowels" is properly a harmony of sounds generally. In the Tartar languages, of which Turkish is the chief representative, this law of harmony or euphony exists; but it is not restricted to vowels, for it extends equally to consonants. I will give you an instance. The roots of the language are either hard or soft roots; e.g., *bul* is hard, *bil* is soft. The former as Imperative means: find! the latter: know! Now their respective Infinitives are: *bul-mag* (to find), *bil-mek* (to know); their future Participles: *bul-adjag* (going to find), *bil-edjek* (going to know), &c. So you see the law of harmony in Turkish regulates both the vocal and consonantal character of all the formative additions. According as the root is either hard or soft all the affixes must likewise be either hard or soft. You therefore have here a symphony of sounds affecting not only the vowels but the consonants as well.

The AUTHOR.—I thank you for the reception given to my paper, and shall not detain you more than five minutes. I consider myself very fortunate to have been treated so kindly by those

who have spoken on my paper and who are all known to have more experience in philological subjects than I possess, and especially I feel honoured by the presence of Professor Legge, who is so well known to us as one of the most distinguished Chinese scholars in England, and whose Chinese translations I have had occasion to read. There are two points in his remarks that I should like to mention: one is in regard to the decayed, broken down condition of Chinese. I intended to refer to the vocabulary, not the idiom, or construction of the language, which is most distinctive. But I think, comparing the oldest known Chinese dialect (Cantonese) with the Mandarin dialect, any scholar would allow that a considerable abrasion has gone on in the vocabulary of the Chinese.

The other point is the question of the single origin of language. That is exactly the question I wished to raise; but I do not consider myself capable of settling it—I only wished to raise a discussion on the subject. It appears to me that as the Asiatic peoples are supposed by all scholars to have lived, originally, within a comparatively short distance of each other—not more than 500 or 1,000 miles apart, there is nothing *primâ facie* improbable in the theory of their having been, originally, a single stock and their languages having an extremely remote common origin.

With regard to Mr. Pinches, he always treats me with kindness, and I have confidence in him as an Akkadian scholar, for I regard him as the safest we have in England. There are one or two remarks that he made as to Chinese in regard to the works of Mr. Ball, to which he referred, and which I have read with great interest. His conclusions would go in favour of my conclusions. As to the word *kurrd* for *horse*, in the Mongolian language, it simply means a galloping animal. As to the word *dingir* I am of Mr. Pinches' opinion, that it means *spirit* and comes from a root which means to live or breathe or be alive.

Mr. Macdonald's remarks were of great interest to me because I know nothing of Gaelic, though I am aware that the Celtic Latin group is, perhaps, the oldest of all Aryan groups of language, and the discovery of vowel harmony in that group goes still further towards the observation of the general law which to a great extent has died out in many languages and survived in others.

Dr. Koelle's remarks on the harmony of consonants are of great value. I have noticed in the Turkish that what he has said to-

night is observable, and I have to a certain extent mentioned it in the paper at page 210 in regard to the Aryan languages in which vowel harmony exists to a certain extent, and it is also supplemented by the consonantal harmony which is found to exist in the Tartar and Zend languages.

The meeting was then adjourned.

#### REMARKS ON THE FOREGOING PAPER.

The Rev. R. COLLINS,\* M.A., writes:—

After the long study and care bestowed by Major Conder on the subject of this most interesting paper, it seems almost an impertinence on the part of one who has comparatively little time for such study to say a word. Nor am I able to refer to all the vocabularies that have been used by Major Conder. I would, however, venture to suggest a doubt whether all language can be traced ultimately to simple monosyllables. Is there not evidence of some further law of sympathy between sounds (especially consonants and combination of consonants), and the impressions produced by actions, or feelings, which carries us along beyond merely so simple a syllabic origin as here suggested? However correct the illustrations at the close of this paper be, are there not many cases left thus incapable of explanation?

Take a class of words in which k, s, p (with sometimes r) are the backbone. For instance, there is the remarkable word used for the first description of the "manna" (Ex. xvi. 14). Leaving the vowels out of the question, it is *khasaph*, or *khasap*, the root meaning being to "peel," or "scale"; so that it seems to mean a "scrap," or, as our Revisers put it in the margin, a "flake." Another form of the same word seems to be *sakhaph*, to "scrape," or "sweep." Gesenius, no doubt correctly, compares it with the Gr. *skaptein*, to "hoe," or "dig," whence we get *skaphos* (scraped out, or dug out), *skiff*, *ship*; *khasap* and *sakap* both occur in Arabic, also conveying the same idea, as in the Hebrew, of "scraping." I do not recall a parallel in Sanscrit, or the South Indian languages. But in our own German and Latin, we have *scab*, *schaben*, *scabere*, and (perhaps) *shave*; probably *scoop* belongs to the same family. With a later addition of r (a point Major Conder notes) we get *scrape*, *scrap*, *scramble*, *scrabble*, *scrub*; and as s is apt to be lost before k (as between Sanscrit and Pāli) we may

\* Late principal of Cottayam College.

get *grub*. We have here similar combinations of the same, or allied, consonants, and the same idea implied. But we do not seem able to trace the words back to any simple monosyllable. On the contrary the apparently oldest form is found to be dissyllabic. Of course the Hebrew form is far from the original; already the word exists in two forms in that language, and in Arabic, the position of the letters being transposed. It strikes one that, could we get no further back than *ship* and *shave*, we should be entirely in the dark about their antecedents. May not, then, some of the apparently simple roots have some very different origin from what is supposed? even in some cases less simple than they themselves seem to be? Imitative sounds no doubt count for a good deal; but is there not a further sympathy between *sound* and *feeling*, that is probably capable of at least some amount of investigation?

The study of the growth of language is extremely fascinating, and Major Conder's paper is a most valuable contribution. But perhaps, after all, the evidences as to the unity of the human race is the most interesting and important point brought out by these studies of language.

#### THE AUTHOR'S REPLY.

The three roots to which Mr. Collins refers are, I believe, secondary and tertiary roots. The prefixed S in both Semitic and Aryan speech (a degradation of the root *AS* "to be") has the force of a causative verb. In Assyrian and Sabeian it forms the *Shaphel* voice of the verb which is causative. The earlier roots I, therefore, suppose to have been *Kap* and *Karp*. The first root which occurs in all languages has the meaning to "be hollow," hence "Ship" and "Scoop" would mean "hollowed out." The root *Karp* in Aryan and in Semitic speech means to "cut off," and in the former class is regarded as a secondary root from *Kur* which means to "cut" in all three classes of Asiatic speech. These roots may, therefore, I think, be easily reduced to monosyllables. The Hebrew root *Sakhap* would come from *Kap*, but *Khasap* is a distinct secondary root, from *Khas* which, in all three classes, means to "split." The *p* is a common termination in in Mongolic and Aryan speech, for words derived from monosyllabic roots, and none of the words quoted seem to me to run counter to my system.

As regards the unity of the human race, those who follow Darwin's theory of variation should find no difficulty in accepting it. Darwin has shown how species tend, under altered conditions, to become black and white in colour. White men are found near the poles, and black men near the equator, so that the influence of the sun on colour may be suspected. The difference between the long head of Aryans, Semitic peoples, and negroes, and the short head of Mongolic peoples, may also have developed within historic times; for, as Dr. Beddoe has noticed, the prehistoric heads, in countries where short heads now prevail, have been found to be longer than at present. The Akkadians, both in feature and in vocabulary, present resemblance to both Aryan and Turanian peoples: the oldest Aryan languages (Lett and Teutonic) belong to peoples with medium heads; and such evidence as we possess seems to indicate an original type brown in colour, and medial in measurement of the head, whence the various races have diverged. The ancient Egyptians give the medium character.

### INTERMEDIATE MEETING.\*

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

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

MEMBER:—Francis G. Smart, Esq., M.A., M.B., F.L.S., F.R.G.S., F.S.A., Kent.

LIFE ASSOCIATE:—Major A. W. Bell, Ind. S.C., India.

ASSOCIATES:—Robert P. Greg, Esq., F.S.A., F.G.S., Herts; S. McCracken, Esq., A.B., Ireland; Rev. J. E. Kittredge, D.D., United States; Hugh Shrewsbury, Esq., M.A., New Zealand.

A LECTURE entitled "Notes of a Visit to Tel-el-Amarna," was given by Mr. W. St. C. Boscawen, M.R.H.S. A discussion of a general character ensued.

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\* 11th of 28th Session.

## INTERMEDIATE MEETING.\*

D. HOWARD, ESQ., F.C.S., &c., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and

A LECTURE on the "Endurance of Cosmic Conditions" was delivered by Professor J. Logan Lobley, F.G.S. A discussion of a general character ensued.

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\* 2nd of 29th Session.

## 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 Election took place:—

LIFE ASSOCIATE:—Rev. G. Whitehead, Burma.

A LECTURE on "Extinct Animals in Relation to Living Types" was delivered by the Rev. H. N. Hutchinson, M.A., F.G.S. A discussion of a general character ensued.

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\* 4th of 29th Session.

## ORDINARY MEETING.\*

THE PRESIDENT, SIR G. G. STOKES, BART., F.R.S.,  
IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

The PRESIDENT.—We had all hoped that Professor Prestwich—whose Paper I am glad to see is exciting such interest, to judge by the number attending this meeting—would have been with us to-day; but I am sorry to add that, to his great regret, he is unable to be present, his doctor having absolutely refused to allow him to face the journey in these east winds. Professor Rupert Jones, F.R.S., has kindly arranged with the author to read the paper, and I will now call upon him to do so. I am sure there are not any in this room who will not regret Professor Prestwich's absence more from a feeling of deep regard for him than even by reason of their own loss (applause).

Professor T. Rupert Jones, F.R.S., then read the following paper:—

*A POSSIBLE CAUSE FOR THE ORIGIN OF THE TRADITION OF THE FLOOD.*† By JOSEPH PRESTWICH, D.C.L. (Oxon.), F.R.S., F.G.S., Corr. Inst. France, etc.

THE geologist has to interpret two very distinct classes of phenomena. Firstly, those connected with the great mass of stratified and solid Rocks, and secondly, those relating to the thin sprinkling of *débris* derived from those rocks and scattered over their surface. These latter, termed superficial or Drift deposits are, nevertheless of no less interest than the stratified rocks, as they are connected with the first appearance of Man and with the distribution of the existing Fauna and Flora on the surface of the Earth. These Drifts consist of beds of sand, gravel, and loam, sometimes showing stratification, at other times unstratified. At first they attracted but little attention, and were *all* included together under the general term of Diluvium, it being then supposed that they were due to “an universal and transient deluge,” whereby the animals whose remains are buried in these beds were destroyed and their remains dispersed “by the waters

\* 7th Meeting of 29th Session, 19th Mar, 1894.

† The facts on which this hypothesis is founded are only given in short abstract in this paper. The full evidence will be found in the two memoirs referred to in a note, p. 265.

of the same inundation which produced the deposits of loam and gravel in which they are imbedded.”\*

This view, which was held by many distinguished men, was however soon found to be untenable. An universal deluge was recognised to be a physical impossibility, while further research led to the conclusion that the superficial loams, gravel, and sand, instead of being the result of one rapid rush of waters over the surface, were due to the prolonged action of the several local agencies still acting on the surface of the globe. Such as (1) large spreads of gravel and sand are now known to have been deposited on the flanks and terraces of our valleys by the old Rivers, when, before they had excavated their channels to the present depths, they flowed at various higher levels. That this was their origin is shown by the fact that these deposits contain fluviatile shells, mostly such as now live in our rivers, together with the rolled and worn bones of the contemporary land animals. The preservation of such remains is, however, partial and irregular, because the beds in which they are entombed are in general so permeable that the percolation of the surface waters has very commonly removed the calcareous matter of the bed itself together with that of the embedded shells and bones, but, where these have been protected by beds of loam or clay, the organic remains are often well preserved. The higher and older the terrace, the more rare are the organic remains. (2) Another large series of these deposits contains rock *débris* and boulders, transported far from their native place. This was formerly looked upon as evidence of the rush of the diluvial waters, but now it is well established that these boulders have been carried to their present positions by the slow action of either land or floating Ice and not by any sudden transport by water. (3) Other portions of the Drift are of marine origin, as indicated by the presence of sea-shells, while subaërial processes, weathering, etc., have in places contributed to the general result.

In this way the origin of the larger proportion of the superficial deposits of loam, gravel, and sand has been accounted for, and shown to be due to the same agencies, though often acting with greater intensity and force than those which now act upon the surface of the land; and that so far from

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\* Buckland, *Reliquiæ Diluvianæ*, pp. 184, 185.

being the result of a sudden and transient catastrophe, they result from the long continued and gradual action of known agencies, and represent the work of a long period of time.

### THE RUBBLE-DRIFT.\*

Nevertheless, it became evident to me, in the course of studying the Drift beds of the South of England and the North of France, that, besides the Drifts referable to known causes, there was a residue which could not be referred to any of the causes generally assigned for the formation of these deposits. Such was also the conclusion which Sir Roderick Murchison† was led to form, though he failed to eliminate some of the recognized valley-Drifts, and ascribed them generally to a wave of translation. More lately Professor James Geikie‡ has expressed a similar opinion. Speaking of certain accumulations of coarse gravels and detritus which have yielded mammalian remains and palæolithic implements, he remarks that they are spread continuously over wide districts in Southern England, and bear little or no relation to the present drainage systems of the country, and could not have been laid down by ordinary river action. In explanation of these deposits Professor Geikie adopts a suggestion of Darwin's—that their origin is to be attributed to the cold and snow of the Glacial period. Though it seems to me that in both cases reference is made to other drifts besides the Rubble-drift, and our explanations differ, still the essential fact remains of the recognition of an aberrant form of drift.

This Rubble-drift, as I have named it, is distinguished by a general want of that *wear and rounding* of the rock fragments, and of the included organic remains, which characterise the fluvial and marine drifts, while none of the materials are *glaciated*, nor are any of them *transported from beyond the immediate vicinity of the place* of their occurrence, as is the case with beds of glacial origin.

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\* I gave a short notice of this Drift in the South of England at the meeting of the British Association in Swansea in 1880, but fuller details will be found in the *Quarterly Journal of the Geological Society*, vol. xlviii, p. 326, while I have since described in the *Philosophical Transactions for the Royal Society* for 1893, p. 903, some of the chief localities where it occurs on the Continent.

† *Quart. Journ. Geol. Soc.*, vol. vii, p. 349.

‡ *Prehistoric Europe*, p. 140.

The explanation which I would suggest and which seems to me best to satisfy all the conditions of the problem is that the special character and position of this Rubble-drift are due to the submergence and subsequent re-elevation of a land surface, whereby the Fauna and Flora of the submerged area were destroyed, and their remains dispersed over the surface of the submerged land. As that surface emerged from beneath the waters, the scattered remains of that fauna, together with the loose land *débris*, were swept together down the slopes of the hills and into the valleys, leaving traces or isolated portions in any cavities or hollows over which the Rubble passed. The stone implements and weapons of Quaternary Man left and lost on the old land surface, would necessarily be mixed up with the general mass of *débris*, as would also human remains where Man had failed to escape. That such may have been the case is shown by the circumstance that the Rubble-drift contains the remains of the various Quaternary animals living at the time of its formation, together with, in places, Flint Implements of human workmanship, and in a few rare instances portions of the human skeleton itself. Although the several forms of the Rubble-drift differ widely in aspect and have been referred to different agencies, they are all concordant and admit of explanation by reference to one common cause. The following are the more common forms of this Drift in England.

*The Angular Rubble or "Head" over the Raised Beaches.*— This, which is the commoner form of this Drift in this country, has accumulated in hollows on the surface or under the lee of the old cliffs of the Raised Beaches. Owing to the existence, on the coasts of the Channel, of an old shore line, now raised 10 to 30 feet above the level of the present beach, those conditions are often present, the Old Cliffs being generally masked and hidden by a mass of this Rubble. The idea that it was a mere talus was soon abandoned, because the *débris* does not lie at the angle of repose assumed by a talus, and because it contains blocks of stone not belonging to the cliff, but that have come from beds at some distance inland. Amongst the best examples of the "*Head*," as it has been termed, overlying the Raised Beaches, are the masses of rubble exhibited in the cliff immediately east of Brighton, and on the cliffs at Portland Bill, Hope's Nose near Torquay, and at Baggy Point near Barnstaple.

The two most usual explanations that have been proposed to account for the *Head* are, 1st, that the rubble was driven over the old cliffs at a time of excessive rainfall during the late Quaternary or Glacial period; 2nd, that during the Glacial period, sheets of frozen snow or ice slid down the hill slopes above, and carried with them the *débris* of the surface. The objection to the first is that the rain draining off the land would have worn water-channels, and the *débris* would have been spread out in the form of cones of dejection and would also have been waterworn; whereas there are no special water-channels, and the *débris* is spread over the cliff edge in the form of broad sheets conterminous with the extent of the cliff itself. Nor, as a rule, are the rock or bone fragments in any degree worn. For these and other reasons given in the paper read before the Geological Society,\* this cause must be considered inadequate.

The agency of Snow and Ice is open to fewer objections. It would in fact account for many of the phenomena. Where the slopes were sufficient, frozen masses of snow or sludge might carry down with them the surface *débris* and lodge it at the foot of the cliff or slope, but the angles of the slopes above, and the extent of the gathering grounds, are in most cases insufficient, and no instances are recorded where such *débris*, formed at the present day, contains perfect land shells and sharply fractured bones. The grinding of the mass, as it slid down, would be fatal to the preservation of fragile shells, and to the retention of the sharp angles of the bones. A still more serious objection to either of these causes is the distance to which the *débris* has been projected and the large blocks moved, of both of which we shall give instances presently. It must be borne in mind also that it is very unlikely that a surface subject to the frequent occurrence of these slides could contain organic remains of the character found in the *Head*. As often happens, explanations are tendered in consequence of their satisfying some of the conditions of the problem, but without satisfying others, or having regard to the consequences which must ensue were the assumption adopted.

*Ossiferous Fissures.*—Another feature connected with one phase of the Rubble-drift is that relating to the fissures, often

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\* *Quart. Journ.* for 1892, p. 326.

of large size, so common in some limestone districts, filled to the brim with a breccia of limestone fragments, imbedded in a red earth or loam, and generally cemented by calcite. In this rubble, bones of extinct mammalia, and occasionally land shells, are not unfrequently met with. The only locality in England where these Ossiferous Fissures are common, is the neighbourhood of Plymouth. On the shores of the Mediterranean they occur in many places.

The origin of these Ossiferous Fissures has been attributed to the circumstance of rents in the rocks formed during the Quaternary period having been long left open. Into these it was supposed that, from time to time, animals fell, as they do now in similar unprotected pitfalls, or else that they were driven into them when pursued by beasts of prey. The washing in of the soil by streams and the fall of fragments from the side rock were supposed to have gradually filled the fissures. But there is nothing to show the presence and action of streams, or to indicate that the process was a long one. On the contrary, there are *no water-worn materials*, and the bones are all in the same *unworn condition*, nor do they show any of the ordinary effects of weathering. Besides, had the bones been those of animals *which had fallen into the fissures, the entire skeletons of those animals should be there*, though the bones might be displaced. So far from that being the case, the occurrence of an entire skeleton is a rare and exceptional event. It is rare even to find the bones of a single limb in relative position. The *bones are dispersed without order*, teeth largely predominating, and entire bones being comparatively scarce, whilst broken fragments and splinters abound. These, I conceive, are fatal objections to the explanation that the bones are those of animals which fell into the fissures whilst alive.

The following list, the result of the collection made by an early visitor to one of the Fossiliferous Fissures near Plymouth, will serve to show the character of the animals and the relative proportion and abundance of their bones.

	Teeth.	Jaws.	Vertebræ and portions of skulls and bones more or less perfect.	Fragments of bones without distinct characters.
Cave tiger ....	} 1,587	} 147	} 279	} 1,000
Cave hyæna ....				
Wild boar ....				
Fossil horse ....				
Ox ....				
Deer ....				
Wolf ....				
Fox ....				
Hare ....				
Water rat ....				

In addition to the above, there have since been found by later observers, remains of—

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|---------------------------|---------------------|
| Mammoth.                  | Reindeer            |
| Rhinoceros (two species). | Bear (two species). |
| Hippopotamus.             | Bison.              |

Human remains are also reported to have been found in one of the fissures, but this wants confirmation.

These fissures are sometimes spoken of as bone-caves, but the condition of the bones is entirely different from those found in true bone-caves, where they are in greater part more or less *gnawed by carnivora*, and also from those found in river deposits, where they are more or less *rolled*; but they agree exactly both in *species* and *condition* with those found in the *Head* or Rubble-drift. In both instances they are almost all broken, and the fractured surfaces *retain their sharp angles*; in both the bones occur detached and without order, and in both *land-shells* are occasionally found. It is to be inferred from this that the two deposits are closely related, though occurring under different conditions—not, however, so different in reality as in form—the one having been drifted into rents on the surface, and the other swept into hollows or over the face of old sea cliffs which were thereby swamped and hidden.

The structure of the Rubble-drift, as exhibited in the *Head* which overlies the beaches, suggests its origin. It is composed of alternate layers of *débris* of the adjacent rocks, and where the strata consist, as at Brighton, of a soft rock with

intercalated hard bands (of flint), these materials (or rather their *débris*) alternate in the *head*—not with the regularity of stratified strata, but irregularly, and with much confusion, the upper bed especially being rolled over and *thrown back*, as though by some sudden *strong driving force*. It is possible to conceive that a rubble of this character might have been projected on the old cliff by an ice or snow slide, were it not for the objections I have before urged, and the fact of finding, as at Brighton, large angular blocks of rock that have been transported from a distance of a mile or more inland, and must have required considerable force to move. At the same time there are intercalated beds of fine chalk silt, sometimes laminated, and at Sangatte containing uninjured fragile land shells, which could not have been subjected to rough treatment. A body of water acting under great pressure, and with varying velocity as the land rose, could, I conceive, alone have accomplished these variable results.

The late Mr. Hopkins\* of Cambridge has shown that, if a considerable area at the bottom of the sea were *suddenly* elevated, a *wave of translation*, accompanied by a current, the velocity of which would depend principally upon the depth of the sea, would diverge in all directions from the central disturbance. Calculations, he says, “prove beyond all doubt that paroxysmal elevations, beneath the sea, varying from 50 to 100 feet in height, may produce currents of which the velocities shall vary from at least 5 or 6 to 15 or 20 miles an hour, provided the depth of the sea do not exceed 800 or 1,000 feet.” In considering the magnitude of the blocks which might be moved, he found that the force exerted on a surface of given magnitude *increases as the square of the velocity*, and that it “*varies as the sixth power of the velocity of the current.*” But the movements must be repeated for large blocks to travel beyond short distances.

It is evident that we have in this form of disturbance an engine of enormous power, and, though our hypothesis does not deal with the greater movements and powerful currents contemplated by Mr. Hopkins, we may infer what the results might be with changes having even only a fraction of such magnitude. Movements of this character would, like Nasmyth’s hammer, be capable at times, when the uplift was rapid, of exerting enormous force; while at other times, when the

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\* *Quart. Journ. Geol. Soc.*, vol. iv, p. 90.

uplift was slow, the action might be of the most gentle description. It follows from these premises that the character of the deposits formed under such circumstances will afford an approximately relative measure of the velocity and duration of the currents under which they were accumulated. Where, for example, the sediment is fine, we may conclude that the velocity was slow and the rise which gave origin to it small. Where, on the contrary, the materials are coarse, we may suppose the rise to have been more rapid and the velocity of the current greater, though they might have been continuous.

These considerations, added to the circumstance that this rubble contains the remains of a *land fauna only*, led me to conclude that the South of England had been submerged at the close of the Post-glacial period to the depth of not less than about 1,000 feet, for to that height there are traces of this Rubble-drift. As the surface of the submerged area shows no marine terraces indicating periods of rest, it may be inferred that the submergence was comparatively slow and gradual, the only disturbance being the removal of the finer surface materials with which the waters would become charged. On the other hand, the alternation of fine and coarse materials in the *head* indicates that the upheaval was by movements alternately slow and rapid, during the latter of which the *débris* of the surface so submerged was swept down to lower levels, or lodged in the Hollows and Fissures of that surface, together with the remains of the animals and land shells that had inhabited the submerged land. I conclude further, from the absence of marine sedimentation and of marine shells on the area that had been submerged, that the submergence was of too short duration to admit of such sedimentation or to afford time for the immigration of a marine fauna from adjacent unsubmerged submarine areas.

*The Phases of the Rubble-drift on the Continent and Mediterranean Coasts.*—The Rubble-drift of the Continent, which is met with at various places over Western Europe and along the coasts of the Mediterranean, accords perfectly with that of the South of England. But it presents in addition other phenomena, which, although differing in detail, bear the same interpretation, and point to the same common origin, and are all explicable on the hypothesis of a comparatively recent, geologically speaking, submergence of the land. We may mention a few of these phases and places.

Passing by the fine specimen of Raised Beach and "*Head*"

at Sangatte, near Calais, which is identical with the section at Brighton, the old Beach in the estuary of the Somme, and the traces of "Head" on the coasts of Normandy, we come to the novel and very illustrative case furnished by the Channel Islands. Both Guernsey and Jersey consist in greater part of a table-land of granitic and metamorphic rocks 300 to 400 feet high, more or less covered by a deposit, 5 to 20 feet thick, of loam or Loess, and terminating in high cliffs. At the foot of these are occasional remnants of an old Raised Beach, 6 to 20 feet above the present beach, surmounted by a sloping "Head" composed of rock fragments and loam carried down from the hills inland. It is certain that it is not a mere talus, for the rubble has a base of loam identical with that on the central plateau, and the *débris* has often been propelled to considerable distance outwards from the foot of the cliffs.

The plateau loam or Loess deserves special attention, for, as there are no rivers to have originated flood waters, this Loess cannot have had a fluvial origin; nor, as there is no higher ground, could it be the result of rain-wash; neither can it be the result of the disintegration of the surface rocks.\* It must therefore have had an origin different from that usually ascribed to the *Loess*, and this I would attribute to the deposition of sediment from the turbid sea-waters during submergence, whilst the "head" results from the surface *débris*, together with portions of this loamy sediment, swept off by divergent currents in quaquaversal directions during upheaval. Considering the then isolation of these islands, no other explanation seems to me possible to account for the presence of Loess in such a position. The cause must have been continental, not insular.

*The High-level Loess of France and Central Europe.*—A great portion of the Loess of Europe is no doubt of fluvial origin, and is confined to river valleys. But there is a still larger portion, to which such an origin cannot be ascribed, for this latter is not confined to the river valleys, but is found on the dividing watersheds and on the high plains separating the river basins. In the North of France it attains a height of 400 to 600 feet, and in the neighbourhood

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\* No land shells have been found in this loam in either Jersey or Guernsey, but they have been found in a similar deposit in the island of Bréhat on the coast of Brittany.

of Lyons of 1,300 feet, whilst in the great upper valleys of the Rhine and Danube it reaches an altitude of 1,500 feet, which is even exceeded further to the east. It likewise covers the high plains of Hungary and Southern Russia. Various theories have been proposed to account for this wide dispersion of the Loess, the principal of which attribute its formation:—1. To a depression of Central Europe whereby the gradient of the upper valleys was greatly reduced, while no change of level occurred nearer the sea.\* 2. To the advance of the great northern ice sheet, blocking the large rivers of Central Europe, and damming back their waters, and so flooding the land.† 3. To high winds acting upon disintegrated rock surfaces.‡ There are grave objections, which I have specified in the papers before referred to, to all these views. Such an accumulation of silt would, however, necessarily be one of the consequences of the submergence suggested. It is such a sedimentation as would fall from the turbid waters as they slowly advanced or rested, whilst as they retreated those portions of the sediment most exposed to the effluent currents would again be swept away, and spread over lower levels. And in this case, as in those of the other phases of the Rubble-drift, the organic remains of this Loess are those of the Quaternary *land fauna* living in the respective districts at the time of the inundation, and include in several instances the remains of Man. It tells therefore the same tale as the Angular Rubble and “*Head*.”

*The Ossiferous Breccias of the Continent.*—FRANCE. On some of the hill slopes in inland parts of France and again on the face of the precipitous hills on the coast near Mentone, there are masses of angular *débris* of local origin containing the remains of extinct Quaternary Mammalia with occasional traces of the works of Man. The same rubble masks some of the celebrated bone-caves of Belgium, and forms slopes covering the cave-beds at their entrance.

It is, however, where this rubble has been swept into Fissures and Cavities that it is best preserved and presents the most interesting features. As before mentioned, a few such fissures, occasionally ossiferous, occur in the limestone rocks around Plymouth, but they are more common on the Mediterranean

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\* Lyell, *Antiquity of Man*, p. 383.

† Belt, *Quart. Journ. Geol. Soc.*, vol. xxx, p. 490.

‡ Richthofen, *Geol. Mag.* for 1882.

coast of France. Nor are they wanting inland. To take a few of the more illustrative cases, such for example as those of Nice, Pédémar, Santenay, &c. At all these places the breccia contains the remains of the *Mammoth*, the *Woolly Rhinoceros*, and other Quaternary animals. It is a remarkable fact that these fissures are generally situated on *isolated hills* often of considerable height. In explanation of the presence of the animal remains, it has been suggested that the bones are those of animals which fell into the fissures while still open, or else that they were remains brought together by predaceous animals. But neither of these opinions can be correct, for *no skeleton is found entire*, very few of the bones are in their relative position, and none of the bones have been gnawed by carnivora. As M. Gaudry asks in discussing the facts presented by the fissure on the "Montagne de Santenay"—a flat-topped hill near Chalons-sur-Saône—"Why should so many Wolves, Bears, Horses, and Oxen have ascended a hill isolated on all sides?" The members of the Geological Society of France present at the *réunion* at which this remark was made, seemed to agree that the animals had met their death by drowning, but in what way was left indeterminate.\*

In most of these cases, those hills rise *in the midst of plains or low grounds*. At Nice the hills are 132 and 436 feet high, at Antibes, 250 feet, and at Cette, which resembles on a small scale the Rock of Gibraltar, the hill rises 355 feet above the sea level. Still more formidable are the hills inland. Mont Pédémar (Gard) rises to a height of 1,128 feet, whilst Santenay is not less than 1,640 feet high. Among the animal remains found in the Ossiferous Fissures are those of—

5 Carnivores	{	Felis. Lynx. Wolf. Hyæna. Bear.	4 Ungulates	{	Mammoth. Rhinoceros. Wild Boar. Horse.
2 Rodents	{	Lagomys. Hare.	3 Ruminants	{	Ox. Deer. Antelope.

Together with *land shells* of various living species. The breccia, which is composed of *sharp angular* fragments of the *local rocks* usually imbedded in a matrix of red clay or loam, is

\* *Bull. Soc. Géol. de France*, 3rd series, vol. v, p. 681.

generally cemented by calcite. The bones are mostly broken and splintered into innumerable sharp fragments, and evidently *are not those of animals devoured by beasts of prey; nor have they been broken by man.* It is not possible to suppose that animals of such different natures, and of such different habitats, could in life ever have herded together. Difficult as the alternative is, I see no other explanation of the phenomena than that of a wide-spread temporary submergence, accompanied by strong earth tremors. In such a case it is easy to conceive that as the waters gradually advanced over the low lands, the animals of the plains would naturally seek safety on the higher grounds and hills. Flying in terror, and cowed by the common danger, the Ruminants and other Herbivores, together with the Carnivores, would, as in the case of the flooding of large deltas in our days, alike seek refuge on the same safety spot. Where that spot was an isolated hill, they would, if it were not out of reach of the flood waters, eventually suffer the same fate. Subsequently the detached limbs and bones, carried, as the land rose again, together with the surface *débris*, by the effluent currents into the open fissures, were subjected to the clashing of the rubble and the fall of large fragments of rock from the sides of the fissures—whence the reason of their having been so generally crushed and broken.

An early French geologist—an able and acute observer—after noting the presence of land shells and bones in a state of disorder in the Ossiferous Fissures of Nice was led incidentally to remark that they seemed as if thrown in by an angry sea invading the land.

**GIBRALTAR.\*** The Atlantic waves have left few traces of Raised Beaches and “head” on the Western Coasts of Spain and Portugal, but on the Rock of Gibraltar there are traces of several such beaches, covered in places by local angular rubble (or *head*). This rubble extends over the lower slopes of the Rock on both sides. On the Western side it is projected 550 yards seaward at an angle of 8° to 9° (sometimes even less) and attains a thickness of 100 feet. It is clearly not a talus, nor is it a cone of dejection. Its origin has been referred to two periods of severe cold and snow slides. The

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\* Sir A. Ramsay and Prof. Jas. Geikie, *Quart. Journ. Geol. Soc.*, vol. xxxiv, p. 505. G. Busk, *Trans. Zool. Soc.* vol. x, pt. 2.

objections to this are the great volume of the detritus, the size of the blocks (some being 12 feet in diameter), and the distance to which it is projected compared to the very limited snow-collecting surface, and the *small angle of slope*. The Ossiferous Fissures of Gibraltar are on a very large scale, and contain remains of *Felis*, *Hyæna*, *Bear*, *Rhinoceros*, *Wild Boar*, *Ibex*, *Ox*, *Horse*, *Deer*, *Hare*. The bones are, as usual, much broken and splintered, and Dr. Falconer tells us that *none belonged to an entire skeleton*. A human molar tooth and some worked flint flakes were also found in this breccia.

It has been suggested that these remains are those of animals that had lived and died on the Rock, and were afterwards washed into the fissures by heavy rains. But this is difficult to conceive, and besides, there is the same incompatibility in the habits and resorts of the animals thus associated as in the other fissures before mentioned. The *Hyæna*, *Felidæ*, and *Bears* might have frequented the dens and crags of the Rock, but the *Deer*, *Bovidæ*, *Horse*, and others must have lived in the surrounding plains, and it has not been suggested that they were carried to the Rock by carnivora. A great and common danger alone could have driven together the animals of the plains and of the crags and caves. As the Rock after its submergence was again upheaved, the currents swept down on both sides of it the *débris* of the limestone disintegrated by the previous long glacial cold, together with the scattered remains of the animals and men drowned by the inundating waters. That the propelling force of the effluent waters was great, is shown by the distance to which the breccia extends from the base of the Rock. The scale is different, and the materials are different, but in all essential respects the phenomena are analogous to those presented by the "head" at Brighton and Sangatte. There is the same restriction to local *débris* with large blocks, the same absence of wear, the same traces of rude bedding, and the same occasional presence of mammalian remains.

SICILY.\* Traces of similar phenomena exist in Sardinia, Corsica, Italy, and on the coast of Dalmatia. The remarkable

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\* Dr. Christie, *Phil. Mag.* for Oct. 1831, p. 1. Dr. Falconer, *Quart. Journ. Geol. Soc.*, vol. xvi, p. 99.

caves of Sicily arrest attention from the extraordinary quantity of bones of *Hippopotami* (most of them broken, and belonging to hundreds of individuals) which were found in connexion with them. Twenty tons of these bones were shipped from the one cave of San Ciro, near Palermo, within the first six months of working, and they were so fresh that they were sent to Marseilles to furnish animal charcoal for use in the sugar factories. How could this bone breccia have been accumulated? No predaceous animals could have brought together or left such a collection, and though Hyænæ lived on the island, they have left no traces of their presence, nor marks of their teeth, in this wonderful mass of bones. This breccia has been classed with the breccia of bone-caves, but the bones are *not gnawed* as is the case with the bones of the caves, and, besides, they are the bones almost exclusively of *Hippopotami*, of which the remains are very rare in caves. The only other suggestion that has been made is that the bones are those of successive generations of *Hippopotami* which went there to die. But this is not the habit of the animal, and besides the bones are those of animals of *all ages down to the fetus*, nor do the bones show traces of weathering or exposure.

The explanation which suggests itself to me is founded on the local topographical features of the island. The plain of Palermo is encircled by an amphitheatre of hills, rising to the height of 2,000 to 3,000 feet, and presenting mural precipices towards the plain. The Caves are situated near the base of this escarpment, and at San Ciro the breccia extends to some distance *in front* and *on either side* of the cave. When, therefore, the island was submerged, the animals in the plain of Palermo would naturally retreat, as the waters advanced, deeper into the amphitheatre of hills until they found themselves embayed, as in a seine, with promontories running out to sea on either side, and a mural precipice in front. As the area became more and more circumscribed the animals must have thronged together in vast multitudes, crushing into the more accessible caves, and swarming over the ground at their entrance, until overtaken by the waters and destroyed. A few of the more agile animals may have escaped to higher unsubmerged ground inland, for, though the remains of *Deer*, *Ox*, *Bear*, and *Felidæ* occur, they are exceedingly scarce; but the unwieldy *Hippopotami* perished in hundreds. As the land afterwards emerged by intermittent

stages, the rocky *débris*, followed by large blocks from the sides of the hills, were hurled down, crushing and smashing the bones, which are, with few exceptions, broken into thousands of fragments. I would account for the enormous numbers of *Hippopotami* by the fact that, after the formation of the Raised Beaches, there was a considerable elevation of the coast, which led, as in more North-western Europe, to a large increase of the land area: so that the plain of Palermo may then have been of greater extent, and the rivers much larger.

MALTA.\* The drift deposits of Malta present on the whole the same general features as those of Sicily, but owing to its peculiar population of *dwarf Elephants* with the *small Hippopotamus*, and the absence of other usual Quaternary Mammalia, the faunal remains have a distinct local colouring. They indicate that Malta had been long isolated before the spread of the Rubble-drift; but, nevertheless, it is evident that it did not escape the catastrophe which affected the adjacent lands. On the south side of the island escarped rocks rise abruptly to the height of 200 to 300 feet. The lower part of these slopes is covered by a consolidated red breccia consisting of angular fragments of the adjacent rocks, mixed with the red earth which covers the hill tops. This breccia, which contains in places remains of the *pigmy Elephant*, I take to be the representative of the "head" at Brighton and Sangatte, only in this instance the height of the escarpment has prevented its being entirely masked as were the old cliffs at those places. It resembles closely the breccia on the Mentone slopes. It is probable that this island, no part of which exceeds a height of 800 feet, was entirely submerged, for not a single species nor even one genus of its Quaternary Mammalia are now living on the island, nor did any of its peculiar forms pass to the adjacent lands.

GREECE. The surface deposits of Turkey and Southern Russia are seemingly in general accordance with those I have just described. The rubble beds are, however, better developed in Greece, and are there occasionally ossiferous. An angular rubble forms great sheets extending to the shore,

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\* Admiral Spratt, *Quart. Journ. Geol. Soc.*, vol. xxiii. Dr. Leith Adams, *The Nile Valley and Malta*, p. 161.

where it is worn back, and forms cliffs 30 to 40 feet high. The present torrents cut through this drift and carry down its *débris*, spreading it out on the coast in the form of cones of dejection, in which it has often become re-cemented like the older breccia from which it is derived. On the adjacent island of Cerigo, Ossiferous Fissures, said to contain *human* remains, occur on the summit of an isolated flat-topped hill. This discovery has never been followed up.

ASIA MINOR. A Raised Beach, 5 to 30 feet above the present sea level, surrounds Cyprus, but it does not appear to be accompanied by a *head*, though a sandy bed, "like Loess," overlies it in places. Nor is there any record of Ossiferous breccia or fissures. This may be owing to the submergence here having been small.

On the coast of PALESTINE\* Raised Beaches range up to the height of 220 feet or more, but I cannot find any record of an overlying rubble or *head*, unless it be represented in part by a bed of red sand near Beyrout, described by Sir William Dawson. Traces of a bone-breccia, of uncertain relations, have also been found near Beyrout, and detrital deposits are alluded to. The best preserved bone-cave there appears to be of Neolithic age. No distinct Ossiferous Fissures have been noticed. I conclude that the submergence, if any, of this district must have been small, whilst of its extension eastward or northward we want further evidence. Monsieur L. Lartet states that stone implements of the Palæolithic type have been found near Bethlehem, and in some other places; but they were on the surface, and give us no clue to the circumstances which led to their being in their present position.

NORTH AFRICA. The coast of North Africa presents confirmatory evidence. It is fringed by Raised Beaches—one in particular, 10 to 40 feet above the sea-level, is very constant. Ossiferous Fissures are met with on the coast of Tetuan, Oran and other places in Algeria. They present the same characters and contain the remains of similar animals as those found at Nice and Gibraltar. The fissures do not, however, seem to extend to the eastward of Algeria, for none have been recorded in the province of Constantine, though there is

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\* Louis Lartet, *Géologie de la Palestine*. Prof. E. Hull's *Western Palestine*.

a breccia which is suggestive of a Rubble-drift. In Algeria\* Palæolithic flint implements have also been found in a few places on the surface.

Eastward of Tunis, the country has been described as consisting of rolling hills of Cretaceous rocks in a sea of Quaternary drift, which, from the account given of it, resembles a Rubble-drift; but Osseous Breccias and Fissures seem absent. It would appear, therefore, that, just as on the north shores of the Mediterranean, the evidence of submergence becomes less as we proceed from west to east along the African coast.

EGYPT.† It may in fact be a question whether the submergence extended in this direction beyond the Lybian Desert. The escarped limestone hills and long lines of quarries in Egypt show no Ossiferous Fissures, nor does there seem to be any Rubble-drift overlying the fluviatile terraces of the Nile, or underlying the river Alluvium. Nevertheless there is reason to believe that Palæolithic Man did exist there, for ordinary Flint Implements of the same type as those of the Thames and Somme Valleys have been found; but they were all on the surface, and none are from any deposit of well-ascertained Quaternary age. It is possible that they may have remained there, or in some fluviatile deposits since Palæolithic Man inhabited the land. It may further be noticed that several of the animals which disappeared with the Rubble-drift in the more western districts, such as *Lion*, *Panther*, *Spotted Hyæna*, *Hippopotamus*, *African Elephant*, *Caffir Cat*, survived in the Nile Valley to historic times.

#### CONCLUSION.

In concluding I would observe that all the phases of the Rubble-drift have certain characters such as show a common origin. Briefly, whether it be the Rubble or *Head* over the Raised Beaches, the *Osseous breccia* on slopes, or the *Ossiferous fissures*, the materials of all of them present a complete absence of that wear which must result from river, sea, or ice action; in all cases they are of *local* origin, while all the faunal remains in these, and in one division of the *Loess*, are such as might have come from the wreck of a *land*

\* Sir John Lubbock, *Jour. Anthropol. Inst.*, vol. x, p. 316.

† Sir W. Dawson, *Egypt and Syria*; L. Adams, *op. cit.*

surface, and a land surface only. The bones of the animals have evidently been subjected to considerable but not lasting violence, for they are *broken and splintered, yet not worn*; and though these remains are associated together in as it were a common grave, it is impossible to suppose that, under the ordinary conditions of animal existence, such dissimilar orders could have been associated in life; nor, as the bones are *free from all traces of gnawing*, could those remains have been collected and left by beasts of prey. These concurrent conditions, together with the mode of dispersion of the Rubble-drift from many *independent centres*, seem to me, howsoever startling may be the conclusion, to be only explicable upon the hypothesis of a wide-spread, though local, and short submergence followed by early re-elevation, and this hypothesis will, I think, be found to satisfy all the important conditions of the problem.

In the first place the Rubble-drift overlies all the other superficial deposits, and is therefore clearly the result of the last geological event that preceded the recent Alluvial beds and Neolithic man. Nowhere between the Rubble-drift and the Alluvial beds have there been found any deposits of Quaternary age. Nor has there been any land-erosion indicating a long lapse of time, though we have a fairly definite measure of marine denudation in the wear of the Rubble-drift where it has been exposed to the action of the sea, as on the coasts of Cornwall, at Brighton, Barnstaple, Sangatte, and around the islands of Jersey and Guernsey, and on the shores of the Mediterranean. But the cliffs so formed would certainly require no very great length of time for their formation, as in no case do they seem to be worn back more than half-a-mile, whilst in many cases it is not more than 100 to 200 feet. Reckoning therefore a mean rate of wear on the coasts of the Channel say at one foot annually, this comes well within the limits of date I have assigned to the Rubble-drift.

On Croll's estimate, however, for which Geologists mostly have contended, a period of some 80,000 years intervened between the disappearance of Palæolithic Man, with the cotemporary extinct Mammalia of the Post-glacial period, and the advent of Neolithic Man. Many years ago I expressed an opinion, in which I am confirmed by the recent observations of American geologists, that the close of the Glacial period comes down to within about 10,000 to 12,000 years of our own times. Not only is there nothing on geological grounds

to sustain the opinion that a period of 70,000 to 80,000 years intervened between the close of the Glacial period and the appearance of Neolithic Man, but the same conclusion is forced on us on archæological grounds alone; for it is difficult to suppose that Palæolithic Man with his stone weapons and tools, his sculptured bones and rude but not inartistic sketches of the cotemporary animals, could in that long interval of time have made so little progress as that exhibited by the similar surroundings of Neolithic Man.

To those who have followed me in this enquiry it cannot have escaped notice that we have possibly in the wide-spread catastrophe involved in the foregoing hypothesis, a more adequate cause for the Tradition of the Flood than any local river or land flood, however great it may have been. Such floods, whether of the Euphrates, the Tigris, or any other large river, have been recurrent at comparatively short intervals, and have attracted but little more than temporary attention. Their limits also are restricted to the valleys, broad though they may be, and consequently would seem to involve no such wide-spread catastrophe as that indicated by the Tradition of the Flood. Even those of the Yellow River, extensive as its inundations are, make but little impression on a busy people, and are generally soon forgotten.

On the other hand we have in this submergence an inundation of continental dimensions, and destructive to large populations of men and animals. The few who resorted to heights and mountain summits, could alone have escaped, and, from those centres, peopled afresh the surrounding areas.

Although our knowledge of all the phenomena is still very imperfect, it is remarkable how in all the leading points the facts agree with the Tradition. In each area the few survivors may well, in their limited world, have looked upon the Flood as universal. To them, as the subsidence was slow, for the land movement would not have been apparent, and the only visible sign must have been the slow encroachment of the waters over their visible land. The geological phenomena have also led me to suppose that the submergence was, as in the Tradition, of short duration, and the retreat of the waters comparatively gradual, while the great destruction of animal life is sufficiently shown in the numerous remains preserved in the different forms of the Rubble-drift, wherever the conditions were favourable.

That Man lived at the time we are speaking of is now a question not necessary to argue, since the fact of the existence of Palæolithic or Quaternary Man over the whole of the area we have described, is, at the present day, a well-established fact. Therefore that Early Man must have suffered in this great catastrophe may be taken for granted, as the dispersion of the Rubble-drift took place at the close of the Quaternary period. At the same time, although portions of the *human* skeleton have been found in Quaternary bone-caves and in the high-level Loess, it is chiefly by his stone tools and weapons that the presence of Man in the Quaternary period has been proved. In the Rubble-drift there are very scarce records of human remains, but flint implements fashioned by the hand of Man have been discovered in it at Portslade near Brighton, at Sangatte, Mentone, Algeria, and other places. Little systematic search has, however, yet been made, and the field is a new one. Besides the older settled countries of Central Asia in which the tradition was preserved, that a not inconsiderable population was spread over Western Europe and the shores of the Mediterranean, at a time anterior to the Rubble-drift, is certain. Still further proofs of Man having been involved in this wide-spread catastrophe should be forthcoming, although, owing no doubt partly to his having known better how to avoid the threatened danger, his remains are rare in comparison with those of the cotemporary animals. It must also be remembered that at that time there were but few men compared with the vast number of animals to be affected by the event.

It is not easy to believe that any local river- or other land-flood could have given rise to so sustained a Tradition as that of the Flood, whereas a Submergence of this vast extent, and of so exceptional a character, would be in accordance with the magnitude of the recorded catastrophe, and of the deep and lasting impression produced on those cotemporary peoples who were sufficiently near to be cognisant of its results. Nor would it accord less well with the remoteness of the event, and the dimness of the Tradition.\*

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\* It is many years since first I had occasion to notice the exceptional nature of the "*Head*" at Sangatte, but I did not then go beyond attributing its formation to some temporary but unknown *debâcle*; and it was on geological considerations alone I was led to conclude that the South of

The annexed short table will serve to show the chronological relation of the Rubble-drift to the other Drift and Alluvial beds:—

ALLUVIAL BEDS	{	Containing the remains of the <i>existing Fauna</i> and of <i>Neolithic Man</i> .
RUBBLE-DRIFT ..	{	Containing the scattered remains of a Post-glacial Land surface and Fauna with scarce traces of <i>Palæolithic Man</i> .
VALLEY - GRAVELS and CAVES of Post - glacial Age.	{	With abundant remains of the late <i>Quaternary Fauna</i> , including the great extinct Mammalia (Mammoth, Woolly Rhinoceros, various Deer, Horse, Bovidæ, &c.), together with a large number of rude Stone Implements of <i>Palæolithic Man</i> . This Fauna marks the close of the Glacial Period (taking its divisions to be Pre-glacial, Mid-glacial, and Post-glacial).

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England and North of France had undergone submergence and re-elevation at a comparatively recent period. Later on, it was the recognition of similar phenomena elsewhere on the Continent which led me to extend this conclusion.

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The PRESIDENT (Sir G. G. STOKES, Bart.).—I am sure all present will join in according best thanks to Professor Prestwich for this very elaborate communication (cheers), and only regret that he is not able to be here himself to join in the discussion which I hope will now take place. (Cheers.) We must, however, not forget to thank Professor Rupert Jones for the part he has so kindly taken as reader. As a number of distinguished geologists are present, I hope we shall hear some of their opinions, after a communication has been read.

The HON. SECRETARY.—Several letters of regret have been received from those unable to be present, including one from the Duke of Argyll.

The communication which has been referred to is from Sir J. William Dawson, C.M.G., F.R.S.

MONTREAL,

*February 9th, 1894.*

To the Victoria Institute.

“I beg to thank you for your kindness in sending me an early proof of the interesting paper of my friend Dr. Prestwich. As you are aware, I have for years, on geological and palæontological grounds, maintained the existence of a physical break between the earlier and later portions of the Anthropogenic Age, and that this was of the nature of a temporary submergence which would probably prove to be identical with the historical deluge. The conviction of the truth of this theory has been growing upon me in recent years, owing to the accumulation of new facts. You may remember that I stated it distinctly in my paper of 1884 (vol. xviii), on the Lebanon caves, published in the Transactions of the Institute, and more recently in a note on another occasion. I have referred to the subject in my Address as President of the Geological Society of America, delivered in Boston in December last, and of which I hope soon to send copies to the Institute. In this Address I have noticed Dr. Prestwich’s recent memoir in the Transactions of the Royal Society of London, and have directed the attention of the members of the Geological Society to the importance of similar observations in America, in relation to deposits resembling the Rubble-drift, but not yet satisfactorily separated from the Glacial beds.

“It is a source of much gratification to me that Dr. Prestwich has accumulated so great a mass of facts as to the results of this comparatively recent catastrophe, and I hope the subject will now

be followed up on both sides of the Atlantic, and will ultimately afford a sure link of connection between the geological record and the oldest historical documents of our species."

Dr. H. WOODWARD, F.R.S., a visitor, President of the Geological Society.—I have been asked to move a vote of thanks to Dr. Prestwich. I am quite sure, sir, that no words of mine are needed to express the feeling which the name of Professor Prestwich must awaken in the minds of all those present. As a geologist he occupies a unique position as the father of our science at the present time. I have, when quite a boy, listened to him at the Geological Society, and ever since I have been in London I have had the advantage of his friendship and constant kindness. I cannot well find words to express the warm feeling of regard that I have for Professor Prestwich. As a worker he has, perhaps, done more than any other man to bring our science into the first position as an applied science. In his researches he has devoted himself especially to two subjects. His earliest investigation was on the geology of Coalbrook-Dale, and that, I presume, led to his taking a deep interest in all pre-existing land surfaces. The old land surface of the Coal Period first suggested to his mind the idea of working out a later exploration of the Tertiary Period, and he has, in these later researches, formulated an entirely new period of Geological History, viz., that of the Quaternary Period. It is remarkable that through Professor Prestwich's researches we have become, as it were, acquainted with a new chapter in the geological record, a chapter which had entirely escaped the attention of all the earlier geologists. He has spent very many years in the investigation not only of the Ossiferous caves and superficial deposits, the valley gravels and alluviums in this country, but also in France and Belgium, and his papers in the *Philosophical Transactions* and geological journals teem with matters of great importance on Quaternary Geology. His work with regard to the erosion of river valleys is, perhaps, one of the most important of his later investigations. He has shown that in our valleys we have a series of terraces, one above the other, and that, contrary to the ordinary way in which we reckon formations (that the lowest is the oldest and the highest the newest), the oldest terraces are the highest, and represent the earliest conditions of the land before the rivers had cut their valleys down to their present depth, so that we find the record of palæolithic man high

above the level of the present river on the old alluvial plain through which the river flowed before it reached the present excavation of the valley. This is another subject with which Professor Prestwich will be long associated in the history of geological science, namely, in connection with river terraces.

From the writings of Moses and from the Assyrian tablets, we know of the Deluge. We know too, that such records of floods have been common in the history of all nations. I do not suppose any occurrence has impressed our feelings so strongly as that of the risk of being drowned. I have, on two occasions, known those feelings, and I can imagine that anyone who went through the experience, in prehistoric times, would have retained a vivid recollection of such peril. That any flood was ever universal is, of course, a thing that must at once be dismissed from the mind of any philosophically disposed person, and the author, you observe, specially mentions that he does not for a moment assume any such condition, for it would be subversive of all possibilities of the conservation of the fauna and flora of the various countries as we know them to exist at present. It would be impossible that the fauna and flora of the tropics could have been preserved, or the fauna and flora of the temperate zone, if the whole of the terrestrial surfaces had ever been submerged at the same time. We must bear in mind that Dr. Prestwich has spent many years on these investigations, and in endeavouring to show that these deposits, which he classifies under the name of "Rubble-Drift," are one and the same deposit, and it would not be possible to discuss here all the circumstances which may induce other geologists to arrive at somewhat divergent views. These various deposits extend through France, along the shores of the Mediterranean, around our own island, and the Channel Islands, all of which the author has referred to as being contemporaneous. With regard to organic remains and the destruction of large numbers of terrestrial animals at one time, we are all perfectly aware that a number of circumstances may converge to the accomplishment of such events. For instance, my friend Dr. Forsyth Major has discovered, in the Island of Samos, the remains of hundreds of antelopes, giraffes, proboscidea, edentata, and carnivora, all herded together and destroyed in a common flood, probably due to the eruption of a neighbouring volcano, the ashes from which, and the water, forming a mud-débâcle, pouring into the valley, destroyed

those animals in the night. It is always in the night that the herbivora are overtaken, for at night they rest on the ground and sleep, and the floods catch them; whereas the carnivora, being astir at night, more often escape. So that when you find the remains of animals intermixed, the carnivora with the herbivora, it has doubtless been due to a very sudden local flood, as under such circumstances they would not have had time to escape. Then, of course, periods of drought drive animals long distances and cause them to make stampedes when they rush to the water, and thousands of them perish. So also in times of flood and prairie fires. All these events are clearly marked on the American Continent, as for instance at "Big-Bone-Lick," Kentucky, and many other well known deposits. No doubt a large number of animals went down to drink, or to lick the salt, and there perished. I will not occupy your time any longer as there are many present who are much more able than myself to address you. I will only beg leave to move that the best thanks of this Meeting be accorded to Professor Prestwich for his very valuable and interesting Paper (applause).

Sir HENRY HOWORTH, K.C.I.E., M.P., F.R.S., &c.—I beg to second the vote of thanks to Professor Prestwich, for this Paper. I am quite sure with regard to that part of my duty, it is an extremely light one. We should all have liked to have welcomed here the Nestor of geology, and we know that he would have much liked to have been present. To myself it is naturally a very pleasant occasion indeed, because, heretic as I am, and having written two or three rather large and heavy books on this subject, I am pleased to find myself so much at one with my friend. In other words, it is very gratifying to find a veteran geologist coming so closely to the conclusions that I have put forward for so many years. In fact, were it not for one postulate, which I cannot quite accept, we should be very nearly in absolute agreement. I do not quite accord with my friend that it is necessary to postulate a great and lasting upheaval and a great submergence of the land in order to produce the events he postulates himself. If a local submergence of the land took place over a considerable area, that is quite sufficient, according to the mathematical investigations of several competent writers, to produce the motive force to which some of us appeal.

Now the whole subject is one of enormous intricacy and

difficulty. It is extremely difficult to discuss it amongst a mixed audience, and still more so when several champions of very different views are prepared with grape shot on one's flank every moment. I hope you will pardon the simile, because I hold this, and I am sure you will hold it, every one of you, that no opinion deserves to live unless it can survive a very hard struggle indeed, and no scientific heretic has a right to expect quarter until he establishes his claim by testing every objection. That I hold strongly. I am not going to put you to the test to-night, but I will put one or two facts before you to turn over in your mind as you go home.

In the first place, I look upon this rubble drift of Professor Prestwich's as being only one out of a series of phenomena which all point in one direction. The rubble drift on the coasts of France right away to Normandy, shades off and passes on gradually into what the French call red and grey diluvium. This form of diluvium covers the north of France irrespective of the contour of the country, and lies in great homogeneous beds without stratification, and covers hill and dale irrespective of valley or hill, and this same great deposit of brick clay again passes insensibly into deposits of loess, and passes into the great valley of the Danube, and over two-thirds of Southern Russia, where my own observation stops, but according to Ermann and others, it extends right across Siberia until it reaches China. Beds of loess exist over the Pampas of South America, and Darwin says nothing struck him with such surprise and delight as the exploration of that immense mass of loam many yards thick with no stratification, which covers the whole Pampas district of South America.

I have always held, since I was a small boy, that no possible river action or any mere local force can explain this enormous spread of continuous loam and other associated deposits, without those signs of stratification which would be there if it had been deposited by rivers by annual layers of warp or silt—this formation which exists perfectly without any break whatever. This always seems to me to involve an appeal to some great continuous cause. Again, as to the remains that have been found in it. It is a most extraordinary thing that skeletons have been found, from the east part of Siberia right away to Mecklenburg, of the mammoth and great rhinoceros, without the disturbance of a single bone. In Siberia they have found carcasses with the flesh intact. In the north of Russia I have seen a skeleton, found *in situ* without

the disturbance of a bone. Is it possible to suppose that by any means these animals could have died by any ordinary current process, and that they should have been ultimately deposited under fourteen or fifteen feet of gravel, gravel which does not lie along the river bed, but which extends for hundreds of miles, apparently without a break? I hold that the wild animals would have torn them asunder if exposed, and if their bones had been exposed to the air they would be weathered, whereas it is not so.

Now it seems to me that this continuity of conditions is consistent only with one continuous cause, whatever it may be, and establishes the conclusion that the animals were drowned by a great diluvian catastrophe which also spread out the beds of gravel and loam for hundreds of miles as we find them.

Then take another side of the issue, take this question you have heard so much about, of Palæolithic and Neolithic man. It is very true that early man, who did not polish the weapons he made, but chipped them out with a rude stone, made it difficult in many cases to distinguish as to whether a particular stone weapon was made at one epoch or another, but you have this remarkable and extraordinary fact, that in one case you have the remains of man existing with those of extinct beasts, and in another you find the remains of man with the remains of domesticated beasts, and there is never a case, out of the hundreds of caverns which have been examined, where there is a mixture of these extinct beasts with domestic animals. There cannot be a mistake about that; you may mistake palæolithic and neolithic stone implements, but you cannot mistake the fact that the mammoth and two or three other absolutely extinct beasts, have never been found mixed with or intermingled with the remains of domestic beasts. Hence it comes about that amongst those who have studied these palæolithic remains of man there is an almost absolute opinion, especially amongst French authorities, that there was a great gap, or hiatus, between one set of people and the other, notably in regard to the European area, and I think the only explanation, the only cause which explains the facts is that some great catastrophe, involving the rush of a mass of water, must have occurred, which intervened between one set of men and the other set of men.

I am not going to prosecute this matter further. I have put before you a few salient facts on this very large and interesting subject, and will leave it there (applause).

The Resolution was carried *nem. con.*

Professor T. MCK. HUGHES, M.A., F.R.S.—I must commence with an expression of regret that we have not got Professor Prestwich with us to-day.

The points in this paper lead us over a very wide field of inquiry. Sir Henry Howorth has pointed out that we must not always take the simple explanation which presents itself to us from the examination of one section only, but that we must consider the whole question from a larger point of view, and we must see how the explanation of given cases fits in with the observations of others, made over a wider extent of country. That is perfectly true; but on the other hand, if we can prove a particular negative we overthrow the affirmative. The question is not whether the waters of the ocean ever rolled continuously round the whole earth—an hypothesis not impossible, as it would take about thirty-six times all the land above sea level to fill the ocean bed, but improbable, because inconsistent with what we know of the persistence of life, and for other reasons. We are considering the suggestion that there was in comparatively recent times a submergence of a transient nature, extending over a limited area, and giving rise to floods of a violent character and great transporting power. It has been observed that over the surface, not only of our own country, but in the north of France, and over wide areas in Central Europe and Asia, there is a superficial deposit of loam or gravel or mixed soil. But when in one case we hear of remains of the mammoth being found and in another of nothing but recent animals, we may be sure that the two deposits are not synchronous. There appears to be room to believe that some of the finer deposits are due to dust blown by the wind, as pointed out by Richthoven in China and by Drew in India. We must also bear in mind that there are agents of a very complex kind that move the soil and the rubble at a very low angle over the surface of the ground. It may be observed how changes of temperature and moisture will affect our pavements, pushing the kerbstone out, and how the soil travels down a slope and covers ancient foundations. In what does this differ from the material said to have been moved by a wave of translation? The principal point that is relied upon in proof that it was translated rapidly and is not the result of long continued action, is that both the stones in the rubble and the bones are angular and sharply fractured. But how can the rushing waters

have rolled these things together, without sorting them, or rounding them? We see how the pipes in the chalk are filled in. I have seen a rabbit and a trout caught in the same fissure in the mountain limestone—the most unlikely creatures to have lived together. These creatures were carried down stream and so got into one of the potholes or open caves.

I think we can hardly limit ourselves to the alternative explanations of the "Head" suggested on p. 267, and while recognizing that there is a widespread superficial deposit having many characters in common, cannot admit that "all the phases of the rubble-drift are such as show a common origin," p. 280. If we find in one place, in the rubble-drift of the surface or in the fissures, the older group of mammals, and in another place the newer group, we must refer the two deposits to different ages. If we find the two groups in the same deposit, we must infer that the fossils of the older deposit have been washed out into the newer. It was pointed out that in one particular case all the animals were driven into a *cul de sac* and died, but how was it that those whose remains are the most numerous were the best swimmers—the hippopotami?

While asking for further information on some of the points discussed, I must express my great satisfaction in following Professor Prestwich's advocacy of a great post-glacial submergence, though we may not refer it to exactly the same part of the period, and further, in finding that he contends for earth-movements of considerable magnitude continued down to very recent times.

Professor E. HULL, LL.D., F.R.S.—I join with all here in their great regret that the author of the paper was not able to be present. I cannot, however, expect Professor Rupert Jones to give replies to all the objections that have been made. I entirely concur in the view of Professor Hughes, that there has been a great submergence in very recent geological times. I thought, until I had the gratification of hearing a former colleague of mine express his faith in an interglacial submergence, that I stood alone in that belief. But that interglacial submergence which is shown so well in the soil, and gravel, and rocks of the British Isles, going up to a height of 1200 feet on the flanks of the Welsh and Irish mountains, is not the submergence to which the author of this Paper alludes or refers. It is entirely a more recent submergence, and it is very startling in this year, 1894, to have Dr. Buckland's *Beliquiæ Diluvianæ* unearched from its tomb and brought up again

by so eminent an authority as Professor Prestwich. No doubt there is much to be said, as has been shown, in favour of his views; but a serious objection, and to my mind the greatest objection, is the entire absence of marine shells amongst the remains of these ossiferous fissures.

J. ALLEN BROWN, F.G.S.—Professor Prestwich, as one of our most distinguished geologists, has added so much to our knowledge, that any theory suggested by him must necessarily carry great weight. I have looked up to him as my leader and master in Quaternary Geology, and it is with regret I find myself at variance with his opinion as to the formation of the rubble drift and associated surface alterations and deposits.

Like many other geologists, I can only see in these formations the result, but with considerable modifications arising from different geographical conditions, of that period of great cold, extending over a long period which, with its milder inter-glacial episodes, is generally accepted as the Glacial period. With such a condition of severe climate with intervals of milder temperature, the whole followed by a period of great rainfall or the Pluvial period suggested by Mr. A. Tylor, and accompanied by those changes in the level of the country, which we know have taken place, we have the series of causes which will account for the occurrence of the rubble drifts. Admitting that the evidences of ice action north of the Thames are much more pronounced than in the south, we may yet find, in the changes I have alluded to, sufficient for their formation and for the alterations in the sculpture of the land. In my opinion it is unnecessary to suggest a sudden catastrophe caused by rapid upheaval and subsequent as rapid submergence of the land to account for these accumulations and changes as may be seen in action in some parts of the world now, and are still going on, though to a lesser extent at present in the South of England.

Professor T. RUPERT JONES, F.R.S.—I think, sir, this Paper has brought about a deluge! We have had a deluge of information, a great deal of it old, and a great deal that is well worth study. What Sir Henry Howorth said I should have liked to have gone over. I believe him to a great extent, but still fissures, rubble, cracks, and sediments have all to be separately taken at their own value. I am now trenching on Professor Hughes' observation, that we must have "caution"; but I must say that Professor

Prestwich has himself had caution. He has been very cautious in his facts and conclusions, though his conclusions are not all, perhaps, exact, more than other people's conclusions are.

There are one or two things to which I should like to allude—as to the physical impossibility that has been referred to. My notion is that Professor Prestwich has a right to say that. Professor Hughes says he has not. But I will refer to Professor John Phillips. I was under the impression that he measured the land and the sea with all the evaporation and found there was not enough water to cover the whole land to a sufficient depth. If so it was an impossibility.

Then with regard to the æolian method. The author referred to the opinions of others, therefore it did not escape him. I do not think that anything escaped him. A most interesting thing to which Professor Hughes alluded was the instance of the rabbit and the trout being found together. It shows exactly what Professor Prestwich would like to have—that things were thrown pell-mell into the fissures; but, like a wave, it may, in one case, be a small affair; and that reminds me that Professor Hughes did not give him credit for stating that waves of translation, even, might be of a different strength at different times, though comparatively continuous, more particularly with a decrease or increase in earthquakes, making the influx or efflux of water of different powers as they went on. I think if my friend will read the Paper quietly and write and tell Professor Prestwich what he thinks, a reply will come much better from him than from me. Then fissures of various ages are not treated in such a careless manner as our friend on the left says. There was a great deal of care bestowed on pointing out how the materials and fissures were not all exactly alike. They came in under different circumstances, and the conditions, of course, varied.

As to the hippopotami, I am glad that Professor Hughes said what he did, and I am sure we all feel quite a sympathy with these great creatures; but the reason of their crowded death is, I take it, there were so many that one swimming may have prevented the other. They were, probably, huddled up and prevented, before they thought of swimming.

What Professor Hull said was very good. I have a mark or two, in my notes, upon his observations on the deluge, and I should like to have been able to speak for a quarter of an hour on that

subject, but I would say—read Mr. Belt's *Naturalist in Nicaragua*, and there you will find another explanation of what is called the universal deluge, how the water from the ice and snow gradually accumulated over the lands which had become populous and civilized, and then gradually melted away, and only those people and animals that got on the tops of the hills in the consequent deluges were saved. I think Professor Prestwich has pointed out well that some submergence\* had taken place in this part of the world. He does not go further, he does not go beyond that which he knows and what he has seen and learnt; but he does refer to a great many of those points that have been mentioned. He alludes to those other parts in the East, but he says carefully that he does not venture on them because he does not exactly know, and I doubt not he will learn a good deal yet.

The Meeting was then adjourned.

#### REMARKS ON THE FOREGOING PAPER.

The Rev. R. ASHINGTON BULLEN, B.A., F.G.S., writes:—

I visited the fine sections at Portland Bill and at Sangatte, and can corroborate Dr. Prestwich's statements about the angular and subangular character of the flint and Rubble Drift.

The latter section is interesting as it shows that the main features of the land surface were (at the time of the deposition of the Rubble Drift) mainly what they are now. The tertiary strata had been already denuded from the chalk heights. The outlier of tertiary sandstone on Les Noires Mottes rests directly on the chalk.† Among other places mentioned in Dr. Prestwich's paper which I have visited was Broom Ballast Hole in January last. It is situated in the valley of the Axe. Here we have a low hill with higher land in the East and West. The accumulation of which it is composed does not appear to belong to the valley drifts, and standing as it does cannot be caused by rain wash.

It consists of much-rolled pebbles of quartz from older and higher beds, hard, dark grey siliceous rock and chalk flints mingled with chert fragments, which are *angular or subangular*. There are *seams of sand* such as at Sangatte, Brighton, Chichester, &c., occur in the chalk débris. There is also sandy clay mixed with the stones. I found no traces of shells or bones at Broom.

\* *Q.J.G.S.*, vol. xlviii., p. 263.

† The late Professor Challis touched on this question in his paper on "The Deluge and Physical Science" (*Trans. Vict. Inst.*, Vol. x, p. 66).—Ed.

In this pit, moreover, there are flint and chert implements of two or three periods. Few of them are possible valley types. There are (1) the plateau types, showing the usual wear; (2) high-level types, very few of which show any wear, but are sharp and unstained.\* These implements occur, according to the quarrymen, at no particular horizon, and at no particular spot, but at all levels. They are mostly of chert. The depth of the section at its highest point was about 50 feet.

De la Beche described a mass of detritus close to Waddon Barton near Chudleigh, Devon.† He inclined to the opinion that it was suddenly accumulated by a wash of waters over the Haldon Hills. The accumulation occurs on a small limestone hill.

Dr. Prestwich's theory of submergence and sudden elevation in a series of uplifts gives the necessary explanation of the phenomena at Waddon Barton, at Broom Ballast Hole, at two other ballast pits between Broom and Axminster, and at many other places where similar conditions exist. There is evidence in these and similar cases of sudden water transport which carried older and newer gravels down the slopes whereon they reposed, and *angular and subangular débris of the local rocks which is the inland representative of the Head or Rubble Drift overlying the raised beaches*. This angular débris is very important as it is conclusive that we are not dealing with an ordinary river gravel. The rolled pebbles and the stained and worn implements from the highest levels and the uninjured high-level implements mixed with sand and clay and angular and subangular débris, is all evidence that we are not dealing with an ordinary but an extraordinary accumulation of material derived by sudden action from higher ground.

Sliding down an easy slope such as the hills bordering the Axe valley exhibit, borne by strong effluent currents such as Dr. Prestwich posits as the vera causa, the unstained and unrolled high-level implements have reached their present positions intact.

With regard to the Ossiferous Fissures near Plymouth some belong to the period postulated, and some possibly not.‡

There are important fissures at Oreston systematically examined by Whidby, Buckland, and others. I visited the spot last January. The bones of extinct mammalia in this case occurred pellmell, separately and unconnected with each other, amid angular masses of limestone. They were not the bones of com-

\* See also D'Urban on Broom Pit, *Geological Magazine*, 1878, p. 37.

† *Geology of Cornwall and Devon* (1839), p. 410.

‡ The Cattedown fissure in which remains of fifteen human skeletons was found does not rest on sufficiently discriminating evidence. An oyster shell occurred in this fissure and is preserved in the Plymouth Athenæum. But the final catastrophe, judging from the character of the cave and the nearness to sea-level, may have been caused by a tidal wave entering Plymouth Sound. See R. N. Worth, *Transactions Devon Association*, 1878, p. 429.

plete skeletons occurring where the animals died. The bones were ungnawed, their fractures were sharp, and they were not rolled or waterworn. The series is well represented in the Plymouth Athenæum and among the bones, &c., was found a rolled stone.\* The bones are those of *B. Urus*, *E. primigenius*, eq. fossilis, ovis, cervus, *hyæna spelæa*, *R. tichorhinus*, *ursus spelæus*, *canis lupus*, and *cervus elaphus*. The bones were introduced through the top of the fissure.

The summit of the Oreston quarries is now about 80 feet above the mean sea-level.

The theory of submergence and emergence of the land would well account for the introduction of the bones into the fissures.

The animals having crowded for safety to the highest ground in the immediate neighbourhood were drowned, their bones dropped one by one to the then sea floor as the bodies decayed, and when the uplift came the various fissures received whatever bones, limestone débris, and mud passed over them.†

Mr. R. N. Worth (*Transactions Devon Association*, p. 419, 1887) quotes Colonel Hamilton Smith as to the occurrence of a portion of a human humerus. Col. Smith (1848) says "it was immediately thrown away on being pointed out to the possessor. This is not the only instance of the kind. Collectors in the plenitude of their ignorance and prepossession determined that human bones were of no consequence." The bones in this instance as in others evidently drifted no great distance, their unworn condition being well accounted for by the little friction that such water carriage would entail as they fell into the fissure, though the masses of angular limestone‡ falling upon them fractured them.

At Oreston we have in miniature what happened at Santenay, Gibraltar, Mont Pédemar, &c, as our uniformitarian geologists will come to see when they have broken the fetters which at present hamper their judgment.

The suggestion that it is improbable that the hippopotamus, the best swimmer of the Palermo fauna, would remain to be drowned may well be dismissed. *For we have to account for the presence of a large number of bones broken in pieces, whose fractures are sharp and do not exhibit signs of rolling or wear, nor are the bones gnawed by carnivores.* It is contrary to the habit of these animals to die in any one spot. Moreover we find the same phenomena of local angular blocks in the same breccia as the bones as are noticed in so many other bone deposits of cotemporaneous fauna. Other possible explanations such as miring or drowning by volcanic waters are ruled out of court by the conditions of the problem. For in such cases whole skeletons ought to be found, but in the Sicilian and other deposits the conditions are the same, viz.,

\* Labelled "Boulder" in the Plymouth Collection.

† De la Beche, *op. cit.*, p. 413.

‡ Analogous to the Rubble-drift.

single bones and fragments mingled pellmell. The conclusion is that all these various cases are part of one great earth movement downwards and upwards, and that this theory offers the best solution and co-ordinates all the observed facts.

With regard to Mr. Allen Brown's suggestion during the discussion, that the phenomena considered by Professor Prestwich were caused during a "pluvial" period following the Glacial epoch, I would point out that such a period would not account for (1) the phenomena at Chesilton, for instance, where the slope of the nearest height is too abrupt to allow of such an explanation, since the natural drainage would be southward, and not towards Chesilton; (2) such a rainwash, however abundant, would sort the materials, whereas the Rubble-drift is unsorted; (3) a "pluvial" period does not account for the unworn character of the angular *débris*; nor, (4) can we imagine a sufficient mass of water to be dammed up on such ridges as exist at Les Noires Mottes or Portland to develop sufficient kinetic energy to produce such tremendous tumultuary results as the respective Rubble-drifts at Sangatte and Chesilton present.

I cannot conclude without expressing my admiration of the sagacity which marks Dr. Prestwich's papers to the Geological and Royal Societies, and the fairness which has led him scrupulously to reject evidence which to his mind was not absolutely conclusive.

Admiral H. D. GRANT, C.B., R.N., writes :—

It will possibly be interesting to the readers of Dr. Prestwich's very valuable paper if I state the result of some observations I made in the Red Sea twenty-four years ago. I was surveying Ras Gharib, Gulf of Suez, for a lighthouse, and noticed to the north of the point a very remarkable beach of conglomerate composed of numerous small pebbles and stones unlike anything in the vicinity. The adjacent hillocks averaging 50 and 60 feet high were entirely sand, the point itself and hills in the neighbourhood were chiefly sandstone and limestone. The beach, now about 5 or 6 feet above high water mark, extended below the water for some distance.

In referring to this survey I should like to mention an interesting fact. On the island of Shadwan, at the entrance of the Gulf of Suez, are to be seen some extraordinary evidences of both violent upheavals and more gentle action—with very deep water-worn gullies—which caused much astonishment to our party, as the dimensions and formation of the island would not admit of such a storage of water as to form so great torrential streams, which the well-marked water-courses would indicate.

In one part of the island, in the centre of a well-marked crater, is a hillock of an elevation of about 50 feet, which is a mass of fossilised sea shells, embedded in argillaceous soil, and has undergone a process of disintegration. In breaking off a piece of the

rock one obtains not only the fossil shell but the matrix of the shell with, in the case of several varieties of cardium, the exquisite impressions of the shell in clear cut forms. The remarkable feature of this hillock was its intrusion through the volcanic formation, and near to huge masses of granite then in process of disintegration, many granite rocks, exfoliating in layers like slate and becoming fine granite gravel. I found also large beds of gypsum on the top of the mountains.

On other islands in the Red Sea, particularly Jebel Zooghur, the peculiar features of deep well-worn water-courses are observable.

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

Professor Prestwich has pointed out to us that there is at the present time geological evidence tending to show that a very remarkable submergence of a wide area of the earth took place "at a comparatively recent period"; that this was posterior to the glacial period, also to the appearance of Palæolithic man in Western Europe, but anterior to that of his Neolithic successors. This was the last of those great marine submergences, the records of which we read in the earth's crust, and this being the case, and considering that when it took place man was present, may it not be, as Prof. Prestwich suggests, that vast inundation the memory of which has been handed down to us from age to age in the traditions of our race? May it not also explain the existence of that mysterious break which, in spite of its existence having been disputed by a few geologists, does appear to be a fact, the break between the disappearance of Palæolithic man with the Pleistocene fauna, and the advent of Neolithic man and the established conditions which have since then prevailed amongst us? The "Rubble-drift" or "Head" and the Loess are certainly the last traces we have of a marine deposit on a large scale, and that these were, as Prof. Prestwich points out, the result of marine disturbance, although conjoined, it may be, with some glacial and terrestrial currents, seems to be beyond question, and that the phenomena embraced an area of vast extent is also clear, although the originating cause was apparently of short duration.

M. A. de Chambrun de Rosemont in his *Études Géologiques sur le Var et le Rhone, etc.*, has described certain post-pleistocene deposits in the ancient delta of the Var and Rhone and in its neighbourhood, beds which he says "lie in the hollows of erosion and are formed of coarser elements than the pebbles which build up the mass of the delta properly so called." These beds, he remarks, are composed of analogous materials to those of their pleistocene predecessors. Are these in any way similar to those deposits described by Professor Prestwich? M. de Rosemont ascribes their origin to an abnormal rainfall which succeeded the glacial period, a rainfall which he supposes to have been about one hundred times greater than that of to-day, and which would therefore cause floods

utterly unparalleled in their depth and extent, the culminating one of which, he suggests, may have been the flood *par excellence* of which mankind has preserved the memory. This, M. de Roëmont says, was the beginning of the "pluvial period," the flood itself which overwhelmed mankind being the climax. That there may have been during the post-glacial period an exceptionally heavy rainfall is not impossible nor improbable, and it may have left behind it visible traces upon the earth's surface; perhaps Professor Prestwich is acquainted with the deposits in question and can speak as to their origin, but that the scriptural flood should have been caused by rainfall alone, even had that rainfall been not only excessive, but embracing whole continents in its extent, does not appear to me to be an adequate cause for such a flood as that described in the Book of Genesis, where we must also remember it is expressly said "the fountains of the deep were broken up," pointing to marine as well as atmospheric action.

The chief difficulty, however, which now occurs to me in connection with Professor Prestwich's suggestion is the apparent limitation in area of the submergence indicated by the beds which he has described. That the flood was not universal in the geographical sense I cannot doubt, but still should we not expect, supposing that the tradition of it was connected with the submergence now under discussion that traces of that submergence would be found in those regions to which the highest authorities point as being the primitive home of our race, or at any rate the earliest home of some of its most important members. And it is also amongst the races which, at the earliest period to which we can trace their presence, dwelt in Asia especially in the Babylonian area, that we find the clearest and most detailed accounts of the flood and of its accompanying incidents. But Professor Prestwich speaks of the evidence of submergence becoming "less as we proceed from west to east along the African coast," whilst there seems to be little if any evidence of deep submergence on the coasts of Asia Minor or Palestine; here then there seems to be some difficulty, for we can hardly admit that the tradition of the flood originated on the European Continent; this part of the question therefore seems to demand some consideration, and perhaps as a more detailed examination of eastern lands is made, more light than we have at present may be thrown upon the matter, and some of the difficulties, if not all, which now surround it may eventually disappear in the presence of a more extended knowledge.

Mr. WARREN UPHAM, Assist. Geologist of the U.S. Government Survey, writes:—

In attempting to present brief notes of comment on the important paper by Professor Prestwich, I must thank him for such full descriptions of the "head" or "rubble drift" and associated

deposits in the south part of England, France, and the countries bordering the Mediterranean Sea, but feel compelled to differ from him in the view to be taken for their explanation. Although he ascribes the rubble drift in southern England and Wales to rapid emergence of the land from a marine submergence of about 1,000 feet, the only fossils found in the formation are those of land shells and land animals, and no shore line nor terrace of marine erosion or beach deposition has been detected, such as would mark the culminating limits or stages in the oncoming and waning, of the submergence. Professor Prestwich thinks that the effects observed indicate simply currents of the sea flowing down the hillsides while the land was quickly rising, rather than that the rubble transportation was due to waves of earthquake origin. It is very difficult, however, for me at least, to see how such currents could produce the observed results. The total rise being only about 1,000 feet, it would hardly have more effect than the flow of a powerful river current upon its banks during the few minutes in which the flow would advance 1,000 feet. If the emergence were at the rate of the fall of tides, as one or two feet in an hour, 25 or 50 feet in a day, and the whole amount in a month, more or less, requiring a longer time if subdivided by intervals of rest, it would evidently be quite inadequate to form the rubble drift. But so sudden, and not seismic, uplifting of extensive areas, as western and southern Europe, appears, at least in my opinion, to be physically impossible.

It seems to me, on the other hand, far more probable that the true explanation of the origin of the rubble drift is supplied by the second alternative hypothesis that has been held concerning it, which Professor Prestwich states but rejects, namely, "that during the Glacial period, sheets of frozen snow or ice slid down the hill slopes above, and carried with them the *débris* of the surface." The region lies south of the limit of the ice-sheet and the true glacial drift, but I think that during a short time, coincident with the European glaciation, this western side of the land areas in the eastern hemisphere was greatly but slowly uplifted (to the extent of the "2,000 feet or more" which Professor Prestwich mentions when referring to this hypothesis in his paper in the *Quarterly Journal of the Geological Society*, vol. *xlvi*, 1892), causing the southern part of Great Britain and all the countries of southern Europe and northern Africa to experience much more severely frosty and snowy winters than now.

The earliest statement of this view that I have found is by Mr. R. A. C. Godwin-Austen, who, in 1851, treating of the "Superficial Accumulations of the Coasts of the English Channel, and the Changes they indicate," concluded that there was "an elevation of great amount, such as would place the whole of the higher portions of this country in regions of excessive cold," and "that, with respect to movements of the earth's crust in this region,

during a period which geologists have agreed to consider as one and indivisible, the oscillations have been great, both of depression and elevation, and that there has been at several distinct periods a constant return to a level very near the present one." (*Quart. Journ. Geol. Soc.* vol. vii, 1851, pp. 130, 136). Later, Mr. W. A. E. Ussher in the same journal (vol. xxxiv, 1878, pp. 52, 454), and Professor James Geikie (*Prehistoric Europe*, 1881, pp. 224-227), have presented a similar opinion that the "head" or rubble drift was a subaërial deposit, belonging to the time of the Glacial period, and that this area was then uplifted several hundred feet, uniting Great Britain with the continent, though not, as they suppose, to so great altitude as had been suggested by Mr. Godwin-Austen. His early discussion of this question, similar conclusions for North America stated in Prof. James D. Dana's presidential address before the American Association in 1855, and a paper by Mr. T. F. Jamieson in the *Quarterly Journal of the Geological Society* (vol. xxi, 1865), clearly recognised not only great epeirogenic uplifts of drift-bearing areas, which, at their culmination bringing a cool high plateau climate, I think to have caused the Ice-age, but also the ensuing subsidence of the ice-burdened lands, which appears to have induced the rapid final melting of the ice-sheets.

The brevity of this time of uplift in southern England is well shown by the rubble drift, which was preceded and followed by slight submergence, and the formation of beaches that are now raised somewhat above the sea level. We thus have an excellent confirmation of Professor Prestwich's opinion that the Glacial period was geologically short, and not many thousands of years ago. In more northern regions the extensive preglacial erosion of the fjords implies that the gradually increasing uplift there occupied a far longer time, probably having begun during the Tertiary era.

### THE AUTHOR'S REPLY.

*August, 1894.*

Professor Prestwich writes to express his regret at not having been present to reply in person to the criticisms of his friends. They have however made his task an easy one. In answer to Sir Henry Howorth, he would observe that he does not postulate a great Submergence in order to produce the phenomena he has described, but he deduces from the character of the phenomena the conclusion that the whole of the area in question has been affected by a common cause, and exhibits results which indicate that they had a common origin. The *Diluvium gris* of French geologists

represents various *fluvial* deposits all of *older* date than the Rubble-drift. With regard however to the *Diluvium rouge*, some of it probably represents a phase of the Rubble-drift.

In reply to Professor Hughes, it is not intended to mean that the flood was of a very violent character, on the contrary, the Submergence was apparently on the whole so quiet as to have been hardly perceptible. The great transporting power came into operation at intervals during the *re-elevation* of the land, and these have produced effects such as transporting blocks of twelve feet or more in diameter along small inclines, which none of the slight changes he refers to could have effected. Richthofen's views with regard to the origin of the Loess have been noticed in his Royal Society paper. He (Professor Prestwich) considers, however, that the Loess of China has had a different origin from the high-level Loess of Europe. The group of animals found in the surface Rubble-drift and in the Ossiferous fissures are always of the same and not of different ages (except where cavities have been used as newer bone caves), and are never mixed with neolithic remains. It is true that *Hippopotami* are good swimmers in rivers, but overwhelmed as they were in the rising sea waters, and crowded together in a breaking surf, they must have succumbed.

Professor Hull will find in the foregoing pages, but more particularly in the paper read before the Royal Society, reasons, too long to repeat here, to account for the entire absence of marine shells in the Ossiferous fissures or in the other forms of the Rubble-drift (*Phil. Trans.* for 1893, p. 981).

Professor Prestwich assures Mr. Allen Brown that he has not overlooked the causes to which he refers, but these mostly refer to an anterior period, and would be inadequate to explain the special phenomena of the Rubble-drift.

The Rev. J. M. Mello will find in the *Bull. Soc. Géol. de France*, 3-Ser. vol. iv, p. 692, a statement by M. de Rosemont on the agency of rain in connection with the Ossiferous fissure of Santenay, while the objections of the author, who considers the pluvial origin inadmissible, are given in the *Phil. Trans.* for 1893, p. 938. Without more minute description, he could not say whether the deposits of the Var and Rhone referred to belong to the Rubble-drift. It is possible they may. Professor Prestwich would by no means limit the area of Submergence to that embraced by him, but he only at present carries it so far as the geological evidence

allows him. As it is, it extends inland to Asia Minor, and coast-wise to the shores of Syria; but he has little doubt of its extension further inland in the direction of Armenia and Babylonia. The inland forms of the Rubble-drift are however so obscure, and have been so little investigated in that area, that we must wait for further evidence. He only regrets that for the same reason he is unable to speak of the Red Sea and Siberian areas.

In reply to Mr. Warren Upham, who considers that the uplift of the land could not have produced currents of sufficient force, he would refer him to a paper by the late distinguished mathematician Mr. Hopkins of Cambridge, in which he shows that currents of extreme velocity and force may be produced by such uplifts. (*Quart. Journ. Geol. Soc.*, vol. vi, p. 90, and given in abstract in *Quart. Journ. Geol. Soc.*, vol. xlviii, p. 332.) The suggestion made by his (Professor Prestwich's) old friend, the late Mr. Godwin-Austen, that in the "Head" area, the land might have been raised to a height of 2,000 feet, was simply a suggestion made to obtain a supposed necessary degree of cold, but it was not supported by any facts. Professor Prestwich would ask Mr. Upham if a 2,000 feet uplift were required for the English coast, what would be the elevation needed to produce the same results on the coasts of North Africa, and what evidence is there of it? He has not overlooked the opinions referred to by Mr. Upham, of Mr. Godwin-Austen, and other geologists (see *Quart. Journ. Geol. Soc.*, vol. xlviii, pp. 305-323), and has stated his objections to them (pp. 326-328). They would be too long to repeat here.

He feels that there are yet many points of difficulty to clear up, but it would be better that the argument should be on new lines, rather than on objections already discussed and answered.

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NOTE.

As Professor Prestwich treats his subject from a purely geological standpoint, it was considered absolutely necessary that it should be similarly dealt with in the Discussion.

In the words of Sir J. W. Dawson's special communication one may now "hope that the subject will be followed up on both sides of the Atlantic."

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ERRATA.

P. 144, line 7 from bottom.

The words *fortuitous evolution* should be within inverted commas followed by a note of admiration (!)

Two lines further on, a comma after *nature*.