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JOURNAL OF THE TRANSACTIONS
OF
THE VICTORIA INSTITUTE.

VOL. LXI.

JOURNAL OF
THE TRANSACTIONS

OF

The Victoria Institute,

OR,

Philosophical Society of Great Britain.

VOL. LXI.



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PREFACE.

IN an age when scientific investigation is advancing with strides that seem to bring confusion to many a mind, and when philosophical speculation tends to run ahead of the categories of fact and reason, little argument is required to commend to thoughtful people the platform of the Victoria Institute, as it seeks to impose a restraint upon intellectual licence, and supplies an atmosphere suited for the discussion, definitely in the light of Divine Revelation, of such issues and themes as bear upon spiritual life and experience.

The volume now sent forth, the sixty-first of the series, affords proof that the platform thus defined meets with a large measure of appreciation. Scholars of acknowledged authority in their various spheres have made contribution to the *Transactions*, and the papers read have been subjected to discussion, and in many cases to helpful criticism by Members and Associates who in some instances enjoy the reputation of experts in reference to the subjects introduced. Once again papers read by the honoured President of the Institute, Sir Ambrose Fleming, have been heard with profound appreciation, and they are here included, to the manifest enrichment of the volume. The President opened the session with a deliverance on "Matter, Energy, Radiation, Life, and Mind," and closed it with a lecture on "Nature and the Supernatural." In the midst of the session another distinguished Member of the Council, Dr. Arthur Rendle Short, contributed a paper of wide-ranging utility, with the title "Some Recent Literature Concerning the Origin of Species."

With these lectures singled out, no one may gather a suggestion that the others presented in the volume have not performed a great service in furtherance of the important objects of the Institute.

To one and all of the lecturers, the Council expresses thanks for the lead which they gave to discussions of essential value—discussions which most assuredly told in the direction of stabilising thought in regard to great issues, scientific and philosophical, moral and spiritual.

Once again the Council impress upon Members and Associates the privilege of introducing to the Institute acquaintances, so disposed and equipped that they may yield influence for the work, and at the same time derive personal advantage by joining the ranks of scholars who, by means of the Institute, are doing their part to advance the cause of Truth.

JAMES W. THIRTLE,
Chairman of Council.

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VICTORIA INSTITUTE.

REPORT OF THE COUNCIL FOR THE YEAR 1928.

TO BE READ AT THE

ADJOURNED ANNUAL GENERAL MEETING, APRIL 8TH, 1929.

1. *Progress of the Institute.*

It is once more the Council's duty to present to Members and Associates the Annual Report of the proceedings of the Society, with the Balance Sheet of Receipts and Expenditure. This is the Sixtieth Report since the founding of the Victoria Institute, so that it represents the Diamond Jubilee year of its existence. We have cause to be thankful that the Institute has been enabled to carry on for so many years the work she set herself at the first.

The Session was opened with a paper, which raised much interest, by the President, Sir Ambrose Fleming, F.R.S., on "Number in Nature and in the Biblical Literature indicating a Common Origin in a Supreme Intelligence." We cannot let this occasion pass without expressing our warm congratulations to the President, on the honour of Knighthood, which His Majesty the King has lately conferred upon him, and we can only express our hope that the President may long be spared to enjoy his honours, and to advance the cause for which the Victoria Institute stands.

A notable paper from the pen of Dr. Parke P. Flournoy, of Washington, D.C., U.S.A., was, among others, read, it being the Gunning Prize Essay for 1927. The doctor is to be congratulated on this his second success in the prize competition. Other papers read covered a wide range of biblical and philosophical subjects, and were provocative in some cases of considerable discussion.

2. *Meetings.*

Ten ordinary Meetings were held during the Session 1927-28. The papers published were:—

“Number in Nature and in the Biblical Literature indicating a Common Origin in a Supreme Intelligence,” by Dr. J. A. FLEMING, M.A., F.R.S.

Dr. James W. Thirtle, M.R.A.S., in the Chair.

“Christ and the Scriptures: what may we gather from His Attitude and Instruction?” by the Rev. PARKE P. FLOURNOY, D.D., Litt.D. (being the Gunning Prize Essay for 1927).

Alfred W. Oke, Esq., LL.M., F.G.S., in the Chair.

“The New Testament Era in the Sequence of Prophecy,” by W. BELL DAWSON, Esq., M.A., D.Sc., M.Inst.C.E.

Lieut.-Colonel F. A. Molony, O.B.E., in the Chair.

“The Miraculous in Holy Scripture,” by the Rev. A. H. FINN.

The Rev. Canon Marmaduke Washington, M.A., in the Chair.

“The Influence of the Heathenism of the Canaanites upon the Hebrews,” by Professor THEOPHILUS G. PINCHES, LL.D., M.R.A.S.

Avary H. Forbes, Esq., M.A., in the Chair.

“The Doctrine of Forgiveness through the Cross of Christ,” by the Rev. Canon B. K. CUNNINGHAM, O.B.E., M.A.

Robert Caldwell, Esq., F.R.G.S., in the Chair.

“Science in the Book of Ecclesiastes,” by AVARY H. FORBES, Esq., M.A.

Alfred W. Oke, Esq., LL.M., F.G.S., in the Chair.

“Sennacherib’s Invasion of Judah 701 B.C.,” by the Rev. CHARLES BOUTFLOWER, M.A.

Dr. James W. Thirtle, M.R.A.S., in the Chair.

“Protestantism and Rationalism in France,” by Pastor R. SAILLENS, D.D.

William C. Edwards, Esq. (*Treasurer*), in the Chair.

Annual Address: “Relativity and Reality,” by Dr. J. A. FLEMING, M.A., F.R.S. (*President*).

Dr. James W. Thirtle, M.R.A.S., in the Chair.

3. *Council and Officers.*

The following is a list of the Council and Officers for the year 1928 :—

President.

Professor J. A. Fleming, M.A., D.Sc., F.R.S.

Vice-Presidents.

Alfred T. Schofield, Esq., M.D.
 Professor T. G. Pinches, LL.D., M.R.A.S.
 Right Rev. Bishop J. E. C. Welldon, M.A., D.D.

Trustees.

Alfred William Oke, Esq., B.A., LL.M., F.R.S.
 Martin H. F. Sutton, Esq., J.P., F.L.S., F.R.G.S.

Council.*(In Order of Original Election.)*

Sydney T. Klein, Esq., F.L.S., F.R.A.S.	Lieut.-Col. Hope Biddulph, D.S.O., late R.F.A.
J. W. Thirtle, Esq., M.A., LL.D., M.R.A.S., F.R.G.S., <i>Chairman of Council.</i>	Wilson Edwards Leslie, Esq.
Alfred William Oke, Esq., B.A., LL.M., F.G.S.	Avery H. Forbes, Esq., M.A.
Sir Robert W. Dibdin, F.R.G.S.	Arthur Rendle Short, Esq., M.D., B.S., B.Sc., F.R.C.S.
H. Lance-Gray, Esq.	The Rev. Harold C. Morton, B.A., Ph.D.
John Clarke Dick, Esq., M.A.	William C. Edwards, Esq.
W. Hoste, Esq., B.A.	Robert Duncan, Esq., M.B.E., I.S.O.
Alfred H. Burton, Esq., B.A., M.D., C.M.	Louis E. Wood, Esq., M.B., D.P.H.
Lieut.-Col. F. A. Molony, O.B.E., late R.E.	The Rev. J. J. B. Coles, M.A.

Honorary Treasurer.

William C. Edwards, Esq.

Honorary Editor of the Journal.

Dr. James W. Thirtle, M.R.A.S.

Honorary Secretary, Papers Committee.

Lieut.-Col. Hope Biddulph, D.S.O., late R.F.A.

Honorary Secretary.

William Hoste, Esq., B.A.

Auditor.

E. Luff-Smith, Esq. (Incorporated Accountant).

Secretary.

Mr. A. E. Montague.

4. *Election of Officers.*

In accordance with the Rules, the following Members of Council retire by rotation: Lieut.-Colonel F. A. Molony, O.B.E., Lieut.-Colonel Hope Biddulph, D.S.O., Avary H. Forbes, Esq., M.A. and Arthur Rendle Short, Esq., M.D., B.S., B.Sc., F.R.C.S., who offer themselves (and are nominated by the Council) for re-election.

The Council also nominate Lieut.-Colonel T. C. Skinner, R.E. (ret.), F.R.Met.Soc., as a Member of Council; and William C. Edwards, Esq., as Treasurer in the place of Sir George Anthony King, M.A., deceased.

5. *Obituary.*

The Council regret to announce the deaths of the following Members and Associates:—

E. M. Arrowsmith, Esq.; F. Cockrem, Esq.; the Ven. Archdeacon Dobbs; the Rev. G. Hanson, D.D.; the Rev. W. V. Kelley, D.D.; Sir George Anthony King, M.A. (Treasurer); the Rev. S. B. McCormick, D.D.; Lieut.-Colonel G. Mackinlay (a Vice-President); H. W. Mackintosh, Esq., M.A.; the Rev. C. J. Marshall, D.D.; E. Walter Maunder, Esq., F.R.A.S. (late Secretary); Dr. A. Neve; the Rev. E. J. Penford; the Rev. Professor Percy V. Roberts, Ph.D.; The Rev. W. E. Rowlands; the Rev. C. E. Sherard, M.A.; Dr. W. Woods Smyth; Mrs. Isabel Spackman; Miss E. F. Staley; Dr. Eugene Stock; the Rt. Rev. Bishop F. Wallis, D.D.; David A. F. Wetherfield, Esq.; the Rev. E. M. Wherry, D.D.; Charles E. Baring Young, Esq., M.A.

6. *New Members and Associates.*

The following are the names of new Members and Associates, elected up to the end of 1928:—

MEMBERS.—Dr. Henry W. Beedham; Mrs. Katharine R. Beedham; Professor Glenn Gates Cole, Sc.D.; Alexander Macbeth Elliott, Esq., O.B.E., M.D., M.S.; Ernest Hedgman, Esq.; the Rev. J. E. Kuizenga; Philip J. Le Riche, Esq., M.R.C.S., L.R.C.P.; David Ramsay Smith, Esq., M.I.M.E.; William Tytler, Esq., F.R.G.S.; the Rev. Ambrose J. Wilson, D.D.

LIFE ASSOCIATES.—Major A. H. Fraser; H. H. Goodwin, Esq.; James Knight, Esq., J.P., M.A., D.Sc.

ASSOCIATES.—A. T. Babbs, Esq.; R. Biddulph, Esq.; Vincent N. Cooper, Esq.; Alfred Corner, Esq.; W. H. Dempster, Esq.; Miss E. M. Delevingne; Mrs. G. Halley; A. G. Harris, Esq., J.P.; F. H. Fry, Esq.; H. M. Gilchrist, Esq.; H. J. Hannah, Esq.; Mrs. M. Little; the Rev. Charles O'Neill Martindale; Dr. E. F. Neve; Alfred Norris, Esq.; Dr. G. Keppie Paterson; Finch Perrott, Esq.; the Rev. H. R. A. Philp; the Rev. G. L. Powell; George Vanner Rowe, Esq.; F. H. Shand, Esq.; the Rev. A. G. Shorrocks; Lieut.-Colonel T. C. Skinner; Dr. T. A. Neill Watson, M.C.; the Rev. George E. White, D.D.; the Rev. A. J. Williams, M.A.

LIBRARY ASSOCIATE.—London University Library.

7. *Number of Members and Associates.*

The following statement shows the number of supporters of the Institute at the end of 1928 :—

Life Members	...	...	...	12
Annual Members	...	...	...	106
Life Associates	...	...	...	49
Annual Associates	...	...	...	290
Missionary Associates	...	...	...	12
Library Associates	...	...	...	30
				499

8. *Donations.*

William C. Edwards, Esq., £5 (special); Archibald Greenlees, Esq., £1 1s.; Colin McLarty, Esq., £1; W. R. Rowlatt Jones, Esq., £2 12s. 6d.; Dr. Louis E. Wood, £5 10s.

9. *Finance.*

The question of Finance is always with us. A reference to the Balance Sheet will show that, though our expenditure has been reduced by most careful management, we are not yet on a satisfactory footing financially. This end would be in a large measure attained, if we could raise our total membership to five hundred and fifty during the present year. If Members would look out among their friends suitable candidates for election, and present their names to the Council, needless to say such would be gladly considered for election.

10. *The Langhorne Orchard Prize.*

The subject for this triennial competition, limited to Members and Associates of the Institute, was—

“SCIENTIFIC DISCOVERIES AND THEIR BEARING ON THE BIBLICAL ACCOUNT OF THE NOACHIAN DELUGE.”

11. *Conclusion.*

In conclusion, we desire to thank Members and Associates for their continued interest and co-operation in the work of the Institute. A platform such as the Society provides is still greatly needed—where, on conservative lines, matters of vital interest may be discussed in a reverent spirit. And is there not always a

demand for the ventilation of views which, though not having the full *imprimatur* of scientific orthodoxy, in its official expression, may yet contain elements of truth ?

The Council would thank very heartily the scholars who have contributed papers to the *Transactions* ; not forgetting those who, like Dr. Flournoy, of Washington (already mentioned), Dr. W. Bell Dawson, of Ottawa, and Dr. Reuben Saillens, of Paris, have done so from abroad. They hope that Members and Associates will continue to do their best to be present at the reading of papers, and from time to time will take part in the discussions before the Institute.

Signed on behalf of the Council,

JAMES W. THIRTLE,

Chairman of Council.

BALANCE SHEET, 31ST DECEMBER, 1928.

LIABILITIES.				ASSETS.						
				£	s.	d.	£	s.	d.	
SUBSCRIPTIONS PAID IN ADVANCE			12	12	0	CASH AT BANK ON CURRENT ACCOUNT			
							Ditto "Gunning Prize" Account			83 16 4
							Ditto "Langhorne Orchard Prize" Account			28 7 7
SUNDRY CREDITORS for:—							STAMPS IN HAND			1 7 2
Printing and Stationery	84 13 4				SUBSCRIPTIONS IN ARREARS:—			
Audit Fee	3 3 0				Estimated to produce			22 1 0
				87	16	4	INVESTMENTS:—			
LIFE SUBSCRIPTIONS:—							£500 2½ per cent. Consolidated Stock			
Balance at 1st January, 1928	107 2 0				(Market value at 56¼ = £280 12s. 6d.).			—
Additions	31 10 0				"Gunning" Fund:—			
							£673 3½ per cent. Conversion Stock at cost			508 0 0
			138 12 0				"Langhorne Orchard" Fund:—			
Less Amount carried to Income and Expenditure Account	10 10 0				£258 18s. 3½ per cent. Conversion Stock at cost			200 0 0
				128	2	0	INCOME AND EXPENDITURE ACCOUNT:—			
TRACT FUND:—							Balance at 1st January, 1928			143 14 2
Balance at 1st January, 1928	5 18 10				Add Excess of Expenditure over Income for the year 1928			65 2 4
Add Sales	0 18 2							208 16 6
							Deduct:—			
			6 17 0				Donations received			15 3 6
GUNNING PRIZE" FUND (per contra)									193 13 0
Balance at 1st January, 1928	60 5 4							
Add Dividends received	23 11 0							
				83	16	4				

"LANGHORNE ORCHARD PRIZE" FUND			
(per contra) ....	....	....	200 0 0
Balance at 1st January, 1928 ....	....	19 6 5	
Add Dividends received ....	....	9 1 2	
		<hr/>	28 7 7
		<hr/>	<u>£1,055 11 3</u>

£1,055 11 3

I have examined the foregoing Balance Sheet with the Cash Book and Vouchers of the Victoria Institute and certify that it is correctly made up therefrom. I have verified the Cash Balances and Investments. A valuation of the Library and Furniture has not been taken.

15, Old Queen Street, Westminster, S.W.1.
8th March, 1929.

E. LUFF-SMITH,
Incorporated Accountant

THE ANNUAL GENERAL MEETING

OF THE

VICTORIA INSTITUTE

WAS HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, APRIL 8TH, 1929,

AT 4 P.M.

DR. JAMES W. THIRTLE, M.R.A.S., IN THE CHAIR.

The CHAIRMAN called on the Hon. Secretary to read the invitation convoking the Meeting, which had been adjourned from March 18th.

The CHAIRMAN proposed that the Report being now in the hands of Members, be taken as read. He then proposed the re-election on the Council of Lieut.-Col. F. A. Molony, O.B.E., Lieut.-Col. Hope Biddulph, D.S.O., Avary H. Forbes, Esq., M.A., and Arthur Rendle Short, Esq., M.D., B.S., B.Sc., F.R.C.S.; also that Lieut.-Col. T. C. Skinner (late R.E.) be elected; and that Mr. E. Luff-Smith, the retiring Auditor, be re-elected, at a fee of three guineas.

Mr. HOSTE seconded this motion, which was passed unanimously.

Resolution No. 2 :—

“That the Report and Statement of Accounts for the year 1928, presented by the Council, be received and adopted, and that the thanks of the Meeting be given to the Council, Officers, and Auditor for their efficient conduct of the business of the Victoria Institute during the year.”

was moved by Mr. J. NORMAN HOLMES and seconded by the REV. HENRY M. WALTER, M.A., and passed unanimously.

Resolution No. 3 :—

“That the cordial thanks of this Meeting be passed to Dr. James W. Thirtle, M.R.A.S., for presiding on this occasion.”

was moved by Mr. WILLIAM C. EDWARDS and seconded by Mr. W. HOSTE, and passed by acclamation.

715TH ORDINARY GENERAL MEETING,

HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, DECEMBER 3RD, 1928,
AT 4.30 P.M.

DR. JAMES W. THIRTLE, M.R.A.S., IN THE CHAIR.

The CHAIRMAN, at the commencement of the Meeting, announced with deepest regret the decease of Lieut.-Col. G. Mackinlay, long an active Member of the Council and a Vice-President, and he called upon those present to show their respect for his memory by rising in their seats.

The Minutes of the previous Meeting were read, confirmed, and signed, and the HON. SECRETARY announced the election of the following since the last Meeting:—Members: The Rev. Ambrose J. Wilson, D.D.; Ernest Hedgman, Esq.; the Rev. President J. E. Kuizenga, D.D.; and Dr. Alexander M. Elliot, O.B.E. Life Associates: Major A. H. Fraser and Dr. James Knight, J.P., F.R.S.E. Associates: H. M. Gilchrist, Esq.; Frederick H. Shand, Esq.; Horace J. Hannah, Esq.; the Rev. C. O'Neale Martindale, Ph.D., D.D.; Dr. E. F. Neve; A. T. Babbs, Esq.; G. Vanner Rowe, Esq.; and Dr. T. A. Neill Watson, M.C. Corresponding Member: The Rev. W. M. Douglas. Hon. Associate: The Ven. Archdeacon Jas. Adams.

The CHAIRMAN then called on the President, Dr. J. A. Fleming, F.R.S., to read his paper on "Matter, Energy, Radiation, Life, and Mind."

MATTER, ENERGY, RADIATION, LIFE, AND MIND.

By DR. J. A. FLEMING, M.A., F.R.S. (*President*).

THE present age is a period of keen scrutiny and analysis both of things and ideas.

We desire to discover if possible how far we have been able to penetrate behind the phenomena of Nature and arrive at any final truth as to structure and function.

Also we wish to know how far our conceptions and surmises as to the mechanism of the external world correspond to reality, if that be possible.

From time to time men of genius arise who are able to open a door and usher us into a new field of experience or mode of thought. We then begin a new chapter either in experimental science or in philosophy.

In a previous paper the writer has endeavoured to expound briefly the new ideas on the subject of Space and Time which have arisen of late years.*

To-day it may be interesting to give some account of our present position in regard to five other fundamental and general ideas, viz., those of Matter, Energy, Radiation, Life, and Mind, and their philosophic implications.

1.—MATTER.

Matter, which is a collective name for material substance, has been defined in many ways. J. S. Mill defined it as the permanent possibility of sensation. It has also been defined as that which occupies Space or as the vehicle of Energy. Its fundamental quality has been considered to be Impenetrability, which means that two samples of it cannot occupy the same space at the same time.

These definitions, however, do not carry us very far, and are, in fact, little more than equating one unknown quantity to another.

Experimental science has, however, made progress where Philosophical enquiry halts. We have been able to learn some very important things about material substance.

In the first place there are certain kinds of substance from which we cannot extract any different kind of substance. We shall see presently within what limits this statement holds good.

Thus from Water we can obtain two gases, viz., Hydrogen and Oxygen, but from these latter we can get no chemical substances different to themselves. These are called therefore elementary substances. There are about 88 kinds known, and there is some reason for thinking that not more than 92 varieties exist on our earth. All other substances are made up of mixtures or combinations of these elements, just as every word in the English language is made of a collection or group of some of the 26 letters of the alphabet.

The next striking fact is that Matter is molecular in structure. This means to say it is made up of little masses or molecules,

* *Relativity and Reality.* The Annual Address to the Victoria Institute given June 4th, 1928.

each one of which is similar to others in composition and structure.

The elementary substances are composed of atoms, and atoms grouped together form molecules. An atom may be defined as the smallest quantity of any element which has the chemical properties of that element.

Thus, for instance, if we could continue to divide up a bit of Copper into smaller and smaller particles, we should come at last to a piece which, if divided in two, the parts would no longer have the properties of the element Copper.

We also know something about the sizes and weights of these atoms. Broadly speaking, from 100 to 250 million atoms placed in a row in contact would make up the length of 1 inch.

The smallest length visible in a good microscope is about one hundred thousandth of an inch, so an atom is about $1/2500$ of the size of this smallest visible particle. There is little hope of our ever being able to see an atom. Nevertheless we know a good deal about them.

The word atom is formed from Greek roots meaning something which cannot be cut or divided, but the speculations of Democritus and the Greek philosophers had no certain basis of experimental fact.

No real knowledge was obtained until chemists began with the aid of the balance or scales to make quantitative analyses of compound substances.

It was then found that there is a definite and constant proportion by weight in which elementary substances combine to produce a compound.

Thus in the case of Water, which we can resolve into the two gaseous elements Hydrogen and Oxygen, the proportion by weight is 1 to 8. In the case of Marsh gas, which is a constituent of Coal gas and is a compound of Hydrogen and Carbon, the proportion by weight is 1 to 3. There is a common compound of Oxygen and Carbon called Carbonic acid, which is found to have a composition of 8 of Oxygen to 3 of Carbon.

These facts can be expressed in the form of two statements or laws as follows :—

When two elementary substances combine together chemically they do so as integer multiples of certain fixed weights. Thus in addition to Water, which is formed of Hydrogen and Oxygen in the weight ratio of 1 to 8, there is another compound called Hydroxyl formed of Hydrogen and Oxygen in

which the weight ratio is 1 to 16 or twice 8. In addition to Carbonic acid gas, in which the ratio of Carbon to Oxygen is 3 to 8, there is another compound called Carbonic oxide gas formed of Carbon and Oxygen at which the ratio is twice 3, or 6 to 8.

Again, there is a law of relative proportions which is stated as follows :—When two elements combine separately with a third element in certain ratios they combine also with one another in the same ratio or in some simple integer multiple of it. Thus Hydrogen combines with Oxygen in the ratio of 1 to 8 and with Carbon in the ratio of 1 to 3. Hence Oxygen and Carbon combine with each other in the ratio of 8 to 3 or 8 to twice 3.

When these facts came to be considered by the English chemist John Dalton of Manchester (1766–1844), they led to the conclusion that the best explanation is that elements such as Hydrogen, Oxygen, Carbon, etc., exist only in small indivisible masses called atoms which have different weights, and that compounds are only formed by integer numbers of atoms of different kinds and constant weight associating themselves into molecules.

The atoms themselves were imagined to be hard, unbreakable little particles of uniform size and weight or mass.

This atomic theory was not at first generally accepted, but as the years went on it was found more and more to be consistent with facts, nevertheless the atoms of the elements remained the ultimate constituents of Matter.

Then in 1897–8 a great step forward was made by Sir J. J. Thomson, the present Master of Trinity College, Cambridge, in his epoch-making discovery that we can extract from all atoms particles of a uniform kind, but vastly smaller and of less mass than the lightest of the chemical atoms. These are now called Electrons. Astonishing evidence was accumulated that these electrons taken together constitute the agency we call negative electricity.

Finally an hypothesis was put forward by Sir Ernest Rutherford that an atom is a solar system in miniature. It has a central orb called the nucleus which is composed of two kinds of particles, viz., protons, which are each 1,800 times the mass or weight of an electron but perhaps smaller in size. A certain number, one or more, of these protons held together by electrons form that nucleus. The nucleus of the Hydrogen atom is a

single proton and around it revolves a single electron like the moon round the earth. The nucleus of the Helium atom comprises 4 protons held together by 2 electrons, and round it revolve 2 planetary electrons like the two moons of Mars. So we go up step by step until we reach a final very complicated atom of Uranium, in which the nucleus consists of 238 protons held together by 146 electrons, and round this nucleus a family of 92 planetary electrons revolve.

These protons constitute the agency we call positive electricity. Between protons and protons there is a powerful repulsion and the same between electrons and electrons. But electrons and protons attract each other strongly.

The size of these particles of electricity is extremely small compared with that of chemical atoms. The electron is probably as much smaller than an atom as the smallest grain of dust is smaller than St. Paul's Cathedral in London.

All Matter is therefore composed of infinitely smaller particles of electricity, and if we could see an atom magnified to the size of, say, a large church it would seem to us to be no more than a few dozen grains of impalpable dust scattered and revolving in the above-named space.

These electrons and protons are held together by strong electric and magnetic forces, and the question then arises whether they are anything more than centres of force.

Quite recently a discovery of very great importance has been made by Professor G. P. Thomson, the son of the Master of Trinity, and this is that an electron in motion is accompanied by a system of electric waves which guide it and move with it. We shall explain presently what this phrase "electric wave" means.

The old view of the atom as a hard indivisible mass has thus been replaced by a theory which regards it as a cloud of electrons sparsely populating a space, and this again is giving place to a theory that the electron itself is a complicated structure of centres of electric force which when in motion are accompanied by or else create a system of electric waves. But the question is, waves in what medium and of what nature?

The electron theory is supported by the discovery of the radioactive substances, Radium, Thorium, and Uranium. These elements have large and complicated nuclei, and from time to time these break up and fling out electrons, called then Beta-particles, protons, and a special structure of 4 protons and

2 electrons which is called an Alpha-particle. In addition to these there are certain radiations called the Gamma rays of which more will be said presently.

What is left behind after this catastrophe is a new element. This again breaks up with elimination of Alpha- and Beta-particles and Gamma rays. Thus in the case of the element Radium itself, half of the atoms would break up in a period of 1,730 years, and the first formed residual element is called Radium Emanation, which in turn decreases to half in about 4 days. This again leaves a new element, and after manifold transformations the final result is to produce atoms of the metal Lead. Thus we have in a certain sense realized the dreams of the alchemists in transforming the elements. Not Lead into Gold, as they hoped, but spontaneously Uranium into Radium and Radium into Lead, though the complete change takes millions of years to effect.

The old-fashioned Materialism has therefore vanished before the slowly advancing front of scientific investigation. Matter is far more complex, fine-structured, elusive, and, we may perhaps say, spiritual than we formerly thought. Outside of ourselves there appears to be nothing but centres of electric force in rapid relative motion, and even these are seen, under the keen scrutiny of physical research, to be resolving themselves into systems of waves of some kind which appear for a little time and then vanish away only to make their appearance in another place.

Matter, however, only becomes known to us by the constantly reproducible perceptions of our own minds. The opinion therefore, that there is nothing in this Universe except Matter and its operations, has only been held by those who are ignorant of the necessary conclusions of critical philosophy.

2.—ENERGY.

Before we can consider in detail the nature of an electric wave we must devote a little space to the subject of Energy, which is the second fundamental entity in the physical Universe.

When any mass of matter is in motion relatively to others, whether it be celestial masses such as stars or planets or else bullets, molecules, atoms or electrons, it possesses the power of imparting motion to other masses of matter or of making some

changes in them which it would not do if at rest. Thus a bullet laid on a board makes no essential change in it, but a bullet moving very rapidly towards the board if fired from a gun will pierce a hole in it and tear wood out of it.

It is found that this property can be transferred from one mass of matter to another. Thus a croquet ball set rolling and colliding with another sets the latter in motion and perhaps comes to rest itself. Again the motion of large masses can be transferred to atoms and molecules, and thus give rise to heat which consists in atomic motion. We find that when measured in a certain way there is a certain quantity which remains constant in all these changes, and that the gain by one mass of matter is equal to loss by other masses. This quantity is called Energy, and it may be generally defined as that which is the cause of physical phenomena by its addition to or subtraction from matter or by its changes of form.

There is a close analogy between Matter and Energy in several respects. There are, as we have stated, various kinds of elementary Matter; and there are various forms which Energy may take such as Heat, Light, Energy of Motion, Energy of Strain or Displacement and Electric Energy.

Nevertheless, there is also a difference. We cannot convert, at present, the various kinds of elementary Matter freely into one another, but we can interconvert the various kinds of Energy.

There is, however, a law of Conservation which applies separately to both Matter and Energy. In all its changes of combination we ourselves cannot alter the total amount of each, or convert them into one another.

Energy must be therefore something which has the same claim to be considered real, as Matter. Nevertheless we have reasons for thinking that in the interior of Stars a transformation of Matter into Radiant Energy is taking place.

Just as Space and Time are merely different aspects of the same entity we call Space-Time, so Matter and Energy are merely different aspects of one reality. Matter is in short localized or concentrated Energy. This interconnection of Matter and Energy is shown by the impossibility of defining one except by relation to the other. Matter in Motion is said to possess Energy, and Energy is measured by the product of the Mass or quantity of Matter in a moving body and half the square of its velocity or speed.

It is necessary to be careful in our definitions of the various measurable quantities with which we are concerned. When a mass of matter is in motion such as a stone falling from a height, its speed and therefore its energy of motion is changing from instant to instant. The rate at which the kinetic energy is changing with time is called the Power absorbed or given out.

Power means therefore the time rate of change of Energy. The Energy of a body may change with the length of the path and the space rate of change of Energy is called the Force acting on the body.

Power and Force are therefore only names for rates of change, just as interest is the name for the rate at which money is lent, but it is not money itself.

There is another important quantity called Action. If we multiply together the number representing the energy of motion of a body and the time during which it possesses that energy we have a measure of the Action of the body.

In many cases the motion of a body such as that of a planet round the sun takes place under conditions such that the Action is less than would be the case if the body moved by any other path. This principle of Least Action combined with that of the Conservation of Energy enables us to solve many problems in Dynamics which is the Science dealing with Forces and Energy.

We also use the word Work in a technical sense to denote Energy expended. Thus, when a heavy body is lifted against the force of gravitation through a certain distance, its potential energy is said to be increased and we also say that Work has been done on it.

Energy or Work is always measured as the product of two factors one of which is of the nature of a distance and the other of a resisting force.

These terms Energy and Dynamics are derived from Greek words *Energieia* and *Dunamis*, and it is interesting to note that these are words which occur in the New Testament to describe operations or events coming about by exceptional exhibitions of Divine exertion or intervention. Thus, in the Epistle to the Ephesians, i, 19, Paul wrote, as translated in the Authorized Version: "And what is the exceeding greatness of His power to us-ward who believe, according to the working of His mighty power, which He wrought in Christ when He raised Him from

the dead." The words "according to the working" are in the Greek *kata tēn energeian*, and the words "greatness of His power" are *megethos tēs dunameōs autou*.

We see therefore that in considering the nature and operations of Energy we are coming very close to the spiritual sources of the material Universe. It is scientifically true that "the things which are seen are temporal, but the things which are not seen are eternal" (2 Cor. iv, 18).

3.—RADIATION.

We have in the next place to consider a special form of Energy called Radiation.

A few illustrations must first be given of the scientific meaning of the term *wave*. In ordinary custom we use the word to describe an up-and-down motion on the surface of water or the splashing up of the sea-water on the coast.

In a strict scientific sense it means any kind of change not limited to motion which is repeated periodically, that is over and over again, at any one place in some medium and is also repeated successively at equidistant places at the same time. The characteristic of a wave is that the same kind of changes are taking place simultaneously at equispaced distances called the wave-length, and that at any one place the same cycle of changes is being repeated in a time called the periodic time. The number of cycles of operation performed per second is called the frequency. Thus in the case of sound waves in air or water the change consists in a slight compression followed by a slight expansion of the fluid. The frequency of sound waves falls within the limits of about 100 and 10,000.

If we could watch a particular zone of compression we should see it shifting its place and moving over a distance equal to 1 wave-length in 1 period of time. This speed is called the phase velocity of the wave and in air at normal temperature it is about 1,100 feet per second.

The special peculiarity of a wave is that it is possible for two waves from one source to arrive at the same place, but so that the wave changes cancel or destroy each other. Thus two sound waves can travel by slightly different routes, but so that the condensation of one wave reaches the same place at the same

time as the rarefaction of the other wave and then they destroy each other's effect at that place. This is called *interference* and whenever we find it taking place we can be sure we are concerned with a wave of some kind.

This interference can take place with light. It is possible for a ray of light to be divided into two parts which travel to the same place by paths of slightly different lengths, and if that difference is equal to an odd number, *e.g.* 1, 3, 5, etc., of half wave-lengths the rays extinguish each other. We have then the curious effect that light added to light produces darkness. This could only happen if light consists in some kind of wave effect.

The questions then arise of what nature are these waves and in what medium do they exist ?

It has taken nearly a hundred years of investigation to find even partial answers to these questions.

The first has, however, received reply. The quantity which varies cyclically in a ray of light is the electric force at each point on its path. This force is at right angles to the direction of the ray and changes from a maximum in one direction to a maximum in the opposite direction, and this change is repeated periodically from point to point along the path.

In ordinary yellow light the wave-length is of the order of about one fifty thousandth part of an inch, and the frequency about 600 billion vibrations per second. The wave speed is about 300,000 kilometres per second or nearly 186,000 miles per second. The range of frequency which can affect the human eye as light lies between 400 billion which produces the red sensation and 800 billion which gives the violet. Beyond the violet there are vibrations of greater frequency which cannot affect the eye but impress a photographic plate. Beyond the red end of the spectrum there are also invisible rays called infra-red which have a heating effect. Beyond these again are the so-called Hertzian rays which pass by degrees into the long and longer wireless waves.

We are thus acquainted with about 60 octaves of radiation only one of which can affect our eyes as light. All this immense gamut of vibrations is essentially of the same nature, *viz.*, electric vibration, but they differ in wave-lengths which extend from many miles to an infinitesimal fraction of an inch.

In the next place it is necessary to discuss briefly the manner in which this electric radiation is created by the movements of

electrons and how these create variations in the electric force at various points in space.

If any of the physicists of a generation ago had been asked how light and radiant heat are produced, they would undoubtedly have stated that it was caused by the vibrations of atoms communicating their motion to a space-filling medium called the ether, just as tuning-forks set in vibration impart their motion to the air.

We now know, however, that if there is an ether at all it cannot be thus set in vibration by the movements of atoms, and that the properties of the ether are entirely different from those of any material substance, whether fluid or solid.

The theories of the ether which assumed it to have inertia and some kind of elastic resilience to distortion are now all abandoned and dead. All that we know as a matter of fact is, that if an electric force is made suddenly at any point in space, such electric force meaning some influence which would displace or move an electron if placed at that point, then the effect is not felt at all points in space instantly but spreads out from it with a velocity of 300,000 kilometres or 186,000 miles per second. Hence it follows that a periodic or cyclical electric force at any point, that is, one repeated over and over again, creates a wave of electric force, and this wave is a storehouse of Energy.

The sun, for instance, sends out from each square foot of its surface energy per second equal to 7,000 horse-power. The earth captures at best only 1 part in 47,000 of all this radiation, which means that in cloudless tropical regions about 7,000 horse-power is delivered to the earth per acre of surface. This energy takes $8\frac{1}{2}$ minutes to travel to us. During that time, after it has left the sun and before it reaches the earth, it must be stored up and conveyed by some medium in space capable of transmitting energy in the form of a vibratory electric force.

We do not yet know the true nature of this ether, or of this electric force, but the facts of wireless telegraphy and broadcasting bear witness to their existence.

We have already mentioned that in the atomic theory at present held, an atom comprises various planetary electrons revolving round a nucleus. When an electron is in an outer orbit it possesses more energy than when in an inner orbit. Hence to lift it from an inner to an outer orbit *work* must be done, and when it falls back again energy is liberated. This liberated energy takes

the form of a stream of electric waves which pass away into space.

As long as we think of the electron as a tiny ball revolving round its nucleus like the moon round the earth, it is very difficult to see why this sudden change of orbit is accompanied by the production of emitted electric waves. If, however, the electron itself is only a system of electric waves, and if the energy of this wave-system is greater the larger the electron orbit, then it is not difficult to see that the difference of these wave energies may be flung out as another wave travelling away from the atom in the form of radiation. Experiment has shown that the frequency of the radiated waves, that is the number per second in the train, is given by the difference of the energies of the electron in its two positions divided by a certain constant, called from its discoverer Planck's Constant.

To take the simplest case, viz., an atom of hydrogen with one planetary electron. If this electron jumps or is knocked from an outer to an inner orbit, the emitted radiation has a definite frequency and wave-length and produces a single bright line in the visible spectrum.

The important suggestion was made some years ago by Dr. Niels Bohr, a Danish physicist, that for each atom there are only a certain number of permissible orbits in which the planetary electrons can revolve. It is just as if round a city there were only a certain number of circular roads along which motor cars could run, but not in intermediate routes.

We do not yet know the reason for this, but its probability is confirmed by deductions from the hypothesis.

Hence there are many different jumps which an electron can take from one orbit to another, and hence many bright lines due to corresponding radiations in its spectrum.

Atoms are therefore very complicated structures, in fact, as one eminent physicist has said, a grand piano is a very simple kind of structure in comparison with an atom of iron. At every stage in our investigation of its architecture we are as clearly met with evidence of purpose and design as we are in the case of the most complicated chronometer or wireless receiver.

We cannot invoke, as an explanation of their origin, any process, such as a struggle for existence or survival of the fittest, as there are no intermediate types. The 88 kinds of atoms we know are distinct or separate, those of each particular form are absolutely

similar in structure and performance. They are like coins struck in a Mint and they each bear the impress of the image of their Maker in the attributes they possess.

Nevertheless, they have, like all created things, a certain life or duration. The radio-active atoms are constantly changing, and Matter is in a state of flux. That which we can see happening very quickly in certain derivatives of Radium or Thorium may be taking place in atoms of all kinds, but much more slowly.

It has also become increasingly clear that Matter, that is atoms, can be converted into Radiation, and there is a certain definite rate of exchange. Thus the long-standing puzzle of the source of the heat and light of the sun and stars has been solved. Their radiation results from a loss of mass.

Our sun wastes away at the rate of 250 million tons a minute to supply the heat and light it sends out. No one, however, need be afraid it will not last out our time since the mass of the whole sun is somewhere about 2,000 billion billion tons.

Nevertheless, neither sun nor stars are everlasting, but are slowly vanishing away, by conversion of Matter into Radiation, unless in some places there is a compensating reconversion of Radiation into Matter.

It would not be inappropriate to speak of Radiation as disembodied Energy in motion. If we discard the hypothesis of an Ether, for the existence of which there is no direct experimental evidence, all that we actually know is that Energy can be transmitted through space in a form or by a process called Radiation. All along the line of propagation, but at right angles to it, there exists a state in the space called electric force or displacement. At any one place this effect varies cyclically, that is, from a maximum in one direction to a maximum in the opposite direction, with gradually varying values. At any one instant all along the line of propagation there is the same kind of cyclical variation.

This variation in time and space is called an electric wave. The Energy travels forward with the displacement at a speed of 1,000 million feet per second in empty space. If an electric wave is started at one spot its effect is not felt for one-millionth of a second at a place 1,000 feet away. A wireless wave (which is an electric wave) travels right round the earth in about a seventh of a second.

Matter in the form of chemical atoms consist of localized Energy. Matter and Radiation are therefore interconvertible

because they are essentially of the same nature. Without Energy there would be no events or phenomena in the external world, but we cannot describe it in any simpler terms.

The nearest approach we can make to an interpretation of it is that it is the result of the ever-acting Will of a Divine Mind present at all times and in all places. What we call the laws of Nature are, as H. C. Oersted says, "only the Thoughts of God."

4.—LIFE.

We turn next to the consideration of a subject in which the problems to be resolved seem even more difficult than those which present themselves when we are dealing with inanimate material substances. We are surrounded not merely by inert matter, or even matter possessed of energy of some kind, but by an immense variety of structures we call living, broadly divided into animals and plants, although in their very lowest forms this differentiation becomes difficult.

The characteristic of these living substances is that they exist in certain well-marked forms called species, and the individuals which form a species resemble each other far more closely than they do those of a different species. Each individual increases or grows, and to do this absorbs or takes in nourishment which may be non-living matter. Each individual in general has a certain duration or life, and by various means reproduces other individuals of a similar type or propagates itself.

The most important fact about all living structures, whether animals or plants, is that they are built up of an agglomeration of very small elements called "cells." The cell is the atom or unit of organic life just as the molecule or chemical atom is the unit of inorganic or non-living substance.

The cell itself consists partly of non-living material and partly of materials called protoplasm, composed of organic colloids of complicated chemical constitution. The word "colloid" may need a brief explanation. An eminent chemist (Thomas Graham) found that there is a remarkable difference between such materials as water containing common salt and a dilute glue or gum produced by putting solid glue or gum into warm water. One difference is that the salt solution will pass through blotting paper or a filter, but the gum will not. We can filter the dirt out of

dirty sea water and obtain a clear solution but we could not filter dirty gum in a gum bottle. The gum will not pass through the filter. Graham called substances like gum water Colloids, from the Greek word *Kollē*, meaning glue. He called substances like common salt Crystalloids. There is, however, no sharply marked division of substances. Some materials can exist in both states either as crystalloids or colloids. The latter have in general very complex or bulky molecules formed by the union of a large number of atoms. The colloids which occur in animal or vegetable cells are composed of atoms of carbon, hydrogen, oxygen, nitrogen and, perhaps, sulphur or phosphorus, built up into compounds called proteins, fats, albumens, carbohydrates, etc.

The study of cell structure and function, which is now called Cytology, has shown us a wonderful series of operations connected with the production of a cell. The simplest forms of living organisms consist of a single cell, but the higher animals and plants are composed of billions of cells which form an organic community, particular functions or duties being allocated to certain groups of cells, and all acting together in health not for themselves but for the good of the community as a whole.

When a single living cell such as that forming an amœba found in sea or pond water is examined, we find it to consist of a little blob of a jelly-like substance four-fifths of which is water, the rest being colloids and certain crystalloids. At rest it has a nearly globular shape, but it never is for long at rest, but is slowly changing its shape and moving about in the water holding it in search of nourishment which it takes in, and it also gives out particles of debris or undigested material.

The most recent investigations, such as those of Professor A. V. Hill described at the 1928 British Association Meeting by Professor F. G. Donnan, have shown that in each cell the continuance of the life processes is dependent on the operation of Oxygen, possibly required to oxidize certain cell materials and remove them from it. Living protoplasm continually produces materials which put a stop to its life unless they are taken from it. This, however valuable as a fact, gives us no explanation of the essential nature of living substance and why it has its remarkable powers of motion, assimilation and development.

When we examine a living cell from an animal body under a microscope we find in the jelly-like mass certain things. In the first place, there is often a more transparent globule called a *vacuole* which seems to be concerned with fluid motions in the

cell. Then there is a more important object called the *nucleus*, which is essentially connected with the life of the cell. If the cell is cut into two unequal parts that which contains the nucleus goes on living; that which does not contain the nucleus dies.

This nucleus at an early stage exhibits a sponge-like or net-like structure. Then after a time this changes to a sort of tangled thread. Later on this thread divides itself into short lengths called *chromosomes*, which are always the same number in all the cells of an animal or vegetable of the same species, and always an even number.

The next stage is when all these chromosomes divide lengthways so as to double their number. When this is done half of them move to one side of the cell and half to the other. The jelly-like mass then constricts itself to an hour-glass shape and nips into two parts. Each part then grows up to a complete cell with its nucleus and chromosomes. This fission is the process by which cells are made and multiplied. No one has ever succeeded in making, by artificial means, a single living cell of any type. It can be and has only been produced from a previously existing living cell. Hence spontaneous generation is a myth.

We have then to try to explain the origin of and peculiar powers of the organic cell. Several theories or hypotheses have been advanced.

One view, called the vitalist theory, assumes that there must be some fundamental difference between living matter and non-living colloids, and that the operations of living cells are not merely due to chemical and physical forces or agencies as known in connection with non-living matter.

This view has been combated by those who hold what is called the mechanist theory, in which it is assumed that the process of cell-production is the result of structure and of the operations of simply physical agencies or forces.

The late Professor T. H. Huxley at one time said that there was no more need to assume any recondite agency called "vitality" in connection with living cells than to assume something called "horology" to explain the action of a clock. The clock is a piece of mechanism to which energy is supplied on winding it up, and its subsequent operations are merely the result of its mechanical structure utilizing this energy. The mechanistic theory assumes the same thing to be true of a living cell.

There is, however, a strong argument against this mechanistic theory of the organic cell as follows:—

The multiplication of cells by fission does not result merely in the production of a disorderly mass of cells, but in the upbuilding of an animal or plant in which all parts of the structure are related to each other and subject to a general idea or purpose. When a hen's egg is gently warmed in an incubator for a few weeks this cell multiplication takes place inside the shell. But after certain days the shell cracks and out steps a living chicken with powers of motion, nutrition, and sensory organs completely formed.

The mechanist theory has certainly not given a complete explanation of this daily wonder; hence a large number of biologists have abandoned it. Even the elementary process of cell division cannot be explained by it. An eminent Bio-Chemist, Professor Benjamin Moore, says in his book, *The Origin and Nature of Life*, p. 222, concerning this cell-fission: "There is nowhere outside living matter a set of energy phenomena found to occur *spontaneously* at all resembling this remarkable sequence of changes. . . . There is a type of energy at work never found elsewhere than in living structures." He has therefore suggested the term *biotic* energy for this type of energy upbuilding the cell structure.

It seems to me, however, that this is not a sufficient explanation, for the reason that what is required is not merely an energy but a *directing power* of some kind which can manipulate and guide the materials, the organic colloids, etc., into particular forms.

All physical quantities or agencies are divided into two great classes called scalars and vectors. The scalars are measured by one single number and are undirected quantities such as mass, temperature, and energy; on the other hand the vectors are directed quantities. We have to measure them by two terms, and not only say how much or in what degree they exist, but in what direction they operate. Such quantities as forces, velocities, and momenta are vector quantities.

In connection with the living, multiplying, and upbuilding cell of organic life there is unquestionably some intelligence and foresight or purpose present. Accordingly another school of naturalists have been compelled to assume that living matter has psychic powers in addition to chemical and physical properties.

In a short controversy on the subject of Evolution which

took place in the *Nineteenth Century and After* review in November, 1927, January, February, March, and April, 1928, between the present writer, Mr. G. H. Bonner, and Sir Arthur Keith, the last-named eminent anthropologist maintains the above view in the words: "It is the inherent and essential quality of living matter that it can both plan and execute; unless Matter is purposive it cannot be alive. For modern students the 'thinker' and the 'thought,' the directing intelligence, do not lie outside living matter as Mr. Bonner and Dr. Fleming seem to think, but are of the essence of its constitution."

Nothing could possibly be clearer than the meaning of these words. Every particle of living matter in a cell must then know what to do in the production of a cell, and all the cells produced must know what is their ultimate objective and how to co-ordinate with the others so as to build up the body of a certain animal or plant of particular type in which they have never taken part before.

It is difficult to mention any well ascertained facts which justify this theory of psychic properties possessed by living matter, whilst very much can be said against it.

The question will be again considered in the next section on "Mind." Meanwhile it seems doubtful whether the term "living matter" can be applied to any particular and special substance. The animal or vegetable cell has a very complex constitution in mere material.

It is very well known that the green material called chlorophyll in the outer tissues of plants has the power of utilizing energy from sunlight, and building up out of water and the gas carbonic dioxide in the air and ammonia substances which ultimately form the organic colloids of cells. From these are formed more complicated chemical plant-products. These again are then used by animals as food, and provide the energy and materials required to build up the cells and structures of the animal body.

It may be a question whether any of these complicated substances entering into cell structure possess *per se* any peculiar quality or endowment apart from their special chemical and physical state which would justify the use of such terms as vitality or vital condition in connection with them, but they are the materials with which some Directing Power works to build up organisms we call living. There is no escape from the

conclusion that psychic qualities are evident in living matter but it is not evident that these are simply intrinsic qualities of the matter itself. They are evidence of Mind, but that Mind is an over-acting directivity, a control which is not self-produced nor self-maintained by the material, but is distinct from the material controlled.

The tendency of much scientific thought on biological subjects seems to be in the direction of searching for some broad general principles which will dispense with the necessity for the assumption of any such guidance by a self-conscious Intelligence, and render the world of animal and vegetable life the mere outcome of the operation of automatic forces or of the conditions imposed by exuberance of multiplication. Such conceptions as the struggle for existence, the Survival of the Fittest, Natural or Sexual Selection, reduce the production of the world of living things very much to chance. The multitude of beautiful forms and adaptations we see in animal and vegetable life cannot be the result of a blind struggle of mere amorphous living matter to continue to exist. The choice in the last issue is between Design and Chance. Design implies Thought, and Thought is the action of Mind.

It is not to be denied that there are in the Inorganic world certain general physical principles such as those of Least Action or the Conservation of Energy, and there may be others of similar kind at work in the organic world. We contend, however, that whilst these may be the tools or implements with which the Creator has worked, they do not obviate the necessity for guidance in their use. Creation, in short, is an ever-continuing process.

Our large telescopes show us, on the confines of the stellar Universe, stars and star-systems in process of making, though in our observations of to-day, on account of the abysmal depths of space, we are watching events which took place millions of years ago.

Nevertheless they give support to and endorse the words which Immanuel Kant uses in one of his writings, where he says:—*“Die Schöpfung is niemals vollendet. Sie hat zwar einmal angefangen, aber sie wird niemals aufhören,”* which may be rendered: “Creation is never completed. It had indeed a beginning but it will never have an end.”

On this subject of life some impressive words were uttered in a British Association Presidential Address at Exeter in 1869, by a

former very illustrious President of this Victoria Institute, viz., Sir George Gabriel Stokes, sometime President of the Royal Society of London. He said, "What this *something* which we call life may be is a profound mystery. It would be presumptuous indeed to assume we have already reached the last link, . . . a stage where further progress is impossible, and we can only refer the highest law at which we are stopped to the fiat of an Almighty Power. Let us fearlessly trace the dependence of link on link as far as it may be given to us to trace it, but let us take heed that in thus studying second causes we forget not the First Cause, nor shut our eyes to the wonderful proofs of design, which in the study of organized beings especially meet us at every turn."

5.—MIND.

The fundamental difficulty of all philosophy is the essential duality created by Subject and Object; Observer and Thing or effect observed; that which is Self and that which is Not-Self; or between Matter which is a permanent possibility of sensation and Mind which is the seat of sensations and perceptions. One of these cannot be defined without naming the other. The old epigram embodies this idea. What is Mind?—No matter! What is Matter?—Never mind!

A certain school of scientific thinkers have endeavoured to annihilate this duality by the postulate that Matter is a double-faced entity, to use the words of Alexander Bain, which has both physical and psychical properties or sides.

This single substance, says Bain, "has two sets of properties or two sides, the physical and the mental, but is nevertheless one substance, and the only substance which exists in the Universe."

This Monism as a philosophy has been revived again since Bain propounded it. It was crudely expressed by Haeckel and supported by Tyndall. We have seen that Sir Arthur Keith assumes living matter can "plan and execute" and is "purposeful" in power. These latter terms are, however, qualities not of Matter but of Mind.

We all recognize that whilst mental qualities, perceptions, emotions, and sensations can be more or less, large or small, they cannot be measured in terms of the units we employ in the quantitative measurement of Matter. There is no sense in

speaking of 10 pounds of love, or 4 square feet of joy, or a cubic foot of intellect.

Then, again, if this double-faced unity, commonly called Matter, has both physical and psychical properties united in it, how comes it to pass that these two different sets of properties can be so easily separated?

Let us consider a small portion of brain tissue. This considered as Matter has mass, volume, area, density, and a number of other physical qualities. According to Sir Arthur Keith this living substance can both "plan and execute," and has psychical properties. Suppose we give it a small electric shock, not sufficient to alter its physical properties, but just sufficient to "kill" it or render it lifeless or dead. We have not altered its main physical properties, but the psychical powers have vanished.

If matter is a double-faced entity with two sides to it, how is it we can separate these sides? We cannot separate the two sides of a coin, nor the inside from the outside of a vessel or box.

Again, how comes it to pass that there is no proportion or connection between the degree of the physical and of the psychical qualities if they are merely the two sides of the same entity?

It is true that the different parts of the brain are concerned with various sense perceptions, bodily motions, and mental faculties, but the immense difference between the small mental powers of the very ordinary man and those of some exalted genius, a Faraday, a Handel, or an Einstein, do not seem to be correlated to any proportionate bulk of brain, or even as far as can be seen to brain structure.

The materialistic biology which finds mind only in brain operations, and declares that what we call Mind or Soul vanishes with the destruction or death of the brain, finds its great support in the fact that we have little direct evidence of intelligence divorced from brain, if we except the rather uncertain testimony of psychical research or Spiritualism, when all allowances are made for conscious or unconscious deception, or for the subconscious powers of the human mind.

There are, it is true, an ever-accumulating number of physiological facts which show the very close connection between body and mind in human beings. Of late years the researches on what are called the ductless glands in our bodies which produce

substances called *hormones* have revealed very extraordinary facts.

There are glands called the thyroids in the neck. If these are deficient at birth, growth of the child in body and mind is hindered, and a peculiar kind of dwarf with stunted intelligence called a *cretin* results. The disease can often be remedied by giving food containing the thyroid gland of animals, and within a few weeks great improvements produced not only in body but in mind.

The decay of intelligence in some old people is possibly connected with deficient function of the thyroids.

But all these things do not prove that Mind is nothing but the functioning of the body. They merely exhibit proofs that the relation of body and mind is closely similar to that between the musician and his musical instrument. We cannot discover the musician merely by taking a piano to pieces. If the latter is defective or is injured, the musician, however skilled, can produce only imperfect music. But the instrument alone, however perfect, can produce no music at all.

There is another fact which seems to support the view that there is something else in a human being than a body, and that is the continuous sense of personal identity we each possess. In spite of all bodily changes due to age or disease or normal tissue changes, and in spite of all lapses of memory, there is not merely a self-consciousness, which is the result of the Mind becoming an object to itself, but there is a sense of the continuous inter-connection of this self-consciousness from day to day.

There is something in us which endures, no matter what else changes. It is this which really constitutes the basis of moral responsibility and the true self. It will be remembered that Bishop Butler, the author of *The Analogy of Religion*, has a brief but important Dissertation on "Personal Identity" in his book.

Amidst all the flux of material atoms in the body and tricks of memory in the mind, there is some element in us as human beings which preserves and constitutes personal identity. It is this element which we believe survives the death of the body and is the controlling power in it whilst it is alive.*

* There are curious abnormal cases known to psychologists in which one and the same person as regards body and brain may yet exhibit totally different characters, dispositions, and recollections at various

We have had a very confident assertion to the contrary made this year (May, 1928) in a Ludwig Mond lecture at Manchester, on the "Implications of Darwinism," by Sir Arthur Keith. He assured his audience that "every fact known to them (*i.e.* biologists) compels the inference that mind, spirit, soul are the manifestations of a living brain just as flame is the manifest spirit of a burning candle. At the moment of extinction both flame and spirit cease to have a separate existence." In other words nothing at all survives the death of the human brain.

It would be almost waste of space to put down the names of even a score of those, the most illustrious and greatest of our race, who have given even life itself in support of the contrary opinion. Their names are indelibly inscribed not merely in cathedrals or on tombs, but on the pages of history and in those inspired Scriptures which countless multitudes accept as the Word of God.

Ascertainable truth is not limited to that which can be experimentally demonstrated in a biological laboratory, nor to that which can be resistlessly proved to the reason by rigid logic alone. We have a right to consider that the heart and the conscience are as closely in touch with realities as is the intellect. Tennyson gave expression to this idea in words of perfect form in his "In Memoriam" :—

"If e'er when faith had fall'n asleep,
I heard a voice 'believe no more,'
And heard an ever-breaking shore
That tumbled in the Godless deep ;

"A warmth within the breast would melt
The freezing reason's colder part,
And like a man in wrath the heart
Stood up and answer'd 'I have felt.'"

times, the transition from one state to another being quite sudden. Whatever the true explanation of this phenomenon may be, it is at least consistent with the belief that the brain is not the only element involved in personality. On the other hand some injury to the brain may deprive a person of a knowledge of his own name, or who he is, or where he lives. This, however, is only an illustration of the fact that the Mind cannot express itself in our present state of existence except through the brain. The musician cannot express himself musically except through his musical instrument, but for all that, the musician is not identical with his instrument but has a separate existence, and may survive even when his instrument is destroyed.

But however deep or widespread our human intuition, or passionate our hopes, a courageous philosophy will always recognize that because we wish for or anticipate a certain condition it does not in the least follow we shall reach it.

If we are to retain our belief in the special psychic nature of humanity, in its essential differentiation from the animal creation and in a life beyond the grave, we need a more solid foundation than hopes or emotions if that faith is to withstand the subtle but determined attacks made on it to-day in the name of science or literary criticism.

We have that foundation in the evidence, external and internal, of the historical veracity of the events and statements made to us in the writings of the New Testament and in the record of their effect on humanity during nineteen hundred years.

These narratives and records have survived the most ingenious attempts to reduce them to a slender basis of normal events embroidered by myth. In a past generation Strauss, Renan, and others did their best to this end, but their work has withered and the facts remain.

Before the modern biologist can announce so confidently that bodily death ends personal existence for human beings, he has first to explain, if he can, the Resurrection and Post-Resurrection Appearances of Jesus Christ, because it is on those historical facts that the Christian faith is established and belief in a future life for those to whom He communicates life.

There are many who consider that the natural and intrinsic immortality of the human soul is not a truth taught in Scripture, but there are deep mysteries involved and a dogmatic tone is not admissible.

Let me conclude, however, with an additional quotation from the British Association Presidential Address in 1869 of our former Victoria Institute President, Sir George Gabriel Stokes, who, as Lucasian Professor of Mathematics at Cambridge and occupant of the Chair held once by Sir Isaac Newton, claims always our closest attention. Speaking of the human Mind, he says :—

“ When from the phenomena of Life we pass on to those of Mind we enter a region still more profoundly mysterious. We can readily imagine that we may here be dealing with phenomena altogether transcending those of mere life in some such way as those of life transcend, as I have endeavoured to infer, those of

chemistry and molecular attractions, or as the laws of chemical affinity in their turn transcend those of mere mechanics.

“Science can be expected to do but little to aid us here since the instrument of research is itself the object of investigation. It can but enlighten us as to the depth of our ignorance and lead us to look to a Higher Aid for that which most nearly concerns our well-being.”

DISCUSSION.

Dr. THIRTLE (Chairman), said : I feel sure that I voice the desire of all present when I move, as I do with profound pleasure, that a vote of thanks be returned to Dr. Fleming for the paper read in our hearing. Once again the honoured President of the Institute has placed thoughtful students under a sense of deep obligation, by indicating with strength and clearness what may rightly be pronounced the basic grounds of Christian confidence ; he has, in fact, directed our thoughts along lines that make for mental stability, and, as a consequence, we are enabled the more definitely to distinguish between phenomena and reality, between things observed and the forces or principles that lie behind all that we can see or feel in wide spheres of knowledge or experience.

It has been our privilege to follow the President in a series of discussions that yield conclusions of great practical importance. To begin with, dealing with Matter, he showed that the old-fashioned Materialism has retired before the advancing front of investigation ; and the perverse opinion that there is nothing in the Universe except Matter and its operations can only be held to-day by those who are ignorant of the necessary conclusions of critical philosophy.

While sincerely thankful that this truth has been placed before us in a convincing light, we welcome with equal satisfaction the President's discussion of the related subject of Energy—by which we are brought into more intimate contact with the spiritual and unseen sources of the Universe of things that are seen and material.

By his treatment of Radiation, Dr. Fleming has conducted us to thoughts regarding a deeper reach of ideas—to the consideration of a special form of Energy, involving electric vibration, atomic

structure, and much beside. We have listened with rapt attention to considerations advanced as only a master in science could formulate them. We found ourselves in presence of mystery and marvel, and in the result we realized a greater sense of the ever-acting will of a Divine Mind, present at all times and in all places, enabling us to agree in the definition of Oersted, who declared that the Laws of Nature are in reality the Thoughts of God (p. 24).

Proceeding to discuss Life, the President expounded cell-structure and function, and along various lines of argument he more than encouraged us to treat with impatience the evolutionary theories which are so widely current at the present time, and to see in the psychic qualities of living matter evidence of Mind, and that Mind "an over-acting directivity, a control which is not self-produced nor self-maintained by the material, but is distinct from the material controlled"—I quote the words of the President, words of decisive significance, as we shall assuredly admit (p. 29).

Finally, we have been privileged to listen to a discussion of Mind. Here we were shown the distinction between physical and psychical properties united in Matter, with a study of brain substance and function. We are truly thankful to Dr. Fleming for meeting, in terms consistent with philosophical theory and at the same time fully informed with regard to Divine Revelation, the vaunted demand of some that "death ends all." He has not only shown this contention to be unscientific, but declared it to be contrary to the warrant of faith as we know it to be established on grounds that evade the touch of scientific investigation. As he tells us: "Ascertainable truth is not limited to that which can be experimentally demonstrated in a biological laboratory, nor to that which can be resistlessly proved to the reason by rigid logic alone. We have a right to consider that the heart and the conscience are as closely in touch with realities as is the intellect" (p. 33).

In this region of thought we are enabled to yield authority to Divine Revelation, made sure by "many infallible proofs." Here we have our stand-by in the doctrine of "Jesus and the Resurrection." A risen Christ, who brought life and immortality to light by the Gospel, authenticates the faith and hope which sustained saints and martyrs, past and present, and, moreover, is the confidence of millions of all races in many lands to-day. The researches of science have their sphere, and the theories of philosophy may well

demand a place ; but over and above these there is the region of faith, wherein nourishment of the spirit is found by men and women who by experience have come to realize a knowledge of God, as revealed in our Lord and Saviour Jesus Christ.

With these remarks, it gives me pleasure to move a vote of thanks to the President for a paper which has been full of light and uplift to all who have listened this afternoon.

Mr. SIDNEY COLLETT said : Our first thought this afternoon must be of wonder and amazement at the marvellous way in which our President has dealt with these profound subjects. Parts of his paper are necessarily above and beyond some of us ; but we thank him most heartily, not only for his wonderful grasp of those mysteries of Nature's Laws, but also for the felicity and simplicity of the language he has used. His arguments are so cogent and unanswerable, and his illustrations so apt and intelligible, that his paper has helped us more readily than we otherwise could do to realize some of the wonderful works of God.

The reverent and fearless way in which he has denounced such foolish errors as that of the spontaneous generation of Life, together with his whole line of argument, all go to prove that *true* science does not contradict, but confirms, the statements of God's Holy Word. And, further, his remarks support the remarkable statement made by Sir George Darwin when President of the British Association in 1905, viz., "The mystery of Life remains as impenetrable as ever !"

I gladly, therefore, second the vote of thanks moved by our Chairman, for I am sure we must all feel that Dr. Fleming deserves our most grateful thanks.

Mr. AVARY H. FORBES said : "Spontaneous generation is a myth" (p. 26). Many years ago I heard Tyndall, at the Royal Institution, explain his experiments which led directly to this conclusion. A couple of years ago a Professor of Bacteriology (delivering the "Tyndall Lectures" at the same institution) said that the French physicists were at issue with the British on this point, and maintained that their experiments pointed to spontaneous generation being a fact. Can Dr. Fleming say if this contrariety of opinion still exists ?

Mr. PERCY O. RUOFF said: The Victoria Institute owes Dr. Fleming a great debt for his informative and lucid paper. The section dealing with the persistence of personality after death is very important. Marcus Aurelius has laid it down with considerable dogmatism that Alexander of Macedon and his groom are equals now in death, for both have either been received back into the same generative principle of the Universe or dispersed impartially into the atoms. This is a hopeless philosophy and stands in sharp contrast to the Bible revelation, which shows that personality persists after death. Christian personality is sacred, because it arises from the working of God within the human spirit, and it endures for the same reason.

The paper covers a very wide range of scientific facts, taken from many fields. Many of these facts set forth the exceeding glory and power of the Lord Jesus Christ, for it is revealed in Holy Scripture that He is not only the Creator, but "He upholdeth all things by the word of His power" (Heb. i, 3), and it is this knowledge that invests His Presence with His people in this world with such intense and supreme importance.

Rev. C. E. STOCKS said: Some of you may remember how Robert Blatchford, founder and editor of *The Clarion* newspaper, and a prominent opponent of Christianity, was compelled to acknowledge, a few years ago, that the discoveries of modern science had knocked the bottom out of his materialism. There was no longer any "matter" on which he could take a firm stand. He must now turn his attention to the unseen and the spiritual. We can be profoundly thankful that God is thus, through His book of Nature, confirming the truth of the book of His Holy Word.

Rev. J. J. B. COLES wrote: One of the chief merits of this most valuable paper is the very clear way in which the teaching of Monism is set forth. Sir Arthur Keith (*see* p. 28) asserts: "It is the inherent and essential quality of living matter that it can both plan and execute; unless Matter is purposive it cannot be alive. For modern students the 'thinker' and the 'thought' . . . do not lie outside living matter as Mr. Bonner and Dr. Fleming seem to think, but are of the essence of its constitution." And in his *Implications of Darwinism*, he assured his audience that "every

fact known to them (*i.e.* the biologists) compels the inference that Mind, Spirit, and Soul are the manifestations of a living brain, just as a flame is the manifest spirit of a burning candle. At the moment of extinction both flame and spirit cease to have a separate existence." In other words, nothing at all survives the death of a human brain. Later on, the science of Psychology which is still in its earlier stages, will teach us more than we can learn from Sir Arthur Keith. When we come to study the psychology of the Pauline Epistles, and such passages as "when it pleased God to reveal His Son in me," and "when Christ, who is our life, shall appear, then shall we also appear with Him in glory," then we shall understand better the meaning of Eternal life. Science may set before us the evolutionary processes of the divine Creator, but on *its own confession* it knows nothing of origins and nothing of resurrection or the life to come.

AUTHOR'S REPLY.

Dr. J. A. FLEMING: I do not think it will be necessary for me to say more in conclusion than to thank very sincerely the various speakers, and especially our esteemed Chairman, for their kind reception of the paper I have submitted. It is, I think, of great importance to set forth as clearly as possible the arguments against the subtle and insidious anti-religious tendencies of to-day, and especially against those which deny any future life or responsibility. Although the old-fashioned materialism has been invalidated by scientific advances, there is a modernized form of it which gives denial to the spiritual nature of man, ignores the inspiration of Holy Scripture and the great truths of redemption there revealed, but endeavours by psychical research, to penetrate, without the guidance of revelation, into the solemn mysteries of life in the world to come.

716TH ORDINARY GENERAL MEETING,

HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, JANUARY 7TH, 1929,

AT 4.30 P.M.

THE REV. A. H. FINN IN THE CHAIR.

[The Minutes of the previous Meeting were read, confirmed, and signed, and the HON. SECRETARY announced the following elections:—As a Life Member, the Rev. William Davey, and as an Associate, Alfred George Secrett, Esq.

The CHAIRMAN explained that in the unavoidable absence in Canada of the author of the paper, Dr. W. Bell Dawson, he would himself read the paper on “The Hebrew Calendar, and Time Periods.”

THE HEBREW CALENDAR, AND TIME PERIODS.

By W. BELL DAWSON, Esq., M.A., D.Sc., M.Inst.C.E.

IN the various calendars used by ancient and modern nations, the main object is to bring the reckoning of time into some relation with the sun and moon, so that the seasons of the year may be known, as well as the months, which depend primarily upon the moon. The peoples of Western Asia have given preference in their calendar system to the period of the moon's phases—that is, the lunar month; whereas, in ancient Egypt and in modern Europe, the chief place has been given to the sun in its relation to the seasons, and the moon has been very largely ignored. Our present object is to point out the way in which the practical advantages of both these systems have been obtained in the Hebrew calendar.

The very early development of calendar systems in the history of the human race is explained, by its real importance to any people who live a natural life and depend upon agriculture and fishing. At the present day, even the most unintelligent tribes find some means of knowing the return of the seasons from the heavenly bodies. From the earliest times men have needed to know when it is best to sow their seed, or when the rainy season would begin. The question of moonlight is of consequence also, for the full moon rises at sunset, and thus practically prolongs the day for any out-door work such as harvesting, for which moonlight may be sufficient. This may be of real service in the urgency of harvest-time; and moonlight may also be helpful for night travel at the hottest seasons of the year. For people on an ocean shore, who depend upon sea-food such as shell-fish and crabs, their best opportunity for collecting these occurs at the lowest tides, which are related to the moon's position. This would concern those who lived on the outer shores beyond the Mediterranean, for in it there is practically no tide.

A well arranged calendar of the year and the months is therefore no merely abstract or technical method of measuring time, and it is specially serviceable to a primitive people leading a natural life. Yet it is essential to secure accuracy in the calendar adopted, so that it may not become disarranged in the course of years and centuries. We now know that astronomy was one of the earliest pursuits, almost at the outset in the career of mankind. There is reason to believe that very early in the history of the world men arrived at true values for the length of the year and the month, chiefly by means of averages deduced from a long series of observations, and undoubtedly the long lives of early men helped them much in their endeavours.

THE MONTH AND THE YEAR.

At the Creation, the two conspicuous luminaries, the sun and the moon, were appointed to "be for signs, and for seasons, and for days, and years" (Genesis 1; 14). The day is the primary measure of time; but the month, from new moon to new moon, is not a complete number of days without a fraction over, nor is the year; and there are not a complete number of natural lunar months in the solar year. It is evident enough, therefore, that the starting-point in the whole matter is to determine correctly the length of the month in days, and the length

of the year in days, so that they may be compared with each other.

Few people may realize how very accurately this can be done by careful observation, without scientific instruments, by simply counting the days. When the moon is actually new, it is close to the sun and cannot be seen; and at full moon it is difficult to estimate just when the moon is truly full. But the ancients found that the moon's quarters could be well observed, that is, the day and hour when the moon is exactly half-bright. The length of the month could thus be measured between the corresponding quarters. It would be found, however, that the length of successive months was not equal, because the speed of the moon's motion varies in a way that does not correspond with its phases. Any observant person can see for himself that the distance which the moon moves on the face of the sky, from one evening to the next, is appreciably different at different times. The ancients termed this the "anomaly" of the moon; but they found the true average value of the lunar month with a remarkable degree of accuracy, as their lunar calendar shows.*

The simplest way to determine the length of the year, is by noticing the point on the horizon where the sun rises or sets, and counting the days till this occurs at the same point in the following year. Anyone who has been in the country or at the seaside where there is a good horizon, must have noticed that the point at which the sun sets shifts in position on the edge of the sky. Some notch in a line of distant hills will readily serve as a reference mark. The Egyptians used specially constructed temples for this purpose, which were in reality masonry telescopes, directed to the Equinoxial point on the horizon. On the same day of each year, a beam of light at sunrise shone directly along the axis-line of the temple. By counting the number of days, a very accurate length for the year, to a close fraction of a day, could thus be determined in course of time. The Chaldeans appear to have preferred the method of marking the length of the sun's shadow at noon, as given by the highest point on a tower or temple; and in this way

* It may be supposed that the true length of the lunar month could be deduced from eclipses of the sun and moon. But to give a correct result, the interval between the eclipses used would need to correspond with the "anomalous month." The observations from month to month, as here described, would furnish a more trustworthy average value in the long run.

the corresponding day in each year could be determined, and the length of the year ascertained.

It may be well to note just what these observations of the point of sunrise or sunset on the horizon would reveal. Any day in the spring or autumn could be chosen as a starting-point for the observations, when the point of sunset is changing most rapidly.* After the lapse of one year it would be found that the nearest sunsets were slightly off the point chosen, because of the odd quarter-day in the length of the year ($365\frac{1}{4}$). But on the fourth year the sun would set very precisely at the same spot, giving a count of 1461 days for the four years. In so short a period as this, it could therefore be found that the year contained $365\frac{1}{4}$ days, and in 40 or 60 years a still more accurate value for the fraction beyond 365 days could be determined. It is futile therefore for critics to maintain that the true length of the year was not known in very ancient times, for the earliest records discovered prove the attention given to astronomy.

A year of 360 days, made up of twelve months of 30 days, may have been used for convenience; just as astronomers at the present day base their reckoning on the Julian year of 365·25 days, to avoid the inconvenience of leap years in their calculations, although they are quite aware that it is not correct.† This year of 360 days is also the mean value between the solar year and the lunar year of twelve lunar months; a compromise which may indicate a desire to harmonize these, and which thus points to a knowledge of the length of both year and month. It was in use as early as the Flood (compare Genesis 7; 11: and 8; 3-4); and the Egyptians continued to use it, although they knew the true length of the year with accuracy.

We cannot suppose that ancient astronomers did not know just where the heavenly bodies were, while they were invisible. For example, they named the Signs of the Zodiac after the seasons of the year when the sun was in its various constellations. They thus knew which stars the sun was amongst, although they could not see them at the time. The "dog-days" of summer heat occur when the sun is nearest to Sirius, the dog-star.

* The summer Solstice is the least suitable time; and the orientation of some Egyptian temples to the Solstice, as well as Stonehenge, had no doubt a different motive; probably in relation to sun-worship.

† See the clear explanation of this usage by Simon Newcomb, Superintendent of the American Nautical Almanac, in his work: *The Recurrence of Solar Eclipses, with Tables.*

They must also have been quite aware of the moment when the moon was new, although it was then invisible; for the ancient Chaldeans were able to predict eclipses. It is only by holding to the Scriptural account, which shows that early man was highly endowed with natural intelligence, that we can understand aright. The theory of the evolution of man, by gradual development from the level of a degraded savage, is thoroughly misleading in any investigation of the achievements of early men.

CALENDAR SYSTEMS.

It would appear that a keen endeavour of the wise men of old was to reconcile the lunar month with the year. Their ambition was to discover a cycle of years which contained some complete number of lunar months, with less than a day of error, over or under, at the end of the cycle. Some very ancient cycles of this kind are known, one of them being even attributed to Enoch. As far on as the Greek times, lunar months were used in the calendar devised by means of a cycle that bears the name of the Greek astronomer Meton (432 B.C.) although the cycle is believed to be of much earlier origin. The system Meton devised was further improved a century later by Callippus. The Romans also, at the beginning of their career, made trials to reconcile the lunar month with the year; but they had quite lost the accuracy of the more ancient nations. Their calendar went through one phase of confusion after another for six centuries, from the days of Numa Pompilius to Julius Caesar (46 B.C.). He gave up the lunar months altogether, and the Julian calendar, which he devised, accords with the sun only, the months being merely an arbitrary division of the year into twelve parts that are neither equal nor orderly in their arrangement. In contrast with these attempts, the Hebrew calendar, a dozen centuries previously had accomplished the reconciliation of the movements of the sun and moon in a very admirable way, and without any necessary dependence upon a cycle.

We must pass over the calendar systems of the various nations with a mere mention of the means used to maintain their accuracy, for comparison with the Hebrew system of reckoning. The solar calendar which we inherit from the Romans, is kept true to the seasons of the year by making every fourth year a leap year of 366 days. The years ending the centuries (1800, 1900, etc.), are not leap years, except at the

end of every fourth century. It thus requires a period of 400 years to complete the adjustments of intercalary days.

The use of the lunar calendar was widely extended by the Mohammedan conquests which began in the seventh century; and it has been the calendar of all the Bible lands of the East until quite recently. Its year consists of twelve lunar months, making up 354 days and a fraction. The months have 29 and 30 days which alternate evenly, and all the adjustments are made in a cycle of 30 years, during which there are 11 intercalary days. The accuracy of this calendar is very remarkable, in view of its being based on the length of the lunar month. Its error is only one day in 2439 years; whereas the Julian calendar, which was in use in Europe until the reform of 1582 A.D., has an error of one day in 128 years. The great disadvantage of this Mohammedan calendar is that the beginning of the year falls back continually to an earlier season.

The nations of Europe and Western Asia settled down to the use of these calendars during the Christian era; and thus abandoned the nobler endeavour of the earlier peoples to maintain a truly natural calendar, in which the sun and the moon are equally recognized.

THE HEBREW CALENDAR.

In this calendar the months conform to the moon and the year to the sun. In counting by lunar months, the first day of the month is at the New moon, and the Full moon is on the 15th day of each month. It was ordained at the Exodus that the year was to begin in the spring, and that the Passover was to be held on the 14th day of the First month. This change in the calendar was no doubt one of the divine ordinances which were intended to keep the Hebrews a separate people. Yet, according to Josephus the year of the other nations which began in autumn was retained for commercial purposes; and it is still used by the Jews of the present day. In the year of the seasons, the reference mark for the spring is the Equinox, when the sun crosses the Equator going northward. It is evident that there must always be a New moon within 15 days of the Equinox, either before or after, because the length of the lunar month is $29\frac{1}{2}$ days. If then the beginning of the First month is counted from this New moon, the Passover will always remain at the spring season. The twelve lunar months of the year, when counted forward from this, will fall short of a full year by 11 days; and

whenever this shortage amounts to a month a thirteenth month must be added at the end of the year. This will usually be required every third year. In this way the months will be kept in accord with the seasons.*

The Hebrew system can thus be reduced to a very simple rule: The first day of the First month is to be at the New moon, which is within 15 days before or after the Equinox in spring. Whenever there is the space of a month between this New Moon and the one at the end of the Twelfth month preceding it is to be made a Thirteenth month at the end of the year.

This is a most natural way, and a beautifully simple one; because it enables the true months of the moon to be used, while at the same time the seasons are kept in their right place in the year. It is strange that many Bible Dictionaries, and other compendiums of Scripture information, seem to look upon the Hebrew calendar as primitive and crude. This can only be because they do not understand the complexity of the problem of reconciling the natural month with the year, by any method of astronomical calculation, or by means of some soli-lunar cycle; and they fail to appreciate a system which affords a solution that can go on for all time without accumulating any error. Practically all the modern nations have abandoned the attempt to maintain a natural calendar; but the Chinese still adhere to it by means of a highly astronomical method which contrasts with the simplicity of the Hebrew system.

The Chinese regard the Zodiac as divided into twelve spaces or "Signs" of exactly 30 degrees each, which thus make up the complete circle of 360 degrees through which the sun moves in the course of the year. Their calendar rule is then as follows: Whenever two New moons occur during the time that the sun takes to travel through any one Sign of the Zodiac, an extra lunar month is to be put in the calendar. To carry out such a rule, it is evident that great precision is required (either by calculation

* In accordance with the position of the First month as here defined, the Full moon of the Passover would be at the Equinox or after it up to the limit of a month later. This corresponds with the decision of the Council of Nicaea (in 325 A.D.) in regard to the position of Easter; that it is to be "on the Sunday following the Full moon which occurs on or next after the day of the vernal Equinox." If it were maintained, however, that the Passover should rightly be kept at the Full moon which is nearest to the Equinox, whether before or after it, the months would be set back 15 days earlier in the solar year than as here defined. But this would in no way alter the bearing of the present discussion.

or careful observation) to determine just when the sun crosses each of the 30-degree lines on the face of the sky, which divide the Signs of the Zodiac ; as well as to correlate these crossings with the time of New moon. Also, the speed of the sun's motion on the face of the sky is slightly lower in summer than in winter ; and the two New moons looked for are therefore more probable in the summer-time. The extra month has thus usually to be put in about the middle of the year, which is a practical inconvenience.

The advantages of the Hebrew calendar may be summarized as follows :—

(1) The months of the year are natural lunar months, so that the New moon is always at the beginning of the month, and the Full moon on the 15th day. This is of much practical service to agriculturalists and fishermen.

(2) The number of days in the month are 30 and 29 alternately, during the twelve months, making up the 354 days of the lunar year. This regularity is in marked contrast with the months that we use.

(3) The additional month, when required, is always at the end of the year, and does not break the sequence of the usual months. This extra or intercalary month is required after 3 years, or sometimes after 2 years ; and it comes in automatically according to the position of the New moon in relation to the Equinox in spring, when the year begins. (In a period of 19 years, according to the Metonic cycle, seven intercalary months are required.)

(4) The first day of the year is always within 15 days of the spring Equinox, before or after it ; and accordingly the seasons can never be more than half a month early or late, as an extreme limit, in relation to the calendar.

We may not know definitely that this calendar was of divine origin, although this may almost be inferred ; because at the Exodus the Lord commanded the Israelites to make the Passover month the First month of the year, and thus to begin their year in the spring, instead of the autumn, which was the custom amongst other nations. (See Exodus 12 ; 1-2.) We readily recognize also how well adapted this calendar is to the sacred feasts which the Lord appointed, and it may even be that

this was a dominating purpose in the arrangement of the calendar. All the feasts were in the first seven months, and the intercalary month was so placed that it did not disturb them. The prominent days in the principal feasts were on the 14th or 15th of the month, when the moon was always full. (See Leviticus 23 ; 5, 6, 34 and 39.) From the beginning of their national career, at the Exodus from Egypt, this calendar was in use, and all the months mentioned in Scripture, and the dates given in the Prophets and other books, are in conformity with it.

RELATION OF THE CALENDAR TO CYCLES.

The typical year for the Hebrew calendar is one in which the first day of the First month falls on the vernal Equinox ; for the seasons, which are governed by the sun, then have their truly correct positions in relation to the months, which are lunar. A question accordingly, that leads to most interesting results, is this : If we begin with this typical year, in which the New moon occurs exactly at the vernal Equinox, how many years will elapse until this happens again ? To answer this question we must discover a cycle of solar years that contains some number of complete lunar months within some very small fraction over or under ; that is, a soli-lunar cycle correlating the month and year ; which is one of the four types of astronomical cycles that there are. The cycle required would begin with a New moon at the vernal Equinox, and this would occur again at the end of the cycle, and the lunar months would thus again have precisely the same position in the solar year.

The relation of such a cycle to the Hebrew calendar is very evident. For if a period of years contains any complete number of lunar months, this will show just how many intercalary months are required in the period. To illustrate this we may take the Metonic cycle of 19 years, which contains 235 lunar months or lunations almost exactly. Twelve lunar months in each of these 19 years make only 228 months, leaving seven over ; which shows that seven intercalary months are required in the course of the 19 years. In the Hebrew calendar system these months will fall into their places every three or two years, in accordance with their relation to the Equinox, as already explained. Yet the cycle makes clear what is required, while, on the other hand, the Hebrew calendar will always accord automatically with any cycle that may exist.

It is very remarkable that the most accurate cycles ever found have been deduced from the prophetic numbers 1260 and 2300 in the book of Daniel. This was first pointed out by M. de Cheseaux in a publication issued in 1754, and he termed them the "Daniel Cycles." They were discovered by accepting the view that the days in Daniel represent years. One of these cycles (now known as the Cheseaux cycle) is so exact that its error is less than one day in 12,000 years. The most comprehensive of all was announced by the writer in 1905; being based on the same two numbers in Daniel, but in another way. It brings the complete lunar year of twelve months into accord with the solar year, with such exactitude that the error would be less than a day in 16,000 years. If such results were better understood, they would convince anyone that the book of Daniel is entitled to reverent consideration instead of hostile criticism.

We may here give a comparative summary of a few of the best soli-lunar cycles. The New moon at the beginning of the cycle is assumed to occur with precision at the moment of the vernal Equinox, when the sun's centre crosses the Equator; and the error at the end of the cycle is indicated by the interval between the Equinox and the last New moon of the cycle.

Metonic Cycle.—19 years = 235 lunations. New moon at end of the cycle, 2 hours $4\frac{1}{2}$ minutes after the Equinox.

Jubilee Cycle.—49 years = 606 lunations. New moon at end of the cycle, one day, 7 hours and 55 minutes before the Equinox.

Cycle of 315 years = 3896 lunations; this period being one-fourth of 1260 years. New moon at end of the cycle, 2 hours and 50 minutes before the Equinox.

Ancient Cycle of 600 years = 7421 lunations. The error in this long cycle of six centuries is only a little over 1 day.

Cheseaux Cycle.—1040 years = 12,863 lunations. This period is the difference between two of the numbers in Daniel taken as years, namely, 2300 less 1260 = 1040. New moon at end of the cycle, 1 hour and 53 minutes after the Equinox.

As the period of 315 years is a cycle, it follows that 1260 years and its double 2520 years are also soli-lunar cycles. At the end of the long period of 2520 years which constitute the whole "Seven times" or Times of the Gentiles, the moon has the same position relatively to the sun, within one day. The

Hebrew calendar would thus maintain the months of the year in their true relation to the seasons, within a day in this age-long period.

We may thus appreciate one aspect of the training of the people of God under divine supervision. They were kept in touch, in their daily lives, with the two great "lights in heaven" which the Creator had appointed to afford a measure for time. The count ran on to the Jubilee, which was a type of the final fulfilment of the purposes of God. The minds of the Hebrew people were thus prepared for the numbers revealed to the Prophets, by which the correlated movements of the sun and moon measure out great cycles of time. By these, in the providence of God, a limit has been placed upon the dominance of evil and injustice in the world. The final jubilee would at length arrive when this "mystery of God" would be finished. A King will then reign in righteousness who shall not fail nor be discouraged till He has set judgment in the earth, and His dominion shall continue as long as the sun and moon endure.

REFERENCES TO CYCLES.

The Cyclical Character of the Prophetic times.—Full explanation of a series of soli-lunar cycles, and relation to cycles corresponding to the numbers in Daniel: 1260, 1290, 1335 and 2300. (*First Elements of Sacred Prophecy*, Chap. XIII, Sect. X, pages 367-372, by Rev. Prof. T. R. Birks, 1843.)

Cycle of Cheseaux.—Explained in *The Approaching End of the Age*, 13th edition, Part IV, Sect. III, Chap. III, pages 399-406, by Dr. H. Grattan Guinness, 1897.

Cycles: general summary.—Description of the four types of astronomical cycles, and their relative accuracy on a comparative basis, with announcement of a cycle of the highest type. ("Solar and Lunar Cycles implied in the Prophetic numbers in the book of Daniel," *Trans. Royal Soc. of Canada*, Vol. XI, Sect. III, pages 33-52, by Dr. W. Bell Dawson, 1905.)

DISCUSSION.

The CHAIRMAN (Rev. A. H. Finn) said: I must confess I find it difficult to follow some of Dr. Bell Dawson's arguments. The paper deals largely with the difficulty of adjusting a year of

lunar months with the solar year, and suggests (p. 48) the desirability of finding "a soli-lunar cycle correlating the month and year." Five of the "best soli-lunar cycles" are mentioned (p. 49), but none of these absolutely dispose of the difficulty. In each case, at the end of the cycle, there is some small difference (here called "error") between the solar and lunar reckonings left over. It is curious that the shortest cycle quoted (the Metonic of 19 years) only differs from the longest (that of Cheseaux, 1040 years) by $11\frac{1}{2}$ minutes.

That cycle, 1040, is obtained from "two of the numbers in Daniel" (p. 49), and those numbers are given as "1260, 1290, 1335 and 2300." So far as I can ascertain, the actual number 1260 does not occur in Daniel. The phrase "a time, times, and a half" occurs in two passages of Daniel—7 ; 25, the duration of the power of the blaspheming king, and 12 ; 7, the time of "the end of these wonders." In Revelation 12 ; 6, 14, the same phrase is equated to 1260 days as the time spent in the wilderness by the "woman clothed with the sun." It is doubtful whether these three passages can refer to the same period, but it is quite likely that the passage in Revelation shows the meaning of the phrase in Daniel. Yet even allowing that the number 1260 is indicated (though not stated), why should this be associated with 2300, which only occurs in Daniel 8 ; 14, as the time when the sanctuary shall be cleansed ? why should the other two numbers be disregarded ? and why should the one number be deducted from the other ?

It is said that this cycle was "discovered by accepting the view that the days in Daniel represent years" (p. 49), but that view is open to serious question. If it is urged that it is generally allowed in dealing with the prophecy of the "Seventy Weeks" (Daniel 9 ; 24), it is to be noted that in that passage the word "day" does not occur, and the word translated "week" simply means "a group of seven." That is no authority for understanding "years" where the text explicitly states "days." Revelation 11 ; 2, mentions a period of 42 months, and the next verse has 1260 days, which looks very much like literal months of 30 days. In Daniel 8 ; 14 (where 2300 is found) the unusual expression "evening-morning" occurs, which again looks like a literal day, not a year. The two numbers 1290, 1335 (Daniel 12 ; 11, 12) come close after the "time, times, and a half" of v. 7. If that means $3\frac{1}{2}$ years (of 360 days = 1260,) then

the next number (1290) is one month later, and 1335 is $1\frac{1}{2}$ months later still.

In the Hebrew calendar, it is said (p. 47) "The number of days in the month are 30 and 29 alternately . . . making up the 354 days of the lunar year." That may be true of the present Hebrew calendar, but there is no trace of it in Scripture. Genesis 7 ; 11, and 8 ; 3, 4, make 5 months equal 150 days, which means a month of 30 days and a year of 360, which also fits with the sequence of numbers in Daniel 12 ; 7, 11, 12. Nor am I aware of any mention in Scripture of the additional month, Ve-Adar, which has to be occasionally introduced. On p. 49 it is said that 2520 years "constitute the whole 'seven times' or Times of the Gentiles." The only period of "Seven times" in Scripture refer to the 7 years of Nebuchadnezzar's insanity. The "Times of the Gentiles" (St. Luke 21 ; 24, probably referred to in Romans 11 ; 25, "the fulness of the Gentiles") is nowhere referred to as a period of "Seven times."

There is a much simpler cycle of years for adjusting the lunar months to the solar year than any propounded by Dr. Bell Dawson. Taking first the lunar year of 354 days, a cycle of 8 years is sufficient if an intercalary month of 30 days is inserted at the end of the 3rd, 6th, and 8th years, respectively. Thus—

8 lunar years of 354 days	...	...	=	2832 days.
3 intercalary months	...	...	=	90 "
Total	...	...		<u>2922</u> "

Equally, 8 solar years of $365\frac{1}{4}$ days ... = 2922 "

There is reason, however, to think that the Scriptural year was one of 360 days, a mean between the lunar and solar years. A cycle of 40 years would satisfy this if intercalary months were inserted at the 6th, 12th, 17th, 23rd, 29th, 35th, and 40th years (sequence 6, 6, 5, 6, 6, 6, 5 = 40). Thus—

40 luni-solar years of 360 days...	...	=	14,400 days.
7 intercalary months of 30 days	...	=	210 "
Total	...		<u>14,610</u> "

Equally, 40 solar years of $365\frac{1}{4}$ days ... = 14,610 "

Since 40 is a multiple of 8, the end of this cycle would coincide with that of the lunar years.

40 is an important Scriptural number (40 years in Wilderness; 480 from Exodus to Solomon's Temple). The Cheseaux cycle, $1040 = 40 \times 26$ ($\frac{1}{2}$ the number of weeks in a year).

Lieut.-Col. KENNEY-HERBERT said: The data contained in this paper will be valuable to those who are interested in the statements of time to be found in the Bible, especially to those who, like myself, are ill-equipped to grapple with the problems which calendars present.

Re the first paragraph on p. 46, I submit that the Hebrew calendar, unlike those of all other nations, was designed to render those who were to use it entirely independent of all formulæ and cycles which a human knowledge of astronomy could suggest. Any observant agriculturalist could tell the day of visible New Moon without any scientific knowledge. He could see for himself whether or no, on any given New Moon, the barley was showing above ground: if so, that New Moon was the first New Moon of the year. All the Feasts of the Lord would fall into their designed place, when once this fact had been noted.

In such a calendar there is no need for exact Full Moons or Equinoxes. In fact, they cloud the issue, and are pitfalls into which many a chronologist has fallen. The endeavour to combine human science with the Law of Jehovah is, I believe, contrary to the spirit of Scripture. If we, however, want to reconstruct the facts as they were, a simple formula, such as that given in *Creation Centred in Christ*, by H. Grattan Guinness, will enable us to fix an astronomic New Moon within the probable margin of two hours, and the 1st day of the month with reasonable certainty. Calculation must do for us what eyesight did for those who lived in Bible times.

I presume that we are interested in calendars merely because, without their aid, we could never understand the exact meaning of the Bible statements of time. There is another snare into which we may fall, that is, the endeavour to harmonize Bible and secular history. It is impossible to do so. The latter is hearsay evidence at best, and not always disinterested evidence: the former we believe to be the accurate statements of the Spirit of God.

If it be correct that "cycles" are unnecessary in God's Calendar, yet He may have used them in His plan of the ages. For it is interesting to note that the space of time from the day of sin at Kadesh-Barnea to the forward movement begun on the day of the passage of the brook Zered, was exactly two Metonic Cycles. Again, if I have rightly understood the time statements of the Bible, and added them together correctly, there were 102 Metonic Cycles from the Covenant with Abraham (Genesis 15) to the Ascension and to Pentecost. The Solar Years of this period would run out at Ascension, and the Lunar Years at Pentecost, as the 2 hours $4\frac{1}{2}$ minutes difference of each cycle amount to over 9 days in the period in question.

In conclusion, I would add that the units of time given to Israel by Jehovah in Numbers 28 were all associated with prayer and worship, and that the calendar was made dependent on the visible New Moon in order to inculcate watchfulness. The lesson, therefore, is "Watch and Pray."

REV. HAROLD C. MORTON, Ph.D., said : Dr. Dawson has argued how simple and effective the Hebrew calendar was, the months conforming to the Moon and the years to the Sun : the New Year beginning at first 15 days after the autumnal equinox (say, October 7th), when the New Moon is due, and each month beginning with the New Moon, although at the Exodus the year's beginning was altered from the Autumn to the Spring. The special value of Dr. Dawson's paper seems to me to be the harmony sought (and so nearly reached) in his own soli-lunar cycle between the years and the months.

So far as the length of the *year* is concerned, I want, however, to call attention to Mr. Norman Denham's contention that the Hebrew year was not solar, but sidereal. It is worth while pointing out that the passage in Genesis 1, which says that God made the sun and the moon for days and months and years, adds the words, "He made the stars also." In his small work (small in size, but not small in any other sense), *The Hebrew Calendar Cycle*, Mr. Denham finds the first calendar clue in Exodus 12 ; 41 and 51, where it is twice repeated that "the sojourning of the children of Israel, who dwelt in Egypt, was 430 years. And it came to pass at the

end of the 430 years, *even the selfsame day*, it came to pass that all the hosts of the Lord went out from the land of Egypt." On the Hebrew system of inclusive reckoning, his formula "at the end of 430 years" means "after an interval of 429 years." This (Exodus 12 ; 41) is an immensely significant statement, and shows that Hebrew reckonings must have been such that, without losing or gaining even so much as *one day*, the datings of the Hebrew year repeated themselves after an interval of 429 years (*i.e.* from Abraham's departure from Haran, *see* Galatians 3 ; 17, to the day of the Exodus).

Mr. Denham's studies have led him to the conclusion that the cycle indicated is one of 39 years, 429 being an exact multiple of 39. That period, 39 sidereal years, falls short only by a very small fraction of 14,245 days. The difference between the solar and the sidereal year is only 20 minutes, 23 seconds, but this is sufficient to make all the difference between exactitude and inexactitude in the statement "the selfsame day" (Exodus 12 ; 41): for 39 solar years are more than half a day short of 14,245 days in length, and in 72 years solar time would fall behind sidereal time by one day. Solar time, then, does not accord with the statement in Exodus 12 ; 41. There is some variation, also, in solar time, which is getting gradually shorter ; but sidereal time is the one time which may be called fixed and without variation. Mr. Denham's investigations of Bible chronology have shown that the sidereal year and the cycle of 39 sometimes multiplied by 11, *i.e.* 429 years, fit with wonderful exactitude into the system of Bible datings. Time could stretch over a period of 17,775 sidereal years before one day was gained, and every 39 years the same series of datings would recur. To quote a phrase of Rev. David Nield, who is trying to reform the calendar of New Zealand, there is in the world to-day a great deal of "tangled time." But the Bible seems to offer material that should help to untangle our calculations.

Dr. Dawson speaks of the soli-lunar cycle, announced by himself in 1905, and based on the numbers 1260 and 2300 in the book of Daniel, which brings the complete lunar year of 12 months into accordance with the solar year with such exactitude that the error would be less than a day in 16,000 years. When one puts side by side with this the fact that 17,775 sidereal years gain only one day,

is it not possible that Dr. Dawson would find, reckoning with the sidereal year instead of the solar year, that there would be, apart from negligible fractions, perfect harmony between the sidereal and lunar years ?

Mr. WILLIAM C. EDWARDS said : The Jewish year 5688, which began on Tuesday, September 27th, 1927, was a so-called *ordinary* year of 354 days, and was the seventh in the 300th cycle of 19 years each—1921-39. This present Jewish year, 5689, began September 15th, 1928, and is an *embolismic* year of 385 days. The year to begin October 5th, 1929, will be a year of 353 days. Each year is regarded by Jews as *annus mundi*.

Now the Jewish year is what we may call a natural year, running apparently from harvest to harvest. It is worth while inquiring whether this was not the world's *original* calendar, and whether the new year which, by divine ordering, was made to begin at Passover (*see* Exodus 12 ; 2), was an alteration of this calendar. If Adam was created about harvest-time, coming into a world *blessed* by God, and uncursed by weeds, or blights, or pests of any kind, such a calendar would be just the calendar which we should expect. Is it impossible to conceive that, in the Jewish calendar, we have the original of all calendars ?

Mr. Edwards proceeded to point out the intimate relations subsisting between passages read in synagogue worship, first, of sections of the Law of Moses and then of excerpts from the writings of the Prophets, as these are set out and ordained in the Hebrew lectionary. Thus to the Jew the lectionary became a sort of calendar.

Dr. LOUIS E. WOOD, referring to statements on p. 49 intimated that in Daniel 8 ; 14, the Septuagint represents a reading, not of 2300 evenings and mornings, but rather of 2400 days, an addition of 100 being thus made to the period in which the sanctuary and the host would be trodden under foot.

In the absence of the Author, immediate reply was made by Dr. THIRTLE, as the result of investigations conducted many years ago. In short, he declared the reading 2400 to be an error, confined to printed editions of the Septuagint, in what is known as Codex B

(Vaticanus), as distinguished from Codex A (Alexandrinus), which reads 2300. He added that the Greek version of Daniel, as given in common editions of the Septuagint, was in reality not part of the original Septuagint at all, but was a revision made by Theodotion in the second century A.D. The true Septuagint of Daniel, which was lost for many centuries, was discovered in Rome, in the eighteenth century, by Prince Chigi, and is known by the name Codex Chisianus, and its readings have been carefully collated for modern, and more reliable, editions of the Septuagint. In this place, that Codex, the true Septuagint, reads 2300 days, and thus corresponds with the Massoretic text of the Hebrew original, the Latin Vulgate and the Peshito Syriac. Hence it is placed beyond question that 2300 is a stable reading of Daniel 8 ; 14, and not brought under any qualification from early texts or versions.

WRITTEN COMMUNICATION.

Mr. NORMAN S. DENHAM wrote : Authorities are not agreed that the calendar rules were as outlined by Dr. Bell Dawson, particularly as regards the commencement of the year, for Fynes Clinton says : "We have seen from preceding testimonies that a Jewish Passover was sometimes celebrated before the equinox, and, as Mr. Benson properly remarks, in the Mosaic law there is no injunction which refers to the equinox at all." Again, it is maintained by several that a month was not deemed to commence till the second day of New Moon, whereas Dr. Dawson observes that the day of actual New Moon must have been known in ancient times because the Chaldeans were able to forecast eclipses.

If Meton's cycle with its seven intercalary months in 19 years were known, as it is deemed to be, then the day of *actual New Moon* must have been known to the Hebrews with or without "observation" for the New Moon's disc. But as is well known to students, and admitted, for example, by Sir Robert Anderson in *The Coming Prince*, full moon did not fall on Thursday or Friday in any year from A.D. 27 to A.D. 32, on a date suited to the orthodox ideas upon the beginning of the year, and the week-day of the Crucifixion. The 39-year cycle harmonizing the day, the week, and the sidereal year—which I deem to be the basis of the *fixed calendar* of the

Scriptures from Adam's first day—is unique in the sense that the calendar could have continued close on 18,000 years, unaltered by a day.

With reference to the chronology advanced, I beg consideration of the following facts: In 480 B.C., prior to Xerxes setting out on his famous Grecian Expedition, there was a total eclipse of the sun, as recorded by Herodotus (VII, 37). There is no such eclipse recorded in Oppolzer's Canon. I drew the attention of Sir Frank Dyson, Astronomer-Royal, to this fact, and suggested that an eclipse satisfying the conditions would be found in 401 B.C. according to the telescoping of time deemed necessary from examination of sacred and secular history. In his courteous reply, he showed that of the four total eclipses visible to Xerxes at Sardis, that of January 18th, 401 B.C. (Julian)—in the period 300–500 B.C.—*is the only one tenable*. This would solve a long-known problem, and accord exactly with sacred chronology. If so, then the 2520 and 1260-year periods specified by Dr. Dawson are *necessarily lessened by 79 years*, and the theories of *The Times of the Gentiles* will need to be modified or abandoned.

THE LECTURER'S REPLY.

Writing from hospital (February 12th) after a major operation, the Author is unable to reply at length to the various criticisms of his paper. Some of these are suggestive; and he will be content to let the readers of the paper weigh the different points of view against each other.

The question of the beginning of the "Times of the Gentiles" deserves a note, however. This great period has its beginning in the era of the Captivity in Babylon, in the days of Daniel. Now, there is an interval of about two centuries at that time (say, 740 to 530 B.C.), in which the chronology is more definitely fixed than anywhere else in ancient history. It subsequently becomes less certain until we get well into the Christian era.

In the two centuries referred to, the dates of the kings in the region of Chaldea are fixed with reference to a series of *seven* eclipses of the sun and moon. These eclipses are recorded with all their details; the amount of the eclipse when not total, the hour of the day or night at which they occurred, as well as the month and day,

and the locality where they were observed. They are perfectly definite and unmistakable; and the years of the reigning kings are correlated with them. All this is in strong contrast with the vague accounts of eclipses in later centuries, as seen by armies on the march, with wide uncertainty as to their location at the time.

The interval of two centuries referred to, stands therefore as an island of rock in the midst of the ocean of time, which cannot be displaced by any uncertainties in subsequent history. For the chronology of this interval is correlated directly with the sun and moon. This can only be regarded as providential; as it is here that the Four Great Empires of prophecy have their beginning. The first of these Empires thus records its own starting-point, by means of a scientific (astronomical) method of its own devising. This ideal method places the chronology of the Babylonian and early Persian empires, in the days of Daniel, above the reach of any criticism. It would be well if this were more generally recognized and accepted.

717TH ORDINARY GENERAL MEETING,

HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, JANUARY 21ST, 1929,

AT 4.30 P.M.

DR. JAMES W. THIRTLE IN THE CHAIR.

The Minutes of the previous Meeting were read, confirmed, and signed, and the HON. SECRETARY announced the following elections:—As a Member: Norman S. Denham, Esq.; and as Associates: R. Arthur Button, Esq., and the Rev. W. M. H. Milner, M.A.

The CHAIRMAN then introduced the Rev. Charles W. Cooper, F.G.S., to read his paper on "Some of the Precious Stones of the Bible, with special reference to the High Priest's Breastplate and the Jasper of Rev. iv, 3."

*SOME OF THE PRECIOUS STONES OF THE BIBLE,
WITH SPECIAL REFERENCE TO THE HIGH
PRIEST'S BREASTPLATE AND THE JASPER OF
REV. IV, 3.*

By THE REV. CHARLES W. COOPER, F.G.S.

(Specimens of all stones mentioned in this paper were on view.)

TO many of us the Bible is so manifestly an inspired account of the unfolding plans of God, that we have come, not only to reverence it and value it for its revealed truths, but to be interested in the details of *much* of the subject-matter with which it deals. Part of that subject-matter, which interests us to-day, is that which refers to stones called in the Bible "precious," but which in our day are no longer so regarded.

To take but one or two instances to illustrate this interest in the precious stones of the Bible, let me quote as follows from Exod. xxviii :—

Verse 9.—“Thou shalt take two Onyx stones, and grave on them the names of the children of Israel.”

Verse 12.—“ . . . two stones . . . for stones of memorial.”

Verses 15 sqq.—“Thou shalt make the Breastplate . . . foursquare . . . set in it . . . four rows of stones . . . the stones shall be with the names of the children of Israel . . .”

Verse 29.—“Aaron shall bear the names of the children of Israel in the Breastplate of Judgment upon his heart . . . for a memorial before the Lord continually.”

Verse 30.—“Thou shalt put in the Breastplate of Judgment the *Urim and the Thummim* ; and they shall be upon Aaron's heart, when he goeth in before the Lord.”

Whether the sacred Ark of the Covenant with the Holy Breastplate, its precious stones, and the Urim and the Thummim will ever be rediscovered is, of course, a mere matter of speculation. But it is none the less, to some of us, a pious hope that they may yet be found, and that they may be like the Babylonian Tablets—one more, if not a crowning, proof of the veracity of the Bible records.

In the passages quoted we have set before us precious stones—

As divinely chosen.

With a divine purpose.

Of a divine significance.

It is therefore natural that we should be interested in seeking to ascertain, as far as possible, the nature and characteristics of those stones, or, in other words, which of our modern precious stones are referred to.

The facts as given concerning their use and significance help us to determine what their nature was: *e.g.* that their use and message were of age-long significance leads us to suppose they would be stones of an enduring nature, and this leads us to rule out all soft stones, such as malachite, which the *Encyclopædia Biblica* gives for the Onyx stone; likewise, the fact that these stones were engraved with the names of the tribes of Israel, leads us to rule out of court very hard stones such as the Diamond, said by the A.V. to be the 6th stone of the Breast-

plate. For the same reason we must, I think, reject the (oriental) Topaz, the Ruby, and the Sapphires which are corundums, and only next in hardness to the Diamond.

It will be seen by those who understand the hardness of stones that the stones enumerated by me have a more or less uniform hardness of 7 (Moh's scale), *i.e.* of the hardness of quartz, which from time immemorial the ancients have shown themselves capable of cutting and engraving.

It may not be amiss to mention some of the difficulties which surround an enquiry into the nature of the precious stones of the Bible. The etymology of the Hebrew words used for them renders but little help.

The Hebrew word for the first stone on the Breastplate is *Odem*, the root-meaning of which is "red." Our difficulty is to decide the kind of red stone referred to. The root-meaning of the second name is "engraved," which again gives but little help, since they were all engraved stones. Some of the names given to these stones are foreign words, such as the 7th. The Hebrew word is *Tarshish*, and probably refers to a stone which came from Tarsus, the place of St. Paul's birth, thus giving but little help.

Again, while the rendering of the names of these stones as given by the LXX is helpful to an enquiry, we realize that such help is very limited, on account of the fact that it often translates the same Hebrew words by different Greek words, and, *vice versa*, gives the same Greek word for different Hebrew words.

So again, the help received from the *History* of Josephus, which mentions these stones, is limited, for in places he is strangely inconsistent and contradictory.

So likewise other works of authority, while they are helpful to our enquiries to a degree, are only partially helpful—*e.g.* Pliny's *Historia Naturalis*, published A.D. 77, describes under the same name many stones which are now known to differ entirely from one another.

But not the least difficulty is the fact that very few men seem to have been interested enough to have given an independent study to such an enquiry.

The most helpful authorities, however, are the treatise of Theophrastus "Concerning Stones," 370-287 B.C.; the *Historia Naturalis* of Pliny; and, above all, the actual statements of Scripture in different passages where the precious stones are mentioned and described.

There is, moreover, one other point of importance in the matter, and that is their size. Professor Myres concludes that the stones on the Breastplate were probably as large as $1\frac{1}{2}$ inches or 2 inches in diameter, which again rules out the interpretation given by certain men of stones which have never been known to reach such a size.

As it is manifestly impossible to discuss the nature of all the precious stones of the Bible in the time allotted, I propose only to deal at any length with the 1st, 2nd, 7th and 11th stones of the Breastplate, and the 12th, a Jasper as mentioned by St. John in Rev. iv and xxi.

The 1st stone in the Breastplate, as given in the A.V. and R.V. (Exod. xxviii and xxxix), is called a Sardius: with this the LXX, Vulgate, Syriac, and Arabic versions agree. The Hebrew word is *Odem* (red).

The question is, to what stone does *Odem* refer? In the margins of the A.V. and R.V. it is rendered "Ruby"; but while there can be no doubt the ancients found great rubies in the gravels of the rivers of India and Ceylon, and also understood how to polish the natural surfaces, yet there is no evidence that there existed in those days any knowledge how to cut or engrave a Ruby, which is the next hardest stone to a Diamond. "Ruby" is therefore ruled out.

In passing, it may be stated that the word "Rubies" mentioned in the Song of Solomon refers to red coral.

Josephus renders this word *Odem* as "Sardonyx." This we conclude is certainly wrong. Possibly it is an error of some copyist; if not, it is difficult to understand why he calls the *Odem* a Sardonyx, for the distinction between this and the Sardius was well known by both Greeks and Romans of his day; both Sardius and Sardonyx are mentioned in Rev. xxi.

In Whiston's *Translation of Josephus* the two shoulder-stones (Hebrew *Shoham*: A.V. Onyx) are also wrongly rendered "Sardonyx."

Professors Myres, Flinders Petrie, and Kunz render this *Odem* stone as "red Jasper," because a brilliant red Jasper is commonly found in Egypt and Arabia. But Pliny, who quotes Theophrastus, definitely describes a *Sardius* as transparent, or, as we should say, translucent; whereas all true Jasper is opaque.

My own opinion is that the stone referred to is the modern red carnelian, for the following reasons:—It is a blood-red stone, chosen as symbolical of the redemption by blood of

the first-born among Israel. This rules out the modern "sard" stone, otherwise Sardius stone, which is a dark red-brown stone. This stone was no doubt included in Pliny's variety of Sardius, but it is not blood-red.

The carnelian (often called cornelian—Latin *cornu*—from the horny appearance of its crypto-crystalline nature) is also a chalcedony, a stone which, as Mr. C. W. King points out, comprises by far the greatest number of very ancient seals.

The 2nd stone of the Breastplate is, without much doubt, the modern Peridot, which is a green stone. The Hebrew word is *Pitdah* (root meaning "engraved"). The LXX rendering is "Topazion," signifying a stone of Topazios—an island in the Red Sea. It is rendered by the A.V. and R.V. as "Topaz." But it is clear that *Pitdah* is not the modern yellow Topaz. It is true the LXX, the Vulgate, and Josephus render this word as "Topazion," but Dr. Wm. Smith's *Dictionary of the Bible*, quoting Braun, states: the Topazios of the ancient Greeks and Romans was the modern Chrysolite (golden stone), and *vice versa* our Topaz the Chrysolite of the ancients.

For the reason that the Chrysolite is a golden stone, it appears that Professor Flinders Petrie in *Hastings' Dictionary of the Bible* and Professor Myres in the *Encyclopædia Biblica*, accept the interpretation of the 2nd stone as yellow. But Pliny definitely states that the Topazios was a green stone, "softer than a file, brought from the Red Sea, and still held in high esteem for its green tints." This is further supported by the fact that the three Targums render *Pitdah* by the Aramaic word "Yarkan," from a root meaning "green." We have every confidence in saying the 2nd stone is our modern Peridot, which is green in colour, is a soft stone, and comes almost exclusively from the Red Sea, as Job xxviii, 19, infers "The Topaz of Ethiopia."

The 3rd stone, called by the A.V. and R.V. a "carbuncle," *i.e.* red garnet, cut cabochon, may, in short, be said to be the modern Emerald. The Hebrew word means "flashing." The LXX, the Vulgate, and Josephus all render the word as "smaragdos," the modern German name for Emerald. There is little doubt, I think, this is correct. Professor Myres, Sir Flinders Petrie, and Dr. Driver, however, favour the view of "rock-crystal." Dr. Driver interprets the Hebrew word "flashing" as referring to what is known as rainbow-quartz

(rock-crystal). But since such "flashing" of the spectrum is only caused by an internal fracture of the stone, and is not a characteristic, it would be difficult to think that this stone took its name from an imperfection.

The 4th stone, called in the A.V. and R.V. an Emerald, is probably a carbuncle.

The 5th stone, called in the A.V. and R.V. a Sapphire, is without doubt the modern Lapis Lazuli, correctly described by Job xxviii, 6, and Theophrastus as a stone "having the dust of gold," a reference to the iron pyrites, a characteristic of this lovely blue gem.

The 6th stone is rendered in the A.V. and R.V. as a Diamond. Such a stone is ruled out chiefly on account of its great hardness, for, not till the thirteenth century A.D. was it discovered how to cut a Diamond. The LXX inserts here the Jasper, and Professors Myres and Flinders Petrie follow this order of the stones, because they regard the LXX as more trustworthy than the Hebrew text. My own idea of Inspiration would not allow me to accept this view: for this and other reasons, I am of opinion that the 6th stone should read a "rock-crystal," a stone once commonly confused with the Diamond.

The discussion concerning the 7th stone is full of interest. The Hebrew name is *Leshem*, a foreign word Hebraicised by Moses. The LXX translated it by the word "Ligurion," hence the A.V. and R.V. render it "Ligure," a name since dropped out of English nomenclature. Dana, the great mineralogist, quotes a sixteenth-century authority as the first to mention and describe a Ligure, and concludes that the Ligure is the modern Sphene. But with all due deference to so great an authority, we must rule this out. It is a very rare stone to this day; a large specimen has never been known, and until late years was never found within the borders of the old world. The great interest of this stone is as follows:—

Theophrastus does not mention the Ligurion, but he describes a Lyncurion, like amber.* Pliny ridicules the statements of Theophrastus about this stone, and says, unless this stone of Theophrastus was amber, it nowhere existed.

* From which the R.V. in the margin, Kunz, and others render this word as "amber." But it is not likely that soft fossil resin, which is not a stone at all, would be included among stones of an eternal, enduring nature.

On the other hand, Pliny describes the Ligurion as a stone of the colour of a carbuncle. About A.D. 450, however, Bishop Isidorus tells us the Ligurion of the Greeks was synonymous with the Lyncurion of Theophrastus. Theophrastus described his stone as a stone used for engraving seals, having an attractive power *like* amber. In Chapter 51 of his book he adds : it was pellucid and of fire-colour ; that the polishing of these stones was a work of great trouble.

These descriptions are an exact definition of the modern Jacinth, and fully agree with Pliny's description of his Ligurion : there is very little doubt that the Old Testament Figure is the modern orange-red Jacinth.

The *Encyclopædia Biblica* falls into the error of saying it was probably a clear yellow stone like cairngorm or a chryso-prase. Clearly the writer was unaware that Theophrastus was speaking about red amber. But why this writer suggests chryso-prase as an alternative, I do not know, for that is a green chalcedony.

The 8th and 9th stones, Agate and Amethyst, are without much doubt correctly translated.

The 10th, called a Beryl, I judge to be "a citrine or *golden quartz*."

The 11th stone is full of interest. It is, without doubt, correctly described by the A.V. and R.V. as "Onyx." The curious part is, that so many commentators have missed their way, and have given what is clearly a wrong interpretation to this stone. The Hebrew word is *Shoham*, and the question is, what is a *Shoham* ?

Professors Myres and Kunz, and the *Jewish Encyclopædia* think Malachite may be the stone referred to : Professor Flinders Petrie thinks *Shoham* may refer to green Jasper. This is due to the fact that these scholars regard the LXX as more worthy of credence than the Hebrew. It causes them to search for the name of a green stone the colour of a Beryllion, the name given by the LXX.

Professor Myres admits that the 11th stone is the Hebrew *Shoham*. He quotes the Arabic word "Musahham," meaning "a striped garment," and from this concludes that *Shoham* is a banded stone like Onyx ; but through putting his confidence in the LXX, seeks for a banded Beryllion, and decides upon a banded green malachite.

To my mind the correctness of the rendering of *Shoham* as the modern Onyx is clearly established, for these reasons:—

(i) In Gen. ii, 12, we are told the land of Havilah was famed for its *Shohams*: the river of Pison, “that is it which compasseth the whole land of Havilah, where there is gold . . . there is bdellium and the *Onyx* (*Shoham*) stone.” Pliny gives a similar testimony, and Niebuhr, the traveller, relates how he “saw quantities of Onyxes in the same country,” a fact which could not be said of Beryllions as rendered by the LXX.

(ii) In 1 Chron. xxix, 2, we read that David said: “I have prepared for the house of my God, gold, silver, brass, iron, wood, Onyx stones (*Shohams*) in abundance.” Clearly these were materials for building, and not for beautifying or furnishing the Temple after it was built. The abundance of *Shohams* are on a par with the abundance of iron and wood. Nothing is more unlikely that David prepared an abundance of Beryls—they were far too rare, far too costly; but an abundant supply of Onyxes was easy, and they were no doubt used—as Onyxes have been used from time immemorial—as ornamental bosses to the capitals of stone columns. The Onyx is a striped stone, and is therefore correctly described by the Arabic word “Musahham.”

These reasons are, I judge, sufficient for us to say with some confidence that the 11th stone and the two shoulder-stones worn by the High Priest were the modern Onyx stones.

The 12th and last stone which I would submit to your consideration to-day is the Bible “Jasper” stone, the true interpretation of which, I may be pardoned if I say, it has been my privilege to discover. I have found that the A.V. and R.V. of the Book of the Revelation have each misrepresented the true significance of the two stones mentioned therein, known as the *Jasper* and *Crystal*. They have been mistranslated.

The result of the mistranslations is, that wellnigh all—if not all—commentators have given a wrong significance to those stones, causing the writers to state that when St. John spoke of a “Jasper stone most precious” he could not have referred to the Jasper of modern times, which is opaque, but must have referred to a Diamond or other clear stone like a crystal; or,

in other words, St. John was mistaken in his name of that stone. The explanation put in very few words—I hope not too few—is that the original Greek words explaining the crystal should read, not “clear as crystal,” but “glittering or shining like a crystal” (see Rev. xxi, 11; xxi, 18 (clear glass); xxii, 1). The error has arisen through the writers assuming that the only characteristic of the crystal is that it is “clear,” not realizing that crystal glitters and shines, which was the characteristic to which the Apostle no doubt referred.

The phrase “a stone most precious” (v. 11) seems, without doubt, to refer to the Jasper when polished: unpolished Jasper has no beauty or glitter. Jasper was one of the few stones which the ancients knew how to polish, and it takes a high lustre; unpolished, it never was a precious stone. It was its glittering or shining (polished) condition to which the Apostle referred when describing it as shining and reflecting “the light of the Holy Jerusalem, having the Glory of God” (v. 11).

The Very Rev. Dean Alford, in commenting on Rev. xxi, 19, curiously says of the phrase “pure gold like unto clear glass”: “St. John was not thinking of our gold, but of a glorified gold, thus making foolish what is perfectly true and simple (v. 12): ‘The City was pure gold (glittering in the light) like unto (*i.e.* glittering like) clear glass.’ So, too, chap. xxii, 1, refers to the glittering appearance of the ripples of the River, flowing through the Holy City, lighted up with the Glory of God, *i.e.* ‘glittering as a crystal.’”

Hence, once again the Bible is right and scientifically true, and commentators who correct its statements are wrong.

Now the significance of this wrong interpretation is this: It has led commentators to give a false interpretation to the words of Rev. iv, 3, “He that sat was to look upon like a Jasper and a Sardine stone.” Bishop Ellicott’s *Commentary* says of this verse: “The hue of the Jasper is the difficulty. The Jasper of the 12th stone of the High Priest’s Breastplate (Exod. xxviii, 30) and the 1st of the 12 foundation stones (Rev. xxi, 19) is described by the best authorities as a dark opaque green. But this would be an ill combination with the red Sardine and green Emerald stones in the Vision of this chapter. Is there no further light? Yes, we have a Jasper stone spoken of in chap. xxi, 11, with the descriptive phrase, ‘clear as crystal.’ Does not this point to a stone somewhat different in appearance from that spoken of simply as Jasper?

Such a clear crystal stone would be the most natural companion to the Sardine, and the combination of the sparkling brightness and fiery red suits the union of brightness and flame which appears elsewhere."

And so the Bishop concludes that for Jasper in Rev. iv, 3; xxi, 11, a Diamond should be understood. He thus infers St. John made a mistake, that when he spoke of a Jasper he meant a Diamond.

But there is little doubt the Bishop is quite wrong, also the Very Rev. Dean Alford who, in his *Commentary*, gives the same explanation. Moreover, I might add, the Jasper of the Bible is not, as the Bishop says, the modern opaque dark-green variety, but a translucent bright-green stone, most probably plasma, as I show in my book on *The Precious Stones of the Bible*.

To my mind the true explanation of the scene as depicted by St. John (Rev. iv, 3) is that of a Vision of the glory of our Lord sitting on a Throne over which is stretched a rainbow, and the text suggests that our Lord's countenance is radiating with the colours reflected from the rainbow which encircled Him. In v. 3 the Apostle describes that appearance under the simile of a precious (highly polished) Jasper and a Sardine stone.

Now, as may be proved by anyone, one of the remarkable characteristics of a rainbow is, that although it shines out with the seven colours of the spectrum, they are so wonderfully blended that the two colours, green and red, predominate above all the other tints, and it was these two colours which the Apostle saw in the Vision predominating in the "rainbow glory" upon our Lord's Person, and, wishing to describe the beauty of His appearance under the name of precious stones wrote most naturally, "He that sat upon the throne was to look upon like a (green) Jasper stone and a (red) Sardine stone," which is in every respect a true scientific description of both the rainbow and the two stones so described. [The writer sought to demonstrate the above when reading his paper.]

We now come to a consideration of the Ephod, upon which the Breastplate was worn, and our particular design is to reach some understanding as to the Urim and the Thummim, their special character and definite object. The Scripture passages to be mentioned will include every occurrence of the Urim and the Thummim, together with the renderings of those words in the Greek LXX and Latin Vulgate versions of the Old Testament.

It is true that the Bible gives but a slight account of these things, but this by no means warrants commentators in setting the subject on one side in its entirety. Here and there we find indications alike as to object and usage, and from the particulars supplied we may at least be saved from the thought that in this important detail Israel drew upon the experiences of surrounding nations, godless and benighted. According to Holy Scripture, the institution of the oracle was divinely provided.

In proceeding to set forth conclusions arrived at after a careful study of the subject, we begin with the meaning of the two Hebrew words, as first encountered in Exod. xxviii: "Thou shalt put in the Breastplate of Judgment the Urim and the Thummim: and they shall be upon Aaron's heart when he goeth in the holy place."

Our first conclusion is expressed in the words of Dr. Harold Browne, in Smith's *Dictionary of the Bible*. This writer says: "Hebrew scholars, with hardly an exception, regard the word Urim as a plural word for *or*, meaning 'light,' or 'fire.' It is the same word as occurs in Gen. i, 3: 'Let there be light, and there was light.'"

The LXX, while representing light by the word *phos*, employs three different words when dealing with Urim—*delosis*, meaning "manifestation," in Exod. xviii, 30, and Lev. viii, 8; *deloi*, meaning "visible, clear," in Num. xxvii, 21: Deut. xxxiii, 8; and 1 Sam. xxviii, 6; and part of the verb *photizo*, to shine, or give light, in Ezra ii, 63, and Neh. vii, 65. There is also a reference to the subject in Ecclus. xlv, 10, with the Greek *deloi*.

The Vulgate, or Latin version, gives a much wider interpretation to the word, namely, *doctrina*, meaning "teaching or instruction," in Exod. xxviii, 30, and Deut. xxxiii, 8; *per sacerdotes*, meaning "by priests," in 1 Sam. xxviii, 6; while in Ecclus. xlv, 10, Urim is paraphrased as meaning "endowed with truth." Thus the Vulgate rendering of the word implies a meaning "endowed with truth" for "giving instruction" "by the hands of priests."

Taken as a whole, the quotations represent eight interpretations, as (1) something expressing a divine manifestation; (2) something visible, or clear; (3) something which shines or gives light; (4) a means for divine teaching or instruction; (5) something by which the High Priest shall consult the Lord (Vulgate of Num. xxvii, 21); (6) something used (alone) by

priests (1 Sam. xxviii, 6); (7) by a learned one (Vulgate, *doctus*); (8) something endowed with truth (Vulgate).

As to Thummim, in the words of Dr. Harold Browne, there is "almost a consensus of opinion that it is a derivative, in plural form, from the Hebrew word *tom*, meaning 'perfection, completeness.'" The LXX uses the Greek word *teleios*, meaning "perfection," in Ezra ii, 63, and the word *aletheia*, meaning "truth," in other passages. With this the Vulgate agrees, by rendering Thummim with *perfectus* (perfect) in Ezra ii, 63; with *veritas* (truth) in Exod. xxviii, 30, and Lev. viii, 8; and with *eruditus* (learned) in Neh. vii, 65.

Thus we find four interpretations of Thummim, as (1) something to "express truth"; (2) something which is "perfect"; (3) expressing "perfection"; (4) obtained or understood by "the learned."

Accordingly we accept Dr. Browne's conclusions that "most modern scholars agree that the best English equivalent for Urim is *light*, and for Thummim is *perfection*." The plural form of the words, ending in *im*, is to be regarded as intensive in meaning, and not merely as suggesting a bald plurality.

Our second conclusion is concerning the nature of the Urim and the Thummim: first, *they were instruments of a material substance, separate from the Breastplate itself*. This fact follows in part from the words in Exod. xxviii and Lev. viii, where the command is "put **IN** the Breastplate of Judgment the Urim and the Thummim . . . and Aaron put **IN** the Breastplate the Urim and the Thummim." Josephus gives **ON** instead of **in**, and suggests that the Urim and the Thummim were in some way connected with the stones worn on the shoulder-straps of the Ephod. We must, however, decide for the correctness of the A.V. and the R.V. representing the Hebrew text: something was put *into* the *choshen*, that is, into the Breastplate. The verb and preposition correspond with the use in Exod. xxv, 16: "Thou shalt put **INTO** the ark the testimony which I shall give thee."

The very meaning of the words Urim and Thummim suggest qualities or entities distinct from the Breastplate itself, and it would manifestly be a false interpretation of the command to read it as implying that light and perfection, truth and instruction, were to be put *on* the Breastplate. Most certainly it was never in the power of the High Priest to put or place any such qualities upon the Breastplate. We read in Deut. xxxiii, 8: "Let

thy Thummim and thy Urim be with thy Holy One." The contents of the Ephod could be with God's Holy One, but a divine manifestation, light, truth, instruction could not be with the High Priest, though they might, as qualities or entities, be given to him each time he approached the Almighty for guidance or direction.

The mistake expressed in the words of Josephus, and blindly followed by others, has led to much fruitless speculation; also the theory that the Urim and the Thummim, as manifestations, were connected with the shoulder-stones of the Ephod. For this there is no support whatever in the allusions of Holy Scripture. The distinguished Jewish commentator, Kalisch, gave a sound lead when he said that the Urim and the Thummim were kept within the folds of the Breastplate; and in partial harmony with this, a writer in the *Jewish Encyclopædia* advanced a description of the Urim and the Thummim as "sacred dice."

My own conclusion (1) is that the instruments were of a material nature, placed within the folded *choshen*, or Breastplate, which was to be "doubled" so as to form a kind of bag or pouch, wherein the Urim and the Thummim were deposited. And whereas Josephus maintains that the Breastplate was doubled to give it strength, we must go further and (2) find in the doubling accommodation provided for things that were distinct from the Breastplate itself; in a word, the fold was a receptacle in which something could be placed and safely carried.

Our third conclusion is concerning the origin of the instruments. It has been inferred by some that, in the absence of information as to the origination of the Urim and the Thummim, we must conclude that they represented something already familiar in the time of Moses; in fact, it has been explained that they were symbols already prevalent among surrounding nations, in particular in ancient Egypt and Babylonia. Enquiry along these lines may be fraught with much mischief. If Almighty God has at any time made revelation of Himself, and established means of communication with His creatures, and with a particular nation, why should He not give directions altogether special and original? There is no reason to suspect second-hand ideas, or customs taken from heathen nations, to be accepted in the commonwealth of Israel. When God commanded the making of an ark, was He merely following a heathen custom of employing a box?

To be particular, the Urim and the Thummim, were placed in the bag or pouch of the Ephod, and I submit that they were two crystal stones. These were objects of a common order—so common as hardly to require explanation. To ask whether heathen nations ever used such stones for a similar purpose, were to pursue a fruitless enquiry.

Our fourth conclusion is that the Urim and the Thummim (two stones) were divinely-appointed means whereby the High Priest was privileged to enquire of God, and receive Divine counsel in regard to questions affecting the people of Israel. This conclusion finds vindication in Deut. xxxiii, 8, and 1 Sam. xxviii, 6. In the latter passage we read: "And when Saul enquired of the Lord, the Lord answered him not, neither by dreams, nor by Urim, nor by prophet."

Fifthly, as to the nature of the use of the Urim and the Thummim. In a word, they were means for "casting lots," whereby replies, simple or single, were received in answer to questions submitted by the High Priest. In 1 Sam. xiv, 41, read in the light of the LXX, we have guidance as to the *modus operandi*. The passage reads as follows: "And Saul said, Lord God of Israel, why hast Thou not answered thy servant this day? If this iniquity be in me, or in my son Jonathan, Lord God of Israel give Urim, but if it be in thy people Israel, give Thummim. Then Jonathan and Saul were taken by lot." The subject is discussed at length in Hastings' *Dictionary of the Bible*. Most of the questions asked of God were such that a simple answer of *Yea* or *Nay* was decisive.

Our sixth conclusion is that the crystal stones placed in the Ephod were engraved. Let it be admitted, however, that for this suggestion we have no clear authority. Rather, it is an inference from the facts already before us: (1) They were used for casting lots; (2) the Greek words employed for Urim all lead to the natural supposition that the stones were capable of manifesting light; (3) and no object is more fitted for such a purpose than the somewhat common, but gloriously clear, double-pyramid crystals of pure quartz. It has been suggested that when the Greek translators sometimes rendered Urim by the adjective *deloi* they intended the word *lithoi* (stones) to be mentally supplied. Is not this conclusion supported by the fact that the Hebrew word for "lot," *goral*, originally signified a stone or pebble?

Seventhly, we may go one step further, and suggest that the distinguishing marks between the Urim and the Thummim, the two crystal stones, were simple. The stones were engraved, the one with the letter *Aleph* and the other with the letter *Tau*. *Aleph* is the initial letter of the word Urim, and the first letter of the Hebrew alphabet. *Tau* is the initial letter of the word Thummim, and is the last letter of the Hebrew alphabet. Since the twelve stones upon the Breastplate were engraved, it is not unlikely that the two which were placed in the pouch of the Ephod were also engraved; and since the answers divinely given to the High Priest's questions were simple, being positive or negative as the case might be, for doing or for not doing certain things, it seems probable, as suggested, that the one stone bore the letter *Aleph* and the other the letter *Tau*. Here was the opening *Yea* of permission, and the closing *Nay* of refusal—direction at once clear and definite on the part of Him who is at once the *Alpha* and the *Omega* of truth and judgment.

Our eighth conclusion applies to the nature of the phenomena by which the divine directions were given. In a word, the method was similar to that adopted by God when giving directions to the children of Israel as to the moving of encampments, namely, by the appearing of the divine Shekinah. I submit that this Divine Glory-Light of God would shine into the one stone or the other, into the *Yea* stone or the *Nay* stone, and thus the approval of God, or His refusal, was signified in regard to the particular inquiries made of Him.

A careful study of each passage of Scripture in which reference is made to enquiry of the Lord seems to make it clear that answers of *Yes* or *No* were sufficient and fitting in each case. (See Judges i, 1, 2; xx, 23 and 28; 1 Sam. x, 20 and 22.)

From the judgment of the Urim and the Thummim there was no appeal. How could it be otherwise? "The lot is cast into the lap; but the whole disposing thereof is of the Lord" (Prov. xvi, 33). The bosom folds of the upper garment of the High Priest was the receptacle of "the lot," and that lot, the symbol of Divine Providence, was decided by the withdrawal from the pouch of the Urim or the Thummim, or possibly both, the one or the other alive with the Glory-Light of the Divine Presence.

DISCUSSION.

The CHAIRMAN (Dr. Thirtle) said : The paper to which we have listened is one which, I am convinced, will leave an abiding impression in the minds of many. Mr. Cooper has brought under notice, at once helpful and clear, important passages of Holy Scripture—some of them much controverted as to their meaning—with particular reference to a feature in the garments of the High Priest in the worship of ancient Israel, of whose robes of consecration details are given in the Old Testament. Over the robe of blue was placed the ephod of “fine twined linen,” extending from the shoulders to the waist; and of this we read that it was supplied with shoulder-pieces of onyx stones, on which were engraved the names of the children of Israel: that is, the tribes of the people, six on each stone, in the order of birth of the fathers of the nation. Thus, when appearing before Jehovah attired for sacred service, in Tabernacle or Temple, the High Priest not only stood for the tribes, of which the names were a memorial, but he proclaimed them to be the peculiar heritage of the God of Israel.

In front, the ephod was covered with a breastpiece—four-square and double—called in the English version the “Breastplate of Judgment,” which displayed twelve gems, or polished stones, also inscribed with the names of the children of Israel. These were, quite evidently, near to the heart of the High Priest, and also served as a memorial of the tribes before the Lord during holy exercises, and accordingly we read of Aaron that his attire was “an ornament of honour, a work of might, the desires of the eyes, goodly and beautiful” (Ecclus. xlv, 12). And can we doubt that as the Shekinah glory in the Holy of Holies shone upon the jewels, evidence would be afforded that Jehovah had a complacent interest in the people of His choice? Arranged in four rows, of three stones each row, as appeared in the models shown by Mr. Cooper, the stones seem to represent the various tribes in relations that were individual and characteristic alike in their nature and history. Quite evidently the Breastplate was an object of glory and beauty, and when the High Priest entered the Holy place the interests or spiritual prerogatives of the people were declared by memorials

of stones set in gold, and the priest, coming behind, had a place that was secondary; though the cause was upon his heart he himself was in the shadow.

As already intimated the breastpiece was double, and thus was provided a pocket or pouch, into which were placed other utensils or gems, as Mr. Cooper has suggested, to be precise, two pieces of rock-crystal, apparently inscribed in a manner that distinguished the one piece from the other. If crystal, as suggested, may we not ask whether we have not in the Urim and the Thummim, an instrument which, in the distant past, explains the practice of crystal-gazing, which has had a degrading vogue during thousands of years? These utensils, we would suggest, were not fixtures in the Breastplate, but were placed therein, as it were lodged within the fold, in order that, by measures at once simple and well understood, on the part of the priest, people, and prince, the will of God might be sought in regard to the acts and ways of the chosen nation. Known as the Urim and the Thummim, these utensils, these gems or crystal stones, constituted a divine oracle which was consulted in days before inspired prophets had been raised up to serve the nation in the Name of God.

Thus we see the Urim and the Thummim were placed in the pouch of the breastpiece, to be withdrawn by the High Priest in times when the mind of God was sought on behalf of the people, and it was in view of this that the breastpiece was designated the "Breastplate of Judgment" or decision. In a sense that was special and definite, the Urim and the Thummim were, as we read in Exod. xxviii, 30, "upon Aaron's heart," and whenever the well-being of Israel was, so to say, in the balance, the oracle was consulted. The High Priestly hand drew one of the stones from the pocket of the Breastplate: he drew a stone. He did not draw a stone of his own choice or selection, but one which the Providence of God ordained should appear, and the issue, whether "yes" or "no"—whether Urim or Thummim—was regarded as the answer of God to the prayer or desire of His people.

The process followed has been indicated by Mr. Cooper, as I think with accuracy and force. In view of intimations gathered from Holy Scripture, we are, I hold, justified in the conclusion that *Urim* (Lights) spoke "yes," or acquiescence, and that *Thummim*

(Perfections) spoke "no," or disapproval. The one told of a course divinely *opened*, the other of a course divinely *closed*. And when the utensils or gems, taken from the "Breastplate of Judgment" had delivered their message, there was nothing for it but that the people should obey, accepting and following the will of God as thus ascertained.

In days of exile and estrangement from God, as the prophet Hosea makes plain, Israel is not only without king and prince, but also without sacrifice and priestly ephod, and, if without ephod, then also without the "Breastplate of Judgment." And this is an acknowledged fact of history. But who will doubt, in the light of prophecy, that there is in store for the nation a restoration of divine communion, with a revival of kingship and priesthood, also of sanctuary and oracle, all of them assured for Israel in the days of the Messiah, as implied in Hos. iii, 5? The present is not the time to pursue this issue: enough to realize that, though the Urim and the Thummim are gone, and though the prophets of Israel belong to the past, yet in Christ prophecy and priesthood reach their climax of glory. If we have not the Urim and the Thummim we have the God who gave providential guidance to His people in the ancient days, with experience of His continuing favour.

Our lecturer quoted the words of the wise man: "The lot is cast into the lap; but the whole disposing thereof is of the Lord," in other words, as I would suggest, the Urim and the Thummim, though operated by man, was dominated by Jehovah, who gave decision by the "Breastplate of Judgment." If this passage does not propound the process yet its terms are in manifest agreement therewith.

In conclusion, Dr. Thirtle moved a vote of thanks to the lecturer, and the same was carried with acclamation.

The Rev. A. H. FINN said: There are a number of points in the paper open to criticism, and two in particular:—

(A) *Shoham*.—Where the word first occurs, Gen. ii, 12, the Greek has *prasinos*, of a leek-green colour, which might perhaps apply to the beryl. In Exod. xxv, 7, the Greek has *sardius*; in xxviii, 9, *emerald*; and in xxviii, 20, *beryl*. It is fairly evident that the

translators of the Pentateuch did not know precisely what this stone was. In Job xxviii, 16, it is called *onyx*, and in 1 Chron. xxix, 2, the translator shows his ignorance by merely turning the Hebrew into Greek letters. In Ezek. xxviii, 13, there is a list of nine jewels, all belonging to the Exodus list, but in quite a different order; instead of translating this the LXX simply gives the whole twelve as arranged in Exodus. The LXX renderings cannot be relied on, and our author himself rejects several of them. Then if the Greek words are not to be trusted the evidence of Theophrastus and Pliny becomes irrelevant, since they only deal with the Greek.

The Arabic *Musahham*, though used for a garment which was striped, is from the verb *saham*, which means to be pale or pallid without any reference to stripes. The epithet, therefore, probably refers only to the weak colouring of the garment. If the Hebrew *shoham* is connected with the Arabic *shaham* (as it may be), that, too, probably refers to the colour of the stone, as the Greek *prasinos* does. It is by no means clear that the onyx is indicated.

The quotation from 1 Chron. xxix, 2 (p. 67), is not completed. After enumerating gold, silver, brass, iron and *shoham* stones, it goes on: "stones to be set, stones for inlaid work and of divers colours, and all manner of precious stones, and marble stones in abundance." It is not quite fair to couple *shohams* with "in abundance," and then infer that these were "materials for building."

(B) *Urim and Thummim*.—The statements that these were "instruments of a material substance" (p. 71), "crystal stones" (p. 73), "engraved" with the letters *Aleph* and *Tau* (p. 74), are at best only inferences depending on the assertion that they were "put in" the Breastplate. It is true the Tables of the Law were placed in the Ark, and that the English of Exod. xxv, 16, has "put into" (the Greek even more strongly "cast into"). Yet this does not determine the meaning of the phrase in Exod. xxviii, 30, and Lev. viii, 8. In all three places the Hebrew has some form of *nathan*, "give," and the preposition *el*, "to" or "unto." If the Greek has "cast into" in Exod. xxv, 16, it distinctly has "place upon" in the other two passages. The Hebrew gives no countenance to the rendering "put in" or "into,"

nor would it be possible unless the Breastplate was a kind of bag, and it is very doubtful that the word *caphool*, "double," in Exod. xxviii, 16, means anything of the sort. It is also most unlikely that names of plural form would be given to single stones. There is no reason to think that the plural is "intensive in meaning" (p. 71).

The phrase "the Urim and the Thummim"—so emphatic that it might almost be rendered "these Urim and these Thummim"—comes immediately (Exod. xxviii, 30) after the injunction that Aaron was to bear on his heart "the names of the children of Israel" which were engraved on the jewels of the Breastplate. In Lev. viii, 8, it follows a mere mention of the Breastplate without any details given. Why, then, may not "the Lights and the Perfections" be a sort of summary term for the jewels themselves? It would be an apt description and would justify the use of the plurals. The Hebrew of 1 Sam. xiv, 41, gives no sanction to the LXX gloss. The enquiry by "the judgment of the Urim" (Num. xxvii, 21), which explains the regular term "the Breastplate of Judgment," may mean that the response was by some special flashing of the jewels.

Some minor points:—(1) Diamond, Ruby, Topaz, and Sapphire are ruled out because of their hardness (pp. 62–65). Is it not possible that the ancient Egyptians knew how to engrave them, though the art was afterwards lost and not recovered for many centuries? (2) That the first stone of the Breastplate, *Odem*, was "chosen as symbolical of the redemption by blood of the first-born" (p. 63) is an assumption. Were the other stones symbolical, and, if so, of what? (3) I do not know what authority there is for connecting *Pitdah* with "engraved" (p. 64). Fuerst connects it with a root meaning "bright," "glittering." (4) That *Saphir* is "without doubt the modern Lapis Lazuli" (p. 65) is questionable. Job xxviii, 6, only says (*lit.*): "The place of Saphir is her stones, and dust of gold is to it" (or "him"). The name rather suggests that the Greek "sapphire" is right. (5) "Most precious" (Rev. xxi, 11) is simply the superlative of the ordinary word for "precious," *i.e.* costly, valuable. There is no suggestion of "polished" (p. 68).

Lieut.-Col. T. C. SKINNER said : It is good that the lecturer has bestowed so much care on the eleventh stone, for, on grounds quite other than those he urges his judgment would seem to be confirmed. There can, at any rate, be no gainsaying the fact that the eleventh stone and the two shoulder-stones were the same ; it is when we attach the names that the significance of choice appears.

Pastor F. H. White, in his invaluable book, *Christ in the Tabernacle*, while allocating the names correctly in regard to the shoulder-pieces, as in Exod. xxviii, 9-11, makes a strange mistake in giving a different list for the Breastplate stones, excluding *Levi* and *Joseph* in order to find places for *Ephraim* and *Manasseh*. Doubtless it is, and can be argued, but I submit that the effect is to destroy one of the most marvellously beautiful pieces of symbolic teaching in all the Bible.

The names are the names of Jacob's children, the original twelve tribes, whether we inscribe them from left to right, or from right to left, Hebrew fashion, the eleventh stone inevitably falls to *Joseph*, and, the two shoulder-stones, being also onyx, clearly belong, also, to him who was separated from his brethren, despised, rejected, but exalted of God to be a prince and a saviour, to carry them on his strong shoulders, and be for all time a type of Jesus, their Lord and ours. The shoulder-stones were to be for stones of memorial that Israel might ever remember their sin and the one who saved them with so great deliverance. Is it not also significant that the onyx, though costly, in the sense that marbles are costly, was not regarded a precious stone. "When we shall see Him, there is no beauty that we should desire Him," and that, right away at the beginning there is, in the abundance of onyx, a suggestion of "plenteous redemption."

Mr. W. C. EDWARDS said : May I remind you that the ephod was cut in such a way as to leave the breast of the High Priest bare, exactly to fit. The Breastplate was, therefore, on to the bare skin, with nothing between. I think that a careful study will show that there was what we may call a splendid "colour-scheme" in the Breastplate, which made it a thing of glory and beauty. I suggest that, with the help of the paper, each one should draw a plan and enter the various colours to see what I mean. I once

noted that most of these stones were of the seventh degree of hardness, and all about the same specific gravity, say, round about 2.600.

If I understand things aright the cloth belonging to the Breast-plate was two spans long and one span wide. This was folded in two, and thus made a pocket of the same size as the Breast-plate. Following the lecturer, I imagine that there were two stones unwrought and placed in "the pocket." The High Priest went into the Holy place to enquire at times of great national urgency—to do or not to do? "Yes" or "no"? When he came out, the Shekinah glory, like that glory which remained upon the face of Moses, shone upon the stone that gave the answer. I would suggest that the High Priest may have taken out one stone with the right hand and the other with the left. If the right-hand stone shone with splendour and the left-hand stone was dull the answer was in the affirmative and *vice versa*. If neither shone, then it was, as in the later days of the reign of Saul, "the Lord answered not, neither by dreams nor by Urim, nor by the prophets" (1 Sam. xxviii, 6).

Mr. SIDNEY COLLETT said: The paper is evidently the result of the study of a lifetime, and is most interesting and instructive. The discussion, as usual, has also been interesting. But, as regards the Urim and the Thummim, about which so much has been said, we really know practically nothing at all, and it is well that we should face that fact. We know the meaning of the actual words as "Lights" and "Perfections"; but what they were and in what way God was pleased to make known His will by means of them the Scripture is absolutely silent. I believe it is a fact that no living man really knows what they were or how the Word of God was revealed by means of them.

Mr. PERCY O. RUOFF said: I desire to ask a question arising out of the last paragraph of the paper, and the interpretation of the words, "The lot is cast into the lap, but the whole disposing thereof is of the Lord." I have had frequent occasion to give an exposition of the passage, and have submitted two explanations, one, the practice at one time among the Jews of employing a child of tender

years to draw a lot to determine the question in issue (a child being selected to prevent collusion), and, secondly, the drawing up of a lot from the pouch of the High Priest's garment, and thus giving the judgment of the Urim and the Thummim. Can it be determined with accuracy and certainty which of these two explanations is true? Do any or all of the principal words, viz., "the lot," "cast," "the lap," "the whole disposing," afford sufficient evidence for fixing the meaning?

Mr. W. HOSTE said: It is refreshing to listen to a paper in which the Scriptures are treated, not as the poor infra-human patchwork of the Modernist, but in the way which alone explains their enduring influence, universality and perennial freshness, as a Divine Revelation. The lecturer offers instruction on many points which have often puzzled. On the recondite matter of the Urim and the Thummim further light may well be sought. It is not possible to say that questions would always be answered with a "yes" or "no," e.g. that which opens the book of the Judges: "Who shall go up for us against the Canaanites first?" "Yes" or "no," here would have been inconsequent. This special subject is referred to specifically, I think, only seven times in the Scriptures, in four of which, viz., Exod. xxviii, 30; Lev. viii, 8; Ezra ii, 63; Neh. vii, 65, Urim is mentioned first; then, once, Deut. xxxiii, 8, the order is Thummim and Urim; and in the two remaining places, Num. xxvii, 21, and 1 Sam. xxviii, 6, Urim is mentioned alone. Hence it seems legitimate to infer that Urim was of primary, and Thummim of subsidiary, importance. This is confirmed by the meaning of Thummim which is, I suggest, better rendered "supplements" than "perfections." Gesenius gives among the meanings of *Tāmām* (the verbal root from which Thummim comes), "to complete," "to make up a number," etc. Dr. Edersheim suggests that the Urim were little lights which could be let down into the hollow of the Breastplate, and which illuminated the stones set in the front of it to the names engraved thereon. But five letters out of the twenty-two of the Hebrew alphabet are wanting in those names; they seem to be the *Tzadi*, *Cheth*, *Teth*, *Coph* and *Samech*. If this theory be correct then these letters would have been engraved on a loose supplementary transparent stone, which would be kept

in the Breastplate, and in case the letters in the Breastplate stones failed to make complete sense then the supplementary stone would be requisitioned and the missing letter or letters supplied. If it be retorted that Dr. Edersheim got this from Josephus, then the reply is that this may be one of the instances where Josephus is right.

REPLY BY THE LECTURER.

I am grateful to Mr. Finn and others for taking the trouble to criticize my paper. I am not out to defend my opinions, but rather to try and discover, as far as possible, the true facts as they bear upon the subject under consideration. For my own part, I much regret that so few people are sufficiently interested to make independent inquiry regarding the many points at issue.

Mr. Finn's remarks upon the *Shoham* stone tend to make me more convinced than before that this is correctly interpreted as the Onyx. My critic admits that in five different passages the LXX translates the Hebrew word *Shoham* by five different Greek words. To me this appears to show very clearly that there was no unity of judgment in the minds of the Greek translators.

(1) *Sardius*.—All known authorities, including the LXX version, agree that the Hebrew word "Odem" (red) should be translated "Sardius." My own comment, that the reference is to the blood-red variety, now known as Carnelian, seems to be sufficient to rule out Mr. Finn's claim as to Exod. xxv, 7.

(2) *Prasinos*.—Described by Theophrastus, Pliny, and others as of leek-green colour, a variety of Jasper. This is a stone often referred to by the ancients, and therefore well known. It belongs to the family of chalcedony; it was cut from the rock or a lump of chalcedony. No one suggests that "Prasinos" occurred as separate stones, such as beryls, emeralds, and onyxes. But this is what seems to be implied in two Scripture passages, e.g. Gen. ii, 12, that onyx stones were common to that land, which is true to nature, for they lie about at the foot of the mountains as nodules to this day. Again, in 1 Chron. xxix, 2, we read that David supplied wood and iron (substances), and onyx stones, i.e. the natural stones, not pieces of rock. Thus I think that "Prasinos" is also ruled out as a rendering of *Shoham*.

(3) As to *Beryl*.—Distinctive in nature and crystallization, beryls have, for the most part, been clearly defined by ancient writers, and could not easily be confounded with onyx nodules. Moreover, the fact that beryls are not found in regions described in the passage quoted, while onyxes are, points the conclusion that the LXX is wrong in Exod. xxviii, 20, also.

From these remarks it will be seen that I do not entirely depend upon descriptions given by the Greek writers.

Coming to the criticism passed upon the Urim and the Thummim section of my paper, I admit that some of my statements were inferences; but I think they have this merit, that they were based upon Scripture texts, and were not inconsistent with the information conveyed. In support of the theory that the Urim and the Thummim were distinct from the stones in the Breastplate, I refer to the general tenor of the Scripture passages to which I called attention. These seem to me to show that the Urim and the Thummim were, as objects, distinct from the stones in the Breastplate.

On other points raised I would make reply: (1) As to the hard stones: In every case where ancient Egyptian and Babylonian tombs have been opened, not one really hard stone has been found. (2) As to my reference to symbolism of the colours of the stones: I may remark that many students have felt led to a similar conclusion; and I think it probable that these sacred objects were symbolical in other ways. (3) The Sapphire: I cannot see that the literal rendering of Job xxviii alters my claim on this point, a claim which is in entire agreement with the description given by the Greek writers. Moreover, most authorities acquiesce in my contention that the stone was a lapis lazuli.

I thank Colonel Skinner for his remarks on *Shoham*, identifying the eleventh stone, in point of substance, with the two shoulder-stones—both of them onyxes.

In reply to the question of Mr. Ruoff, I would say that, while not pretending to find in Prov. xvi, 33, a precise description of the act of consulting God by the Urim and the Thummim, I have found in that passage an allusion to the practice. For one thing, the Hebrew word rendered "deciding" is *mishpât*, the same word as is used to define the Breastplate in the book of Exodus, the "Breastplate of Judgment" (*chôshên mishpât*).

I recognize the force of Mr. Hoste's remarks; and in reply I may say that it seems to me that inquiry could in any case have been so submitted as to be satisfied by a simple answer, "Yea" or "Nay." Might not the text chosen by Mr. Host, "Who shall go up?" be regarded as representing a series of inquiries, *e.g.* "Shall Judah go up?", "Shall Ephraim go up?", and so on, until the answer was received?

718TH ORDINARY GENERAL MEETING,

HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, FEBRUARY 4TH, 1929,

AT 4.30 P.M.

ALFRED W. OKE, ESQ., LL.M., F.G.S., IN THE CHAIR.

The Minutes of the previous Meeting were read, confirmed, and signed, and the following Elections were announced:—As a Member: Clair Adrian Wontersz, Esq.; and as Associates: Alfred Cowper Field, Esq., George P. H. Maynard, Esq., and the Rev. Charles W. Cooper, F.G.S.

The CHAIRMAN then introduced Dr. P. J. Le Riche to read his paper on "Scientific Proofs of a Universal Deluge."

SCIENTIFIC PROOFS OF A UNIVERSAL DELUGE.

By PHILIP J. LE RICHE, ESQ., M.R.C.S., L.R.C.P.

THE object of this paper is to show that the stratified layers of the Earth's crust have been laid down comparatively suddenly.

At the present time nearly all geologists are agreed that the whole of the stratified layers have been laid down *slowly* throughout untold ages, and that each layer represents the surface or stratum on which plants grew, and marine or terrestrial animals lived.

This theory, on the other hand, attempts to show that the *whole* of the strata has been laid down comparatively suddenly, due to *re-deposition*, by means of sub-marine and sub-terranean *volcanic* explosions, and that the strata represent only "the graveyard of a past marine and terrestrial fauna and flora."

This theory, therefore, is opposed to the chronology of geologists, and is in opposition to Lyell's theory of *slow* stratification.

If we observe the sediments which go to compose the strata of the crust of the Earth, we find a peculiar sequence of events, which geologists term the "Ternary Succession of Sediments," in which a more or less distinct three-fold arrangement, or succession occurs, in which the sandy, muddy, and calcareous sediments have followed each other.

In order to explain this "Ternary Succession," geologists have to assume that the Earth has been submerged and re-elevated—first below, and then above the waters—and this condition of things must have been repeated many times.

There is, however, another method of explaining this condition, viz. : that these sediments were re-deposited in water, due to the effects of volcanic action—both sub-marine as well as sub-terrestrial—for it can be shown that the strata contain the fossil remains of fish which have been *suddenly* interred before putrefaction had acted upon their fleshy bodies, for their bodies are preserved as they were during life.

But this remarkable state of preservation of fish-life is also found in the flora ; for plants—ferns as fine as maidenhair—are found embedded in the matrix, with even their veinules intact, showing that they must have been buried very shortly after their deposition in the sediments, otherwise they would have become converted into leaf-mould and indistinguishable, whereas a botanist can place that fossil plant in its proper Order of plant-life.

Therefore, both fish- and plant-life have undergone an interment different from that which now obtains, for at the present time if a fish dies, in river, pond, or sea, its fleshy body is preyed upon by the predaceous animals, and nothing remains but, perhaps, its skeleton, otherwise its body would have become converted into adipocere.

How, then, has this state of preservation been brought about, both for fish and plants ? Something *sudden* must have taken place in order to have preserved them.

Professor J. Muirhead Macfarlane, D.Sc., LL.D., of the University of Pennsylvania, in his book, "Fishes the Source of Petroleum," gives an exhaustive description of the manner in which fish have been destroyed and *suddenly* buried before putrefaction had taken place, while their fleshy parts were

intact, and the destructive distillation of their bodies has produced *petroleum*, on which we now depend for the motive power of our internal-combustion engines.

But this Petroleum is found all over the Globe, and at different levels in the soil ; therefore, the *cause* which buried them thus must have been universal.

What was that cause ? What *sudden* catastrophe could have brought about the interment of fish-life, and at the same time the preservation of plant-life in the strata ? Professor Hugh Miller explains the appearance of fish of the “ Old Red Sandstone ” by stating that they were suddenly killed by the action of a sub-marine volcano, and that explanation holds good to-day.

Sub-marine explosions, therefore, took place in the days of the deposition of the “ Old Red Sandstone.” In speaking of the carboniferous deposits, Professor Muirhead Macfarlane states that Professor H. M. Cadell (of the Scottish Geological Survey) *hints* what he—Professor Macfarlane—would *strongly emphasize*, viz. : that the inorganic material of the limestone, and much of the clayey material of the oil-shales, is of *volcanic sub-aerial origin* !

This is indeed an admission ! for here again—higher up in the strata than the Old Red Sandstone—we find a statement coming from two eminent scientists, that *volcanoes* have played a great part in the deposition of the *inorganic* material of the carboniferous layers, in fact that volcanoes were the actual source and origin of the carboniferous layers ! But volcanoes have not the habit of “ spitting up ” their contents *slowly*, and Lyell’s “ Theory of Stratification ” demands that *slow* processes have taken place throughout the strata.

Lyell assumes that what is going on *now*, has ever gone on, and that the present-day processes—multiplied by millions of years—are sufficient to account for stratification, viz. : that as rain brings down sediments to lower levels ; as rivers bring down the sediments from the higher ground to the lakes or sea ; that, as the sea encroaches here and retires there ; that, as land is slowly rising in some places, and is slowly sinking in other places ; that all these phenomena are a sufficient explanation for the laying down of the strata all over the Earth.

If this is not so, what is the other explanation ? Certainly *slow* deposition cannot explain the well-preserved state of thy fish, nor of the plants as stated above.

Let us suppose that at an early period of the Earth's existence, there were *no* stratified layers on the Earth's crust, except the fire-clay upon which the plant-life grew; that organic life had been *created* in a *progressive* manner; that fish had been created from their lowest form, viz. : the single-celled mass of protoplasm up to their highest form the mammal, namely, the whale, etc.; that reptilian life had also been created in the same way from the lowest to the highest form of reptilian life, and the same with other animal forms, and that they had been created so *progressively* that it was possible for them to have mixed their "kinds," and that the hybrids of those days were fertile; hybrids to-day are infertile.

If this were so, it would account for the "links" which we now find fossil, and which have been attributed to Evolution. Huxley tried to persuade Darwin to allow that evolutionary processes might have taken place *per saltum*, in order to explain the many anomalies in the theory of Evolution which Darwin had to encounter. This *progressiveness* in creation would therefore bridge over the difficulties, and account for that which is at present unaccountable.

In those early days of which we are speaking, plant-life was growing luxuriantly in the fire-clay which formed the soil in which the roots of the vegetation were embedded, and which at present is found underlying each bed of coal.

It has always been a puzzle to the geologist to account for the luxuriancy of the vegetation of the coal, so much so that at one time geologists supposed that the atmosphere of those days was composed of carbonic acid gas, until they found embedded in the resin of the trees of the carboniferous vegetation, butterflies, cockroaches, scorpions, etc., which were oxygen breathers; and therefore that theory fell to the ground.

If, however, we allow that there were no other stratified layers than the fire-clay, the solution becomes easy, for the plants would have been in much closer apposition to the internal fires of the Earth which would represent what is at present known as a "hot bed," and would account for the luxuriancy of the vegetation. Animal-life had been multiplying, and on account of the close affinity of their creations, hybrids were the result, the proofs of which we find embedded at the different vertical levels in the strata.

The difficulties which Darwin experienced in evolving his theory as to the "appearances" of animal-life in the strata,

were more than equalled in his attempting to account for their "disappearance," for he says in his *Naturalist's Voyage Round the World*: "The mind is at first irresistibly hurried into the belief of some great catastrophe; but thus to destroy animals, both large and small, in Southern Patagonia, in Brazil, on the Cordillera of Peru, in North America up to Behring's Straits, we must shake the entire framework of the globe . . . Certainly, no fact in the long history of the world is so startling as the wide and repeated extermination of its inhabitants."

But were these exterminations *repeated*? Is it possible that *once* and for all, a great catastrophe *did* shake the entire framework of the globe? And what geologists believe to have been a "Glacial Period," or periods, was but *one* phase in this great and unprecedented *bouleversement*?

Geologists assume that at one or more periods of the Earth's existence there came to pass an unusual phenomenon, the "Glacial Period," and that one hemisphere at least was affected at one time. Croll attributes its cause to astronomical conditions, but if Croll is right, we ought to have evidences of these "Glacial Periods" recurring every few hundreds of thousands of years; which, however, we do not find.

Geikie thinks that one hemisphere was "pushed up" above the snow-line, and later on the other hemisphere followed suit. Neither of these theories seems to fit in with the phenomena which are discovered in "The Book of the Earth," and neither has an explanation as to the "causes" which produced such results.

Let us see what "History" has to say about the matter, for there is a book which states that at *one* precise period—calculated in the year of a certain man's life—in a certain month, and a certain day of that month, "the fountains of the great deep were broken up."

I take it that huge rifts or fissures took place in the ocean-bed, and that the waters came into contact with the internal fires of the Earth, producing huge volumes of steam. When the pressure of that steam reached its "critical point" a submarine volcanic explosion took place, which dislocated the ocean-bed, and redeposited those sediments, according to their specific gravities, in water, either on the ocean-bed, or if land were in the vicinity, over the surface of that land.

The animal-life in the sea in that vicinity would be killed by the explosion—as well as by the mephitic gases—and their

bodies would be buried in the detritus of that explosion : this would happen quickly before decomposition had time to act upon their bodies.

The first fish which are found embedded in the strata—the Devonian or Old Red Sandstone layers—are the mud-fish, which are the slow-moving fish, and this can be explained by the slowness of their movements, and their inability to escape from the oncoming sub-marine explosion ; the quicker-moving fish would escape, but only to be overtaken later on. When one sub-marine explosion had taken place, there would be a lull, during which a fresh quantity of water would rush on to the internal fires, and another sub-marine explosion would be repeated.

Therefore, these sub-marine eruptions would be “intermittent” and yet continuous, and would only cease when the fires were quenched.

Another phenomenon connected with these sub-marine eruptions, would be that a “back-wash” would take place, the same as it did at Lisbon, but of course on a gigantic scale, and it would act upon the freshly deposited sediments, producing the same effect as if “denudation” had taken place, but it would act quickly.

Geologists state that “denudation” takes a longer time to produce than the action of “deposition,” but it can be seen that “denudation” took a no longer time to be produced than it would take for the “wave of translation” to act, that is, at once.

The re-deposition of the sediments, therefore, took place, not only on the land but on the bottom of the sea, and it was possibly in this manner that the “continent of Atlantis” was produced, the sediments of which were undermined by the sea later on, and subsided suddenly. In this manner those portions of the globe which are now islands may have been linked together after the Flood, by means of the deposition of these sediments, and might have allowed migration to have taken place from one island to another, and then have sunk under.

Volcanic eruptions may not have been limited to sub-marine ones, but sub-terrestrial volcanic eruptions may have also taken place : the difference being that the sub-terrestrial eruptions would throw their volcanic *débris* into the atmosphere, and enormous quantities of volcanic ashes and volcanic dust would be distributed. Sir Henry Howorth shows that mud-volcanoes of New Zealand produce the nearest approach to that peculiar

deposit known as the Loess, and it is due to these volcanic emanations that I attribute the origin of the Loess.

One of the most difficult problems which faces the upholders of a *Universal Flood* is to account for the enormous rise of the waters of that Biblical Deluge ; and this has caused many to imagine that the Flood was purely local.

As Huxley stated to Gladstone, with reference to a local Flood : " The plains of Mesopotamia are open to the South, and water has a nasty habit of retaining its own level." This difficulty, however, disappears if the scientist remembers that steam occupies 1,400 times the space of the water that goes to form that steam ; the consequence would be that the waters would be forced up to an enormous extent : but another most important factor would be that when the waters rose they would reach the North and South Polar Regions, where they would come into contact with enormous quantities of ice.

At the Antarctic we find Glacial Ice at the present time 5,000,000 square miles in extent, and from 4,000 to 10,000 feet thick. This Antarctic Glacial Ice together with the North Polar Region's Ice must have had a prodigious effect in raising the waters, for the displacement of that quantity of water by the Polar Ice was another most important factor in the raising of the waters of the Flood.

Ice floats with eight-ninths below and one-ninth above. Professor Sir Edgeworth David, of the University of Sydney, who accompanied Shackleton to the Antarctic, states : " That for every 35 feet thick of ice-cap melted off the Antarctica the sea-level all over the world would be raised about 1 foot ; so that if the average thickness of the ice is now 1,800 feet, and if all the ice-cap were melted off, sea-level all over the world would rise about 50 feet."

If we add to the Antarctica the ice at the Arctic Regions, together with the height to which the waters would rise due to the expansion of steam, we would get a considerable elevation of the waters of the Flood. It would, therefore, be possible, after the Antarctic glaciers had floated away, that rafts of floating vegetation might become deposited on the site formerly occupied by those glaciers.

Let us see what effect this floating ice would have upon the terrestrial surfaces. If floating ice came into contact with igneous rock, it would cut, groove, striate, and polish the surfaces with which it came into contact. In fact, it would act in the same

manner that a glacier would, except that it would act quickly. It might fracture that rock, and carry the fractured pieces on its underlying ledges, and transport them to distant parts. On the rising waters of the Flood, it might fracture the rock which lay at a lower level, and transport it to a higher level on percussion. Professor G. H. Hitchcock found boulders on the summit of Mount Washington 6,000 feet above the sea, which he was able to identify as derived from the ledges of light grey Bethlehem gneiss 3,000 feet lower than Mount Washington (G. F. Wright, *Man and the Glacial Period*).

One well-known "bloc erratic" is that which forms the pedestal on which the statue of Peter the Great once stood in St. Petersburg. That "bloc" was found on the steppes of Russia, in a superficial position, and geologists from far and near gathered to view it, and it was agreed that this "bloc erratic" could not have come from any locality nearer than Norway. The explanation of its presence on the steppes of Russia, many hundreds of miles away from its original position, was given as being due to its transport by a "glacier."

In order, however, to meet the conditions of the case, the mountains of Norway would have to have been elevated to at least three times their present height, and the ice-field which fed that glacier would have to have been many hundreds of square miles in extent. A moraine would have to stretch from Norway to the steppes of Russia, and it would have to be shown that glaciers are capable of surmounting mountain heights.

Now it would have been an easy matter for a floating iceberg to have struck the Norwegian mountain, and to have fractured it: the detritus, including the huge "bloc erratic," might have fallen on to its submerged ledge, and have been transported to Russia, and when the iceberg stranded, it would have deposited its burden where, as a fact, it was found.

Another action of floating ice would be, that if it came into contact with the sea-bottom it would act as a mighty plough, and might push onwards any detritus, such as the shells which are found on Moel Tryfyn. Another action is that, if two masses of floating ice came into contact with the floating bodies of animals, they would crush and fracture their bones, as we find the bones of animals fractured, but not gnawed or rolled, in the "Pikermi Beds of Attica," and elsewhere. Another action is, that when floating, the glaciers of the Antarctic, carrying their

boulder-clay on their under-surface, would melt, and the boulder-clay would become detached and deposit itself vertically over the place at which it was floating at the time ; and this would account for the presence of boulder-clay, when no other evidence of glaciation is found.

On the abatement of the waters of the Flood, these floating icebergs would become stranded, and would again form glaciers, and act as if formed *in situ*. Still another action would be that on the abatement of the waters they would ground, and " pond back " the waters into lakes, which would remain as lakes until the ice-barrier melted and allowed the waters to disperse.

In Ohio we have evidence of this having taken place, on a large scale over thousands of square miles. The presence of floating ice on the abatement of the Flood can be seen in the " Parallel Roads of Glenroy," when an iceberg entered the Valley of Glenroy at its lower part and was unable to find an exit. As the waters fell below the level of the " Col," they rushed out of the Valley by its *embouchure*, carrying the iceberg with them, which dammed the waters back, forming a lake.

As the winter came on, the waters froze at the level of the highest " road." The sides of the Valley having been under water had absorbed water, and, as water expands at 40° C. it split the rock, which fell in pieces on to the ice. In the spring the ice dissolved, allowing the pieces to deposit themselves, forming the Upper " road." During the summer the level of the water in the lake fell to the level of the middle " road." This froze during the succeeding winter, and the same occurrences took place again, the pieces of rock falling on the surface of the ice at the level of the second " road " ; this was again repeated, and then the iceberg melted, allowing the imprisoned waters to rush out, and the Valley is as it is now.

But the highest " road " is over 1,100 feet above the level of the sea ; therefore, as water retains its own level, water must have stood at that height all over the Earth.

Again, we have accounted for the presence of floating ice in that water. These " roads " are perfectly horizontal and perfectly parallel, therefore they must have been produced by water, and the Earth has not moved out of its horizontal since those " roads " were formed.

Let us turn to the carboniferous layers, in which we find coal. In order to explain the presence of coal, geologists assume that each layer of coal represents a past vegetation which was growing

in lagoons close to the sea, and they state this because they find fish embedded in the carboniferous layers. But coal is found in the centre of vast continents hundreds of miles away from the sea. This vegetation sank under the sea for from 10,000 to 100,000 years, and then rose again to the surface. Each layer of coal has its underlying fire-clay. A fresh deposit of fire-clay is supposed to have formed upon the newly-risen surface, and also a fresh supply of seeds from which the future vegetation would derive its plants.

In England we have as many as thirty layers of coal, superposed to each other, and in America as many as eighty coal layers, and each layer has its underlying fire-clay. Whence did each layer derive its fire-clay?

More important still, whence came the seeds for each new coal vegetation? According to geologists, it would take, at the lowest computation, thirty times 10,000 years for the formation of coal in England, and eighty times 10,000 years for the formation of the coal-fields of America! Are not periods of from 300,000 years to 800,000 years sufficient to provide evidence of "evolution" in the vegetation? The vegetation, however, of the highest layer is similar to that of the lowest layer!

And we find trees embedded in the carboniferous with fruits still hanging to their topmost branches and expanded as perfectly as in a herbarium (Macfarlane). Also we find erect trees, not rotted away, covered over by *different* sediments; geologists state that it must have taken thousands of years for these sediments to have deposited themselves. We find leaves impressed in the matrix with their veinules perfect, showing that they must have been buried at once—buried while growing.

Let us try to explain the presence of coal on the basis of our theory. When the sub-terrestrial volcanic explosions took place at the beginning of the Flood (while the sub-marine volcanic eruptions were causing the waters to rise), they broke up the terrestrial vegetation into huge rafts, which—on account of the woodiness of the trees—floated, but on account of the mosses and ferns, they absorbed water, and finally sank, carried onward by the marine currents. Each raft had its underlying fire-clay. The volcanoes supplied the carboniferous limestone which Cadell and Macfarlane attribute to a sub-aerial volcanic origin, and the fish were enmeshed in the detritus.

In this way we can explain how fish-life found its way into

the carboniferous layers, without calling in the aid of lagoons by the sea. Neither is there any need to assume that the Earth kept "bobbing down" and "bobbing up" again, so many times, to explain what we actually find. There is need for only *one* submergence to explain the facts as they are found.

Further, let us turn to the appearance of animal-life in the strata. Certain it is that we have now but an impoverished animal world—pigmies of a past fauna, compared with the fossilized monstrosities of "the World before the Deluge." "Everything that was in the dry land died." We ask, "how comes it that the animal world was buried at different levels in the strata?" When a man drowns, he sinks, and about the ninth day his body floats, due to the gases of decomposition generating in his intestines. What makes that man sink again?—A further process of putrefaction, in which the skin putrefies, bursts, and allows the gases to escape, and the "heavier-than-water" body sinks.

Now if these sub-marine volcanic explosions were going on, and laying down fresh sediments, the longer an animal floated, the higher up in the strata would the body of that animal be found. Consequently, the animals that had the thicker skins would be buried at higher levels in the strata than the animals that had thin skins. Therefore, the Pachydermata ought to be found highest of all in the strata. But when it comes to the horizontal distribution of animal-life in the strata, it does not follow that, because, when alive, an animal inhabited the Arctic Regions, its body should be found in those regions, for during the time the body floated, it might be carried from the Poles to the Equator, or *vice versa*. Consequently the carcasses of Torrid, Temperate, or Arctic animals are found buried in a common grave, irrespective of their original habitat.

There is, however, a peculiar condition found in the strata, viz. : the legs of animals—the Mammoth—and *not* the rest of the body. We find in the Loess the limbs of the Mammoth, but the rest of the body is not there. Why is this? I reply: The skin of the Mammoth's limbs is thinner than that of the body, and in floating the skin of its limbs putrefied first, the ligaments did the same, and the limbs of that floating Mammoth separated themselves from the rest of the body, which floated on, and was in due time, deposited in some other locality.

The same can be shown of the lower jaw of the Ungulates, for we find their lower jaws buried by themselves and not with

the rest of the body. The reason of this is, that the Ungulates have lower jaws that are loosely articulated; and these, due to early putrefaction, separated from the rest of the body and became deposited earlier than the rest.

There is, however, an animal which is found perfectly preserved, in Siberia at the mouth of the Lena—the Mammoth. Here we have an extraordinary condition of things, differing from that of other animals. The Mammoth met its death in the plenitude of its strength, suddenly, whilst browsing on the thick grasses at the mouth of the Lena, and the remains of these grasses were found still between its teeth, and its last meal was found undigested in its stomach. Its skin and hair were in a perfect condition, as when alive. How came this about? According to the Biblical account of the Deluge, it took place in the second month of the year on the seventeenth day of the month. This corresponds to November, and in November the gravels at the mouth of the Lena were frozen.

The first sub-marine explosion which took place at the mouth of the Lena threw over that Mammoth the frozen gravels, and embedded it *in* those frozen gravels; and from that day up to the time that Mammoth was freed from its icy bed, its body had not come into contact with the germs of decomposition, because the putrefying bacteria are inert at freezing-point. It might have happened that other Mammoth, close by, and also feeding, escaped being buried under those frozen gravels and were drowned; their bodies would float on, and finally become interred in the Pyrenees or even in England, wherever the floating carcase might burst its skin, through putrefaction, and finally sink.

There are other conditions in which we find fauna and flora interred, for which no explanation can be given other than that water was the agent which transported them. For example, in the Argau district of Switzerland we find the beetle-cases of insects, forming a large deposit, and in Spitzbergen only 8 degrees south of the North Pole, we find only the spores of plants forming coal, while the plants themselves are not there.

The evidences which we have brought to bear on this subject are surely testimony to the verity of the Biblical record of the Universal Flood, but what has hitherto caused doubt, both to the Biblist and the Scientist, as to the Flood having taken place at all, is Lyell's hypothesis of *slow* stratification which has been generally accepted and believed in. Dr. J. A. Fleming was

surely correct when he said: "The majority of persons take their opinions on difficult subjects ready-made from those whom they deem to be special authorities; and hence when once a certain view of a subject has been broadcast, and widely accepted as the right or fashionable one, it is very difficult to secure an unbiassed re-consideration of it."

One of the most interesting, and the most superficial of all deposits is called the "Loess." It is a yellow homogeneous clay or loam, unstratified, and when crushed in the fingers forms an impalpable dust. It is found as the topmost of all deposits, and its distribution is extensive. It covers a wide area in Central Europe, in Northern France and Belgium, up the valleys of the Rhine and its tributaries. It spreads across Silesia, over the plains of Poland and Southern Russia. It extends into Bohemia, Moravia, Galicia, Hungary, Transylvania and Roumania, sweeping far up into the Carpathians, where it reaches a height of 2,000 feet. In the United States it is widely distributed in the great basin of the Mississippi. It crosses water-sheds.

The Loess is found extensively in China. In Shansi it reaches a height of 9,000 feet. In hilly regions it fills up valleys, and traverses mountain-chains. It spreads over the ground so as completely to conceal inequalities. In the Mississippi Valley of the United States, and in Europe in the Rhine Valley, the Loess rests in places upon elevations of 800 feet above the river, but does not occur at higher levels. This would clearly indicate that it is a water deposit.

What is the origin of the Loess? Sir Henry Howorth compares the Loess to the "Moya" or volcanic mud that is thrown out in certain districts, and its calcareous ingredients seem to point to a subterranean origin; and he shows that it consists of comminuted angular particles, free from structure and from the presence of foraminifera, and is charged with carbonates. Silica we know to be a product of volcanic eruptions. The Loess is apparently a substance of volcanic origin, deposited slowly in water, and then acted upon by the wind in many places after its deposition. Its ubiquity, the lateness of its deposition, its disregard for water-sheds—for it is found on each side of a water-shed—shows that it cannot be regarded as having been produced by local floods, but, rather, it must have been deposited by a flood which reached unprecedented heights; and that it is *not* of marine origin, the microscopical

evidence clearly shows. Three crops can be raised on this Loess annually.

Those who assert that the Loess is the product of glacial action, in fact is "glacial milk," cannot maintain that glacial products are fertilizing agents, whereas it is well known that volcanic products are fertilizing agents. My belief is that the Loess is the product of subterranean volcanic eruptions, which took place at the same time as the sub-marine volcanic eruptions, and that it is volcanic *dust*. It fulfils the conditions necessary for a volcanic product, viz. : that it is extremely light in the air or in water, and it is one of the most fertile of soils, its fertility being in the Loess itself. It floats out to sea for nearly 100 miles, and it is that which we find forming the Yellow Sea. It is brought down from the heights by the Rivers Hoang-Ho and the Yang-tse-kiang.

Silica is shown to be a product of volcanic action, and this would explain its occurrence in the Loess. It is found practically all over the world, and, as already said, is the most superficial of all deposits. Professor Muirhead Macfarlane and Professor H. M. Cadell attribute the inorganic portions of the carboniferous to be of volcanic sub-aerial origin ; therefore we can trace from the carboniferous right up to the most superficial of all deposits a *cause* which produced these deposits, and the Old Red Sandstone is also of sub-marine volcanic origin.

It therefore seems as if volcanic agencies, from the lowest stratum up to the highest, had been mainly instrumental in the laying down of the stratified layers of this Earth, that volcanic activities had been produced all over the surface. The distribution of the Loess in positions so far apart as China, the Danube and the Rhine, and in North America, lying everywhere in the same stratigraphical position—and the surmise that it was deposited in water—leads one to suppose that it was the very latest of all the sedimentary deposits. In America, where glaciation is found, the Loess disappears, which is accounted for by the waters of the newly deposited icebergs washing away the superficial Loess.

It is this Loess which has produced the fruitful soil of Minnesota and Manitoba, the granary of the world, for the "ponding-back" of the waters by the stranded icebergs allowed the Loess to deposit itself at the bottom of this huge lake ; and when the waters drained off, after the ice-barriers had dissolved, the Loess remained *in situ*, and from the Loess the fruitfulness of that land

is found to arise. Not only on land, but in the sea we find evidences of enormous volcanic action as one of the latest of deposits.

In the *Voyage of the Challenger* Sir C. Wyville Thompson states : "Over a large part of the bed of the Atlantic Ocean, pumice occurs in quantity in different stages of decay," and that this is more especially evident in the "red clay" area ; and he traces a great part of the material of the red clay to this source. Nodules containing a large proportion of manganese peroxide are usually more or less abundant in the "red clay," which are believed to be derived from the decomposition of volcanic products.

Here again we have evidence of volcanic products being found as a superficial deposit, as ocean deposits. Dr. G. Frederick Wright, in his *Man and the Glacial Period* states : "The connection of lava-flows on the Pacific Coast with the Glacial Period is unquestionably close. For some reason which we do not understand, the vast accumulation of ice in North America is correlated with enormous eruptions of lava west of the Rockies. The extent of outflow of lava west of the Rockies is almost beyond comprehension. Literally hundreds of thousands of square miles have been covered by them to a depth—in many places—of thousands of feet."

Here again we find volcanoes exerting their influence at the higher levels in the strata ; but in the Rockies it is more as if the tired Earth, in its last throes, had belched forth these enormous emanations of lava, as it were, in its dying efforts. So, from the lowest to the highest layers of the Earth's crust we find that volcanoes and volcanic products have been the main causes (if not the entire cause) of stratification. The volcanic mud of the Old Red Sandstone, the Argillaceous material of the oil-shales of the carboniferous, the lavas of the Tertiary, the pumice of the Atlantic Ocean, the Loess—ubiquitous and most superficial—all these are of undoubted volcanic origin.

One of the most startling facts brought out is the very recent, almost universal, change that has taken place in the character of the fauna in Europe, in North America and in South America.* In the most recent deposits—cave earths, peat-bogs and gravels—we find the remains of a whole series of large animals which have

* Professor Alfred Wallace, "The Geographical Distribution of Animals, vol. i, pp. 149-51.

since become wholly extinct, and as Professor Alfred Wallace says, at certainly not a great while ago geologically, and it is almost certain that this great organic revolution, implying physical changes of such vast proportions that they must have been due to causes of adequate intensity and proportionate range, has taken place since man lived on the Earth. It is clear that so complete and sudden a change in the higher forms of life does not represent the normal state of things.

Species and genera have not at all times become so rapidly extinct. For instance, in Central Europe rhinoceri, the great machairodus, hippopotami and elephants, all suddenly become extinct or leave a country. In North and South America the same sequence happens, and all become extinct. Hence it is clear that we are now in an altogether exceptional period of the Earth's history. We live in a zoologically impoverished world, from which all the hugest and fiercest and strangest forms have recently disappeared; yet it is surely a marvellous fact and one that has not been sufficiently recognized—the sudden dying out of so many large mammalia, not in one place only, but over half the land surface of the globe.

We cannot but believe that there must have been some physical cause for this great change; and it must have been a cause capable of acting *almost simultaneously* over large portions of the Earth's surface, and one which, as far at least as a Tertiary Period is concerned, was of exceptional character. Such a cause exists in the great (and recent) physical change known as the "Glacial Period." If Professor Wallace's surmise, that the "Glacial Period" was but a phase in the great and universal catastrophe brought about by the "breaking up of the fountains of the great deep," then we have the solution of the difficulty of accounting for the sudden destruction and the sudden interment of the fauna from the Old Red Sandstone up to the Tertiary.

Professor Muirhead Macfarlane states that petroleum is produced by the destructive distillation of the fleshy bodies of millions of billions of fish, which had been suddenly destroyed, and equally as suddenly buried by means of volcanic disturbances, and interred by the volcanic products at different vertical positions in the strata. I can find no other solution which can account for these intermittent and yet continuous volcanic catastrophes than the one I have given.

I have attempted to show that the "variation of species" of the animal-world has been produced by their "mixing their

kind" owing to the progressiveness of their creation, but in the plant-world we have evidence of the creation of a higher plant-life in Gen. ii, 9, which was produced at the time of the creation of Adam, "And out of the ground made the Lord God to grow every tree that is pleasant to the sight and good for food." This clearly is *not* the same plant-life which was created on the third day of the Genesis records. These trees would be of a more buoyant nature than those of the carboniferous period, and would therefore be found higher in the strata than that of the coal.

Addendum.

The seeming discrepancies between the Biblical versions of the Creation and the Deluge, and the scientific assumptions as to the Origin of Life and the appearance of a "Glacial Period" or periods, lie in the fact that the Geologist has accepted Lyell's Theory of *slow* stratification as the correct solution of stratification. Science—after all—is nothing more than man's attempt to probe God's mind.

Professor Adam Sedgwick once said: "When the Biblical history of the Creation is thoroughly understood, I have no doubt that it will entirely agree with Geology."

DISCUSSION.

Lieut.-Col. F. A. MOLONY said: I regret that this paper was not entitled "Scientific Evidence of a Universal Deluge"; for the arguments in it seem to me to come far short of proof. I see no reason why those who, like myself, desire to uphold the inspiration of Scripture, should feel bound to defend the theory of a universal deluge. Gen. vii, 20, has not received the attention that it deserves. It runs—"Fifteen cubits upward did the waters prevail, and the mountains were covered." Now, fifteen cubits is almost certainly less than thirty feet, a negligible dimension compared with what we call mountains, but a sufficient rise of water to cover all the artificial mounds and sand-dunes of the great plain of Mesopotamia, which is 340 miles long by 140 wide. Doubtless everything that Noah could see, or of which he could hear, was covered; and so he naturally thought that all the high mountains that were under the whole heaven were covered. Bearing in mind, however, the way

that words change their meanings, I do not think that we are bound to believe that Noah had Alps and Himalayas in his mind. Neither is the mention of Ararat evidence against my theory that the flood was mainly confined to the great plain of Mesopotamia, for it seems unlikely that the Ararat of Gen. viii, 4, is the mountain which we call Ararat to-day.

The very important questions, where the water all came from, and where it all finally disappeared to, are inadequately dealt with by Dr. Le Riche. I cannot understand the argument on l. 13, p. 92, about steam forcing the waters up to an enormous extent; surely the steam would immediately rise through the waters! Our author claims to prove a universal deluge, not a universal steam-bath! The only definite minimum figure which he gives for the universal rise of the water is 1,100 feet in connection with Glen Roy. But he only plausibly explains a possible rise of 100 feet by the melting of both polar ice-caps. The argument about the Loess appears to be relevant, but his other detailed arguments do not strike me as proving much more than this, that there are many things which science has not yet correctly explained.

Our lecturer recognizes that his theory of strata laid comparatively suddenly is opposed to the fact that these strata contain very different fossils, and he seeks to explain the difficulty by arguing that some fish swam away from the approaching cataclysm faster than others, and so got embedded in different strata. This may be, but many of the fossils are shells, and the explanation does not account for their varieties being so markedly sorted out into different geological beds. Again, the slow stratification theory seems to account for the carving out of our valleys, and for the weald of Sussex, better than the theories advanced in this paper.

Neither my knowledge, nor the time allowed me, will permit of my dealing with Dr. Le Riche's arguments seriatim, but I should like to refer to Glen Roy, as I have visited it, and, since reading this paper, also looked up the maps. From the up-valley ends of the famous "Parallel Roads," to the sources of the streams feeding the Roy, the distance is five miles, and the rise 1,900 feet. Hence, if an iceberg, or glacier, completely dammed up the mouth of the valley, the rain-water would slowly rise to 1,100 feet, at which level it found another outlet. Thus there is no need to postulate

a universal deluge to account for these "roads." In demanding faith in a universal deluge, our lecturer is laying on some of us a burden heavier than we can bear, until he gives a better explanation of what became of all the water.

Lieut.-Col. SKINNER said: It is not an easy matter to criticize so many details of evidence, most of which would call for very careful examination before one could assent to (or dissent from) the conclusions drawn. But in thanking the lecturer for his able and helpful paper, I will merely say that I have always felt the doctrine of "uniformity" to be inadequate to account for all the facts with which science is confronted. The two schools, uniformitarian and cataclysmic, are poles apart: each has a share of truth, but neither has a monopoly; and it seems to me that, rightly to interpret facts as they are, there must be a sensible fusion of the two ideas.

I may also add that the fact denoted by "the breaking up of the fountains of the great deep" is one that, in my humble estimation, ought to have had the serious attention of all scientists long since, and I feel personally grateful to Dr. Le Riche, alike for his interpretation—not necessarily the only one, or complete, but helpfully suggestive of seismic disturbance and a succession of tidal waves—and for his courage in bringing it forward at the present time.

While agreeing that the title might better have been "Some Evidences of a Universal Deluge," I would deprecate the condemnation with which the paper has been received in some quarters. In every honest attempt to explain phenomena, it seems to me that the truth is better served by an endeavour to extract and employ what is good than by efforts to destroy a thesis altogether by criticism that is purely hostile.

Dr. H. C. MORTON found it impossible to agree with Colonel Molony, that the deluge was merely local, and that in the Biblical narrative Noah is describing simply what passed under his own eyes. The Biblical narrative, on the other hand, very emphatically states, and repeatedly, that all those creatures that breathed the breath of life under the whole heaven, perished, except such as were taken into the Ark, and the Flood is presented to us as a new

beginning for the whole of human history, whilst St. Peter says that the world, that then was, perished. General McMunn's recent attempt to give a modern parallel to the Flood, also, for the same reason, entirely fails. The waters *prevailed* over the whole earth, and, manifestly, the record means "fifteen cubits above the tops of the mountains." Dr. Le Riche seeks to meet the difficulty thus presented, by the theory of volcanic movements altering the levels both of the earth and of the sub-marine areas.

He approached Dr. Le Riche's paper very sympathetically, though certain portions of it appeared to him not possible, yet the general conception of what happened he regarded as worthy of consideration, and he thanked Dr. Le Riche for his paper. But by laying emphasis upon sub-marine volcanic action, as an explanation of the Bible record, the case suffered, for the Bible, on the contrary, lays all its emphasis upon the dry land. Again and again it is repeated that the life of the dry land perished, whereas Dr. Le Riche makes the Flood mainly depend upon mighty volcanic movements and explosions under water, whereby, he suggested, vast quantities of fish and sea animals perished.

The speaker understood the general concept to be this, that by mighty volcanic movements beneath the sea, the sea-bed rose, the sea waters were warmed; they played upon the vast Arctic and Antarctic icefields, and thus the fountains of the great deep were "broken up." In that case, the icefields are evidently included in the fountains of the deep. One of the lecturer's arguments was based upon Professor MacFarlane's contention, that the source of petroleum was the destructive distillation of the bodies of fishes which must have been buried in vast quantities at the time of the Flood. The chemistry of paraffin is organic chemistry, and so far looks in the direction indicated, but did Dr. Le Riche think that fishes could have been destroyed and buried in sufficient quantities, and in such positions, as to account for the huge "gushers" in various parts of the world to-day?

Mr. W. E. LESLIE objected that the paper was seriously at variance with facts of geology. Dr. Le Riche (he remarked) says that at the time of the Flood the Carboniferous forests flourished with *no* sedimentary rocks beneath them; but he also says the sedimentary

rocks were *re*-deposited during the Flood. Where were they before ? With some probability it is suggested that a Mammoth feeding on the gravels at the mouth of the Lena was overwhelmed by the Flood. But the author forgets that these gravels and the sedimentary rocks under them only came into existence, according to his theory, during the Flood.

That the sedimentary portion of the earth's crust was not laid down during the Flood is evidenced by the following considerations : (a) Their enormous thickness, measurable in miles rather than feet ; (b) unconformable bedding upon faults and overthrusts, shows that the lower beds had been hardened into rock before they were reburied ; (c) some strata show marks of wind erosion—the effect of an arid climate ; (d) the strata preserve, not only the bodies of animals, but their tracks, where they walked or hopped over soft ground—conclusive evidence that they are old land surfaces, not a heap of debris ; (e) the chalk (familiar in the South Downs) is mainly composed of the remains of minute organisms, similar to those which to-day are slowly accumulating upon the floor of still ocean depths far from land. That such deposits could, in the course of a few days, assume the proportions of the South Downs is, to my mind, utterly incredible.

Mr. WILLIAM C. EDWARDS said : I think the lecturer attempted too much in his paper ; but I thank him and refrain from criticism. Some of the suggestions of our lecturer will bear more serious consideration than they have received, *e.g.* the theory of the fish origin of mineral oils. We know that seismic disturbance and volcanic eruptions do destroy untold masses of fish which, floating upon the ocean, might be deposited under the conditions, with such results as he suggests. There are many things in the lecture which I think ought to be emphasized because they can only be explained by the deluge. Take the case of the Mammoths which have been found in Siberia with food in their mouths and undigested food in their stomachs. Consider what that means : there were these mighty beasts browsing, and a mighty wave, probably from frozen Arctic regions, in a few seconds overwhelmed them and buried them in deep, freezing mud. Nothing but the deluge can explain this and other facts brought forward by our lecturer.

I once spent some time in a St. Petersburg museum examining some of their remains, and that left upon my mind a never-to-be-forgotten impression.

Our lecturer instances the remains of trees in the Coal Measures, standing with the fruits and leaves upon them. Here the flood of mud must have risen more slowly, but steadily, burying the tree *in situ* and completely; or, again, the fact that in places coal is discovered composed alone of the seeds of plants, without the leaves or the timber. These things *are* only explicable by such a Flood as that described in Holy Scripture.

Mr. HOSTE remarked that it was hardly fair to make the lecturer's theory stand or fall on his ability to answer all the "hows" and the "whys" involved. It was well known one wise man could ask a question that the unwise could not answer, but he can always be met in the Irish way by asking him some more. He would venture to say that Dr. Le Riche's floating icebergs would seem more able to account for the general situation of rocks, and transference of boulder clay and erratic boulders, than the condition of absolute fixedness, which one would suppose must have prevailed during a period of intense cold, like the Ice Age, when everything would be fixed solid. Have great ice-caps power to move over flat surfaces? But still the icebergs must have been enormously numerous, and could only have striated rock surfaces, when the water was comparatively shallow.

As for the question, "Where did the water come from?" he believed it was a generally admitted scientific fact, that were the surface of the earth a uniform curve, there is enough water in the oceans to cover the world two miles deep. This does not include the enormous quantities of water suspended in the form of vapour above the firmament. If the Flood consisted merely of enormous waves of translation, how could the Ark survive except by a continual miracle of which there does not seem a hint in the Genesis narrative?

Mr. Hoste had not noticed any attempt on the part of the critics of the paper to answer the facts cited by the lecturer, as hostile to the Lyell theory of gradual deposit, such as to the occurrence of whole tree trunks in the Coal Measures, with fruit still *in situ*, and

delicate substances like maiden hair ferns, flies, butterflies, whole fish, being found embedded as though so suddenly engulfed that they had not had time to fade or rot. Also, what the lecturer cites about whole Mammoths being found frozen and kept "in cold storage" all these millenniums. However, is it not unthinkable that strata like the Jurassic formation, 1,300 feet in thickness, or the numerous superimposed Coal Measures, or even the Dover Cliffs, could have been deposited in the brief period of the Flood? On the one hand, there is a danger of underrating the extremely important effects of the Flood, but on the other, there is an equal danger of exaggerating those effects, and so bringing the whole theory of the Flood into ridicule.

WRITTEN COMMUNICATIONS.

Rev. W. M. H. MILNER wrote: Having been brought up from my earliest years in the study of geography, physical as well as political (gaining the R.G.S. Public School Medal in 1876), when it came to University and preparation for the ministry, I turned at once to the study of Bible geography in 1880, almost specializing on the scientific proofs of the Bible record of a universal deluge. It almost at once occurred to me that the magnetic poles indicated a second, perhaps the original, axis of the earth.

Suppose a shift of axis took place, some of the old astronomers used to vision a *terrella* or inner earth, comprising the heavier elements, separated by a fluid surround—perhaps mercury—from the outer shell. At first the whole, the outer shell, and the *terrella* rotated on one axis. And something happened suddenly to dislocate the shell, which would slide, as it were, on the intermediate fluid surrounding the *terrella*. I say "suppose," but the Bible language agrees with the "supposition," and goes far to establish it as a scientific fact. "All the fountains of the great deep were broken up," and, as a consequence, "the floodgates of heaven were opened," "and the rain was upon the earth." It was not the rain that caused the Flood, but the Flood the rain.

It is interesting to note that, when the commotion ceased (Gen. viii, 1-3), "the waters returned from off the earth"—not "*continually*" (A.V.) but "in going and returning" (Heb.).

Obviously this was the reverse process of what might have been equally well described (of what happened when the great commotion started) as "the waters advanced upon or around the earth, coming and advancing."

It was indeed as if Almighty Power had, in the poetic language of the book of Job (xxxviii, 13), "taken hold of the ends (Heb. "wings") of the earth, and shaken out the foul unnatural brood that had contaminated the human kind."

And a foul brood it *was*. Gen. vi, which leads directly up to the narrative of the Flood, explains what had happened 120 years before the great catastrophe took place (v. 3). Human kind including, of course, human women (v. 1), had, in the course of some sixteen centuries, grown into an increased population, filling the globe. The women were very fair, the "beni ha-elohim" (sons of God) in Job, who describes them as convened (with the great "Angel" Lucifer as one of them) to give account of themselves "before God in Heaven." The Bible does not use its phrases loosely or at random. "Daughters of men" were human women; "sons of God" (*i.e.* those who had no Father but their Maker), were *immaterial beings* who, on this occasion, 120 years (Gen. vi, 3) before the Flood, *materialized* in human form in wilful contradiction of the natural law of *kinds*.

Having materialized, they intermarried with the women of earth, who doubtless felt honoured by union with celestial mates. The issue of these marriages, increasing in number as the years of the closing century of the Antediluvian Era rolled on, were big, strong men—*nephilim* (literally, "the fallen ones"), naturally "giants." The whole plan of Creation—"each after its kind"—would have been wrecked if this had been allowed to go on unchecked. The *only way* to cleanse the earth of this foul intermixture, *without destroying it altogether*, was by water. And so it happened that at the appointed moment some great continental areas collapsed by one of those volcanic outbursts so well described in the lecture, sent the disturbed ocean *spirally swirling* round the land surfaces of the globe, so that not at one moment, but at successive moments "the whole earth" was overwashed, and "all life" washed out.

Greek mythology in full of the "gods" coming down from heaven

and fathering a wondrous and mighty posterity. Discoveries in the great caves of the earth show large-sized human bones cheek by jowl with those of beasts of the chase, that perpetual "sport" of hunting which would still be in full swing when the last day of that age broke, and involved them both in a sudden and complete destruction. Science and nature conspire with Holy Scripture to tell what happened.

The detailed scientific evidence of such a catastrophe as a Universal Deluge is priceless, and I thank the lecturer. I have ventured to supply, as the result of nigh on fifty years' exploration of the facts of terrestrial changes and of the Bible narrative, the motive and the method of the Flood. Nor do I forget that the New Testament yields its quota of corroborative evidence. For in the First Epistle of St. Peter (iii, 19-20) we are told that our Lord exhibited the extreme limit of Redeeming Love when (doubtless during those forty days of His Resurrection Life on earth) "He went and preached to the spirits" (no mere humans) "in prison—which once were disobedient, while the long-suffering patience of Almighty Power waited (120 years) in the days of Noah."

Dr. A. T. SCHOFIELD wrote: This able and learned paper seems to call for a few important queries. "Flood" and "Deluge," apparently referring the whole of the geologic changes described to Noah's Deluge, are found in pp. 92, 93, 96, and 97. Is this view correct, and could half of the geologic changes which Dr. Le Riche describes have occurred in 150 days? Was not the object of Noah's deluge to destroy the corrupt Adamic race and not the earth? Is not the destruction of "*the world that then was*" by water (2 Pet. iii, 6) a better solution of Dr. Le Riche's problem? Is it not clear that, so far from the Adamic race being widely spread, Gen. xi, 9, treats this as subsequent to Noah? Is not the earth we know "*that which is now*," and is there not a "new heavens and earth"—three in all?

We are quite sure that the Flood of Gen. i, 2, was absolutely universal and of long duration. We know Noah's was of far too short duration for such geologic changes. Moreover, may not the expression of its universality be qualified, according to the genius of Hebrew idiom, by the actual facts? No ark could hold the fauna

of the universe, nor is the idea of water over three miles deep conceivable in the time given. I suggest that this admirable paper best refers entirely and obviously to Gen. i, 2, and 2 Pet. iii, 6, only, and not to Noah's deluge at all.

Mr. W. R. ROWLATT JONES writes: With regard to the Loess, Rev. W. B. Galloway, in his work published in 1888, *Science and Geology in Relation to the Deluge*, thinks that Lamech's remark in Gen. v, 29, "This son (Noah) shall comfort us concerning our work and the toil of our hands, because of the ground which the Lord hath cursed," refers to the continued deposit of cosmic dust, which, having been suspended round the earth like Saturn's rings, was now precipitated downwards as the moisture in the air condensed and spoilt the vegetation which in that rainless era before the Flood depended on a heavy diurnal dew to sustain it.

With regard to the universality of the Great Deluge, it is just possible that these emphatic words "so that all flesh perished that moved upon the earth" (Gen. vii, 21) are open to the same qualifying as Luke ii, 1—"that all the world should be taxed." It might be that the Great Deluge only affected the descendants of Adam and Eve; that the white race, in contradistinction to the races round about, had been hedged around to keep them pure; they had shouldered the White Man's Burden, and having failed to elevate the inferior races of mankind, having "mingled among the heathen and learned their works," their Creator swept them aside, and planted a new Noachic race as torchbearers, disseminating not only true religion but the blessing of civilization to the remotest lands (see both Professor Clay's *Origin of Biblical Traditions* and Professor Waddell's *Phœnician Origin of the Anglo-Saxons*—two works recently appearing independent of each other, yet confirming this world-wide influence of the favoured Noachic families). This theory, too, explains the cryptic sixth chapter of Genesis.

Mr. G. WILSON HEATH wrote: I am sorry I cannot accept the "sudden" theory. I believe that stratification by the so-called Lyell theory of an age-long and slow process is true, and also the "sudden" theory now before the meeting may be likewise true. The two views are not antagonistic, but are capable of assimila-

tion. I doubt if the Noachic Deluge had very much to do with the matter; for the definite results of action by water, we must go back into the watery wastes of the ages before Gen. i: fire, gases, vapour and other kindred elements must have run riot during countless millenniums, and volcanic irruptions would be the characteristic condition of the period.

I cannot believe that it was during the relatively short period of the Noachic Deluge that gigantic icebergs were floating around ready to crash into the nearest mountain-side, take out of it an enormous slice, and forthwith float away with its prize on a journey of many hundreds of miles in order to deposit it in southern Russia, etc. To me the Glacial theory is clear and simple: the Deluge theory is replete with difficulties. The surface of the earth to-day is subject to undulatory movements; in past ages these movements were doubtless more like the great waves of the ocean under the pressure of storm and tempest. Must we not regard this undulatory movement as responsible for much which is difficult of explanation in *irregular* stratification? It seems impossible of belief that stratified coal-seams were formed by "sudden" action! In those countries where masses of soft coal are found in the mountain-side the "sudden" theory might be considered.

The paper raises many questions and provides food for careful study, but it has not left any sense of satisfaction or finality on my mind.

Mr. F. C. WOOD wrote: Noah and the Deluge are mentioned as facts associated with warnings eight times in the Bible. The number is significant. Those who referred to them were Peter, probably Paul, both filled with the Pentecostal Spirit; the Lord Jesus who spake only His Father's words, and Jehovah Himself in Isa. liv. I state it in this way, because I particularly wish to emphasize that we can trace through nearly the whole of the prophetic writings that the Prophets did not speak their own words, but that God Himself spake through them.

My object in entering this discussion is to refer to the fact that the narrative in Gen. vi-viii, gives *two* statements, that not only did the waters above the firmament pour down on the

devoted earth for forty days and forty nights, but that the fountains of the great deep were broken up. This last remarkable statement must have reference to internal convulsions, and without attempting to explain how those convulsions worked geologically, if we accept the statement as inspired—and why should we not?—it is evident it refers to matters of serious moment in the history of the world, by which the combined waters were able in forty days to rise above the mountains.

There is another matter of vital importance to consider, which, if Christians would give God credit for meaning what He says as did the Apostles of old and the Lord Jesus, would enable us to get rid of more than half our troubles. If we read Isa. liv with a candid mind, we must see that Jehovah claims to be speaking for Himself, and that the prophet is not represented as giving forth his own imaginations. Note the passage in question. God utters a promise, joining it up with His oath. He says distinctly that He swore to Noah that the waters of Noah should no more go over the earth. That implies that at one time the waters did go over the earth, namely, in Noah's day, and it is remarkable that, seeing those waters went over mountains, we find the Lord saying that the mountains shall depart, and the hills be removed, rather than His Covenant of Peace concerning Israel should be broken.

It is interesting to notice how frequently for the Divine Being the personal pronoun is used in this chapter, and, in fact, in the whole of the Old Testament. But the critic comes in, and with the stroke of a pen tells us that was only the prophet's way of expressing himself, and thereby the divine promise, though accompanied by oath, is made of none effect.

LECTURER'S REPLY.

Lieut.-Col. Molony upholds the theory that the Noachian Deluge was a merely local flood, but this great Plain of Mesopotamia 340 miles long by 140 miles wide is not enclosed, and water has—as Huxley said to Gladstone—a “nasty habit” of retaining its own level, and the Plain of Mesopotamia is open to the South. Again, surely *Elohim* in Gen. vi, 13, meant what He said: “The end of all flesh is come before Me; I will destroy them with the earth.”

If *Elohim* only meant to bring about a local flood in the Plain of Mesopotamia, it would have been easy for Him to tell Noah to remove himself and his family *away* from the locality in which this local flood was about to take place, and so save Noah the trouble of building an Ark. *Elohim* distinctly states that He is about to "destroy the *Earth*."

Colonel Molony asks where the waters came from and where they have gone to. In Gen. i, 9, "*Elohim* said, Let the waters under the heaven be gathered together unto one place, and let the dry land appear, and it was so." These waters which were "gathered together unto one place," together with the rain which fell for forty days and forty nights, explains where the waters came from, and it was "the breaking up of the fountains of the great deep" which allowed these waters to come into contact with the internal fires of the earth, producing steam. This steam was formed deep down under the solid floor of the ocean, and did not (as Colonel Molony believes) produce a "steam-bath." This interned water was forced upwards to 1,400 times its previous volume by the generation of steam at high pressure.

Colonel Molony again asks, "Where did this water go to?" The waters of the universal flood returned into those cavities into which they had been commanded to go on the "third day." Professor Hecker, of the Potsdam Observatory, has ascertained that the apparently solid earth is subject to daily oscillations, analogous to the tides, rising and falling twice in 24 hours, some 20 centimetres, or 8 inches, called the "earth-tides." This discovery shows us clearly that the crust of the earth is *not* a solid inflexible mass, but that it rests upon a fluid base; so, assuming these sub-terrestrial cavities being filled with water, the explanation of "where the waters went to" may be answered. "Where wast thou when I laid the foundations of the earth? Or who shut up the sea with doors, when it brake forth, as if it had issued out of the womb?" (Job xxxviii, 4, 8). I have attributed the striæ and groovings made on to rocks to the action of floating ice, and therefore the limits of the height to which the waters reached are marked by the height at which we find those markings, and are not limited by the height of the "Parallel Roads of Glenroy."

Re the carving out of the valleys. I will answer this in my reply to Mr. W. E. Leslie.

As to the "Parallel Roads of Glenroy," I fail to understand, on Colonel Molony's theory, how these "Parallel Roads" could have been formed unless you have a mass of descending waters imprisoned in the valley. Each winter a sheet of ice would form, upon which would fall the pieces of rock which constitute the sides of the valley. This on account of the expansion of water at 4° C. These "Parallel Roads" therefore took three winters only in the making. Referring to the height of the flood, we read in Gen. vi, 17, 18, 19, that the waters increased, and all the high hills were covered; and v. 20, "fifteen cubits upwards did the waters prevail, and the *mountains* were covered." I take it that the height of fifteen cubits must be added to the height mentioned in the previous verse.

In reply to Mr. W. E. Leslie, let me say that I do not wish to convey the idea that there were no sediments in the sea before the Deluge, but, rather, that they became re-deposited on land during the Flood; and as Macfarlane and Cadell agree, the inorganic material of the limestone, and of much of the argillaceous mass of the oil-shales, are of sub-aerial volcanic origin: thus we have an explanation of the origin of some of the sediments. In order to explain the origin of some of the sediments, geologists are obliged to assume the existence of huge rivers, by which the sediments were washed down from imaginary continents. There is no evidence of such continents, or of such enormous rivers, but that solution is accepted without demur—*faute de mieux*.

The thickness of the sediments is acknowledged; but the present geological explanation of their presence and of their origin is quite as difficult as the theory which I have brought forward, if not more so, for the volcanic forces that elevated the Rockies, the Andes, and the Himalayas, and distributed the lava and scorixæ west of the Rockies for thousands of square miles, could with equal ease have deposited the sedimentary rocks in the waters of the Flood, and that in a comparatively short space of time. I foresaw the difficulty of explaining the footprints of animals, but Mr. T. Sheppard, M.Sc., F.R.G.S., Curator of the Hull Museum, assured me that this condition is taking place to-day at the mouth of the Humber, where a tract of land is covered over twice daily by the sea, and the Humber brings down the silt over it. Men walk across that tract; birds, animals and worms make their marks upon it; and after a time a piece of that land is dug up, dried, and carefully peeled off; and

there we find the traces of footprints of men, dogs, and worm-burrows accurately reproduced, filled in by the silt of the Humber. The impressions are *not* washed away. This condition, therefore, might have been repeated in the past, when animals attempted to escape, and left their imprints on the newly deposited mud ; as a rule their bodies are not found there.

The chalk (familiar in the South Downs), and mainly composed of minute organisms, was (in my opinion) *not* originally deposited in the position at which we now find it, but was *re-deposited* from the ocean where it originally was. These organisms floated, and were churned up by the volcanic eruptions, to become re-deposited (where we find them now) on the abatement of the waters. They had lived and died ages before, but being of light specific gravity re-deposited themselves together with the particles of silica with which they are found as chalk : silica being a product of volcanic activity.

I can answer Colonel Molony's statement that " the *slow* stratification theory seems to account for the carving out of our valleys, and for the weald of Sussex, better than the theories advanced in this paper." I beg to think otherwise, for I have many a time walked on the Downs north of Worthing, and noticed with what convincing clearness one can see the effects of the downward rushing waters of a flood : they are shown on each side of those Downs. One can see the " scooping out " of the loosely deposited chalk, where the waters first swirled to one side of the little vallon, and then " scooped out " the other side, exactly as one would expect waters to do, when well above the height of the Downs, and " abating " with a rush toward the sea. This " scooping out " could not have been produced by rain, but by the mass of rapidly descending waters which had carried the " brick-earth " or loess toward the sea, and had scooped out the chalk, for no river had been there to do the work. Both to the north and to the south we can see where the waters parted, doing their work of quick erosion on loosely deposited detritus. I believe that it is this downward-rushing water at the abatement of the Flood which accounts for the distribution of the " rubble drift " which Professor Prestwich attributed to a sudden " uplift " of the land, but which the downward rushing of water would equally explain, while exactly " fitting in " with the PROOF of a UNIVERSAL Deluge.

In reply to Dr. Morton, let me say that I cannot see how the Biblical record can suffer by my explanation, for the Bible does *not* account for the *total* destruction of aquatic life—nor does my theory. Rather, the Bible accounts for the total destruction of terrestrial life—“all that was in the dry land died.” One animal, viz., the Polar Bear, does not come under this category, for it lives on ice, and would be in its element—floating ice—and surrounded by the dead floating fish upon which to feed. In the *Illustrated London News* of March 16th we were given a splendid illustration, on a small scale, of the destruction of fish at Walfish Bay by means of submarine volcanic explosions. These fish cover from 30 to 80 miles of ground—thickly strewn fish—and yet the submarine explosion was so insignificant as to have escaped observation. At the Flood this took place on a gigantic scale, and the volcanic dust and debris quickly covered up the fish, so as to preserve them, not as skeletons, but as perfect fish. The fact that these fish are found at different vertical depths shows that these submarine volcanic explosions took place at succeeding intervals, and that volcanic debris were being thrown down at the same time to cover them; these intervals may have been close together.

719TH ORDINARY GENERAL MEETING,

HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, FEBRUARY 18TH, 1929,

AT 4.30 P.M.

LIEUT.-COL. F. A. MOLONY, O.B.E., IN THE CHAIR.

The Minutes of the previous Meeting were read, confirmed, and signed, and the HON. SECRETARY announced the following elections:—As Associates: T. H. H. Foster, Esq., and Mrs. E. Wieland.

The CHAIRMAN then introduced Lieut.-Col. T. C. Skinner, R.E. (ret.), to read his paper on "The Ice Age: its Astronomical Cause, and the bearing of Drayson's Discovery on the Biblical Account of the Deluge."

*THE ICE AGE: ITS ASTRONOMICAL CAUSE, AND
THE BEARING OF DRAYSON'S DISCOVERY ON
THE BIBLICAL ACCOUNT OF THE DELUGE.*

By LIEUT.-COL. T. C. SKINNER, R.E. (ret.), F.R.Met.Soc.

(Illustrated by Gyroscope and Lantern Slides.)

FOR the geologist the Ice Age has presented a problem at once most fascinating and most baffling. There is no doubt about the fact: evidences lie all around us of enormous tracts of country in Europe, in America, and in the Southern Hemisphere having at one time, or more than once, been covered with ice-sheets to which there is nothing comparable

to-day save in polar regions. The ice seems to have crept down from the Poles toward the Equator till something set a limit; after which it seems to have withdrawn as mysteriously, till naught has remained save polar caps and mountain glaciers.

When all this occurred has been the subject of many guesses, ranging from 7,000 to 1,000,000 years ago. Perhaps it is not quite fair to call them guesses; geologists have time-scales in certain local phenomena, which help toward determining dates, and the tendency is steadily toward increasing accuracy. But the most baffling problem of all has been to assign a satisfactory cause. At least seven causes have been offered, of which I will name, for the moment, only five:—

- (1) The gradual cooling of the earth;
- (2) Variation of the sun's heat;
- (3) The earth passing through a colder zone of space;
- (4) Different distribution of land and water in connection with the flow of ocean currents;
- (5) Alteration of the earth's axis of rotation.

The other two, which have to do with the eccentricity of the earth's orbit and the obliquity of the ecliptic, will be more readily understood later on.

Baffled in their quest of a terrestrial explanation, time and again geologists have appealed for an astronomical cause, but without avail; astronomers have hitherto declared that there is no really satisfying astronomical explanation, and they are, generally speaking, of the same opinion to-day. The purpose of this paper is to show that, local influences apart, the underlying general cause of the Ice Age is astronomical; that it has been shown to be so for more than half a century; and that it can be proven to be so to-day by any astronomer willing to break with the great traditions of the past, and give the question a full hearing and a reasonable test.

I yield to no one in whole-hearted admiration for the magnificent work of astronomers, past and present. I love the men, reverence their work, and sympathize with their difficulties, yet one cannot fail to see that the sheer weight of an immensely valuable built-up system is against acceptance of a new and revolutionary idea from the start, and has prevailed. Without presumption may I suggest that in this case, as so often in the past, the *good* has proved to be the enemy of the *best*?

Before going farther I will ask you to refer to the chart of the

polar hemispheres. Take a little time to study the present and former glaciated areas in America, Europe and the Antarctic ; the dark shades indicating the present, and the lighter shades the former, glaciations. It is an old chart (1888 or earlier) and in need of some revision, but will serve the purpose.

Now, taking Major Marriott's comprehensive definition of a glaciation as " a pronounced lowering of the winter temperature in the Polar and Temperate Zones, enabling glaciers to form at elevated centres of ice-dispersion, and to spread therefrom over certain areas of low elevation, conditioned by the configuration of the land, and by the amount of precipitation in the centres of ice-dispersion," our next step will be to look for these centres of ice-dispersion, which, for short, I will term *ice factories*.

Any important mountain-range with a snow-line is potentially an *ice factory*, but not all are suitably placed for other than purely local glaciation. The Himalayas, for example, though the highest mountains in the world, being in the sub-tropics, have only local effect, and even the Alps, nearly 20 degrees farther north, are but local in effect at the present time. To find an *ice factory* capable of causing glaciation over wide land areas now, we must go north or south to the Frigid Zones, and, to-day, they are only to be found in Greenland and Antarctica.

Again, though a factory can make ice, and go on making ice till its bins are full—so to say—not every factory, even in polar regions, can cause a glaciation. It may lack facility for " delivering the goods." If it has a sea-front it can deliver by sea in the form of icebergs ; but to deliver overland it needs a low-level land-front (or the equivalent), on which the ice can be pushed out in the form of a moving sheet.

Consider the process. Warm winds deposit their moisture on the mountains in the form of snow, and the snow keeps on piling up till its lower layers, aided by soakage from the top, are condensed and compressed into glacier ice. Gravity then operates to force this ice down the valleys, somewhat like a stream of lava, till it finds outlet at the valley mouth, and reaches a point where rate of flow is equalized by rate of melting when it thaws and runs away as a river.

On the way down, the ice-river bends this way and that in going over or round obstacles, causing crevasses above or below, or on either side. Incidentally also many boulders and much mountain detritus, falling on the surface, are borne along till they either melt their way through to the bottom or are deposited

as lateral or terminal moraines. If the glacier be situate in a Temperate Zone it generally terminates near the valley mouth, but if in a Frigid Zone its radius of influence is extended over land or sea till a more distant melting limit is reached.

Then as the ice-sheet pushes its way down across country from the factory, the boulders, etc., on the surface, melting through to the bottom, are forced along underneath, scratching rock faces, or smoothing and rounding surfaces, till some resting place is found, either at the limit of glaciation, or short of it. In one locality in Ontario, I noticed a substantial house, built of rubble from boulders lying all around, that obviously did not belong to that area at all, but had been "delivered to site" by ice-sheet from some mountain, perhaps, many hundreds of miles away—an economic proposition for the man that built the house.

Now we will run quickly through a few slides that illustrate ice-movement:—

- (a) The Mer de Glace ;
- (b) Sketch of an iceberg illustrating submergence ;
- (c) Sketch showing how a berg is formed, like launching a ship ;
- (d) A berg just formed ;
- (e) Another on a cruise ;
- (f) An ice-mountain, weather-worn and probably ancient ;
- (g) Ice-worn rocks and erratics ;
- (h) Sunken forest (there is evidence of Wales having sunk upwards of 1,400 feet).

Other evidences of glaciation are derived from Arctic shells ; from flora and fauna and their migrations, clay deposits, etc.

Depths of ice-sheet during the Glacial Epoch are variously estimated: *e.g.* in Britain, 4,000 feet ; in North America, 9,000 feet (a mean) ; in one centre, Keewatin, the inferred thickness was 18,000 feet. In Antarctica the *average* thickness is estimated at 5,000 feet now ; *maximum* thickness in the Ice Age would therefore be vastly greater.

Referring again to the chart, please note what I would call the *throw of the ice factories*, due to the centrifugal effect of the daily rotation ; the outward throw from the Poles. Possibly it may be insignificant ; but, be it small or large, it will surely be greater away from than toward the Poles. From Greenland one would expect the throw to be principally southward, delivering ice-

bergs to the Atlantic and glaciation to Canada, while Scandinavia and Scotland would tend principally to throw southward over Europe and into the Atlantic. The south polar cap would, of course, throw northward in every direction.

The chart shows no glaciation in Siberia. This is a defect, as recent research shows glaciation of fairly large areas. Still the fact remains that there are not the same evidences of general glaciation as elsewhere, and, so far, no satisfactory explanation has been offered. May I, with all diffidence, suggest what may supply the basis of an explanation in the fact that, whereas the long northern strip of Siberia is low-lying and generally flat, there is no northern *ice factory* along the coast, or between it and the Pole, capable of "delivering the goods." Scandinavia could not do it, and Greenland is on the wrong side of the Pole; while the local mountains in Northern Asia are neither large enough nor suitably situated to feed a general glaciation; their effect could only be local.

Must we then conclude that Siberia had no part or lot in the general glaciation? Not quite that, but, in place of a vast moving ice-sheet on the northern plains, I suggest that we should look for heavy snowfalls in winter, followed by meltings and excessive floods in summer, and local glaciations.

So much, in brief, for evidences of the Glacial Epoch; now for the Astronomical cause. But before proceeding further, I will illustrate some movements of heavenly bodies by gyroscope. We are favoured to-day in having the use of a very fine instrument lent for this demonstration by Mr. A. E. Mundy, who has come himself, most kindly, to help us. The flywheel of the gyroscope is mounted in ball-bearings, and when spun at 15,000 revs. a minute it will run for some hours. We could spend a long and profitable evening playing with this beautiful toy, but I must confine myself to briefest possible employment.

First, notice its extraordinary behaviour as I hold it in its carriage and seek to turn it round; it resents the movement and turns a somersault rather than submit. *Next*, notice how it will balance itself on these two stilts and carry on quite happily if left alone. I will now mount it on this pedestal and attach a long vane, as a sort of semaphore, to its North Pole, and a counterweight to its South Pole, when, in addition to its *rapid rotation* on its polar axis, it will add a *second, very slow rotation*, round the vertical axis of the pedestal—a motion that, in astronomical circles, goes by the name of *precession*.

I want you to notice carefully that, if I try to push the Pole down, the gyroscope objects, and runs away sideways to avoid it. Or if I try to push it up, it does its "flank march" in the opposite direction. Even if I hit it hard on the head I can make very little impression.

Now, however, please notice that, if instead of pushing at the Pole, I merely touch the trunnions either way, the gyro., most obligingly, does all I want. Thus, if I hustle the precession, the Pole rises as if in protest, while if I gently retard the precession the Pole drops in acknowledgment. This experiment I am going to repeat, as it is invaluable. I rudely bear down on the gyro., and even hit it on the head, and it resents such treatment with every fibre of its mechanism. Now, however, with consummate tact and this little bit of string, I put gentlest pressure on the trunnions, and lo! the gyro. bows its head in graceful response as if before a royal personage. The moral is obvious and very beautiful: "Gently does the trick."

Now, as we slow it down—while still pursuing its first motion of rapid rotation, and its second motion of slow precession—it will illustrate for us a third motion called *Nutation* or "nodding." All three motions we will find exemplified in the *Solar System*, to which we will now refer (Fig. 1). Here a few definitions will refresh our memories and ensure a common background to our thoughts.

The Sun in Fig. 1—which, of course, is bigger than all the planets put together—has had, for reasons of space, to be shown as a mere dot in the centre. Otherwise the Planets are shown more or less in their right proportions and in their several orbits at varying distances from the Sun, the order of the principal ones being as follows, working outward:—Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. Their orbits are not circular but elliptical, the Sun being in one or other focus. Ellipticity of the Earth's orbit is not great. For convenience the orbits are all shown as if in the same plane as the Earth, but the planes of the orbits really differ, Mercury's, for example, being inclined at 7 degrees, the greatest. The plane of the Earth's orbit is termed the *Ecliptic*, because it is in this plane that eclipses of the Sun and Moon must occur; when the Moon is above or below this plane it cannot eclipse the Sun or be itself eclipsed by the Earth.

For convenience I will refer to the *Ecliptic* plane as horizontal, and its axis, so to speak, as vertical; the terminal points of this

imaginary axis, above and below, are known as the Poles of the Ecliptic.

Now, taking a bird's-eye view and looking down from above, we will find that all the Planets revolve around the Sun in direction against the hands of a watch. Likewise each Planet rotates on its own axis in direction against the hands of a watch, or from West to East. The picture is too small to show the Moon, our satellite, properly, but it also revolves around the Earth, and rotates on its own axis from West to East.

Again, the picture is too small to show the inclination of each Planet to its orbit, but the artist has contrived to show Jupiter as nearly vertical, and Saturn with a considerable tilt, which is as it should be.

Turning now to Fig. 2, here in the middle we have a representation of the Seasons, as the Earth takes its annual course round the Sun. You will at once notice the tilt of about $23\frac{1}{2}$ degrees: this is termed the Obliquity of the Ecliptic (O.E.), being the angle between the Ecliptic plane and the plane of the Earth's Equator. It is the tilt that is responsible for the Seasons, it being summer in the north when the Sun is north of the Equator, and *vice versa*. It is really very simple, reminding one of the schoolboy's howler, who, when asked to give an illustration of expansion and contraction due to heat and cold, replied: "The days are longer in Summer and shorter in Winter."

Next you will note that when the Sun is actually crossing the Equator, it is either Spring as in the lower phase, or Autumn as in the upper, the actual instants of crossing being termed the Vernal and Autumnal Equinoxes.

Localities on the Earth are fixed by the Co-ordinates of Latitude and Longitude, latitude cutting the Earth in slices parallel to the Equator, while longitude cuts it in segments like an orange, from pole to pole. Certain parallels of latitude serve also to divide the Earth into its Zones, Torrid at the Equator, Frigid at the poles, and Temperate in between.

Will you now please observe these four globes of Fig. 3, resembling four Spanish onions, each with its stem and its taproot. They are intended to represent any heavenly body with its imaginary north and south poles, heeling over at various angles of tilt. The Sun you must suppose to be on the right.

The globe on the right is vertical, the next one is tilted at 30 degrees, the third at 60 degrees, while the fourth is at 90 degrees. Now notice that, in each case, the tilt is the exact measure of

the obliquity and *vice versá*. But notice, further, that both alike determine precisely the position of the polar circles, *vide* the second globe. Thus, if tilt and obliquity are 30 degrees, the polar circles must come down exactly 30 degrees, from the poles; if 60 degrees, the polar circles must come down 60 degrees. In the right-hand globe, the axis being vertical, the polar circles are reduced to geometric points; while in the left-hand globe they expand to 90 degrees and meet at the Equator.

Now, bearing in mind that the polar circles mark the limit of the North and South *Frigid Zones*, try and think out the implications: if the globe is vertical, frigid zones simply do not exist; if it is horizontal, its entire northern hemisphere (or southern) is a frigid zone, and is subject to intense cold in winter, followed by intense heat in summer; while, between these extremes of the vertical and horizontal axes, each differing angle of tilt furnishes you with a differing depth of frigid zone for its poles.

Please now examine Fig. 4, depicting five of the principal Planets inclined to their orbits, as they actually are ascertained to be at the present time: JUPITER on the right, with a tilt of 2 degrees; the EARTH next, with its tilt of $23\frac{1}{2}$ degrees; MARS, with a tilt of 25 to 28 degrees; VENUS heeling over at 75, and URANUS at 80 degrees. Now put two and two together. The obliquity or tilt determines the polar circles and frigid zones, therefore, other things being equal, the obliquity will determine the polar ice-caps. If no obliquity, no frigid zones and no ice-caps; but, given a large obliquity, you are bound to have equally large frigid zones, and, *other things being equal*, you ought to expect correspondingly large ice-caps. I have italicized the qualification, since local conditions must always differ, and polar caps can hence rarely, if ever, correspond in size and shape.

Another factor making for inequality is the eccentricity of the Planet's orbit. If very eccentric, it is clear that one Pole will gain advantage over the other, or the reverse, according to whether it, or the other, enjoys the closer approach to the Sun in summer.

We now arrive at the question: "Has the Earth ever had a greater obliquity than now in common with some other Planets?" To answer it we will have to go somewhat deeper into Astronomy.

Fig. 5 will help us to understand what is termed the Celestial Sphere. The Heavens are deemed to be a great hollow sphere of infinite radius, on the surface of which stars are set out and Sun and Planets move to and fro in their appointed courses.

The Earth is deemed to be at the centre of the sphere. The plane of the Equator, produced to the great sphere, is termed the Equinoctial, and the angle between Equinoctial and Ecliptic is simply our old friend the obliquity. The point P, where the Earth's axis cuts the great sphere, is termed the Pole of the Heavens. The point E, vertically above the centre of the Ecliptic, is the Pole of the Ecliptic; S represents a star, etc. In the great sphere, stellar positions, etc., are determined, as in the Earth, by co-ordinates similar to latitude and longitude, but termed Declination and Right Ascension. The intersections of the Equinoctial and Ecliptic give the Vernal and Autumnal Equinoxes, and it is from the Vernal Equinox that Right Ascension is measured in hours, just as we measure our longitudes from Greenwich in degrees. I may add that distances on the great sphere are measured, not by linear measure, but by degrees of the angles subtended at the centre of the sphere: an hour corresponds to 15 degrees.

Now, recalling the gyroscope and its precessional movement, think of the Earth as a gyroscope rotating on its axis once every 24 hours, and performing, in addition, a secondary rotation or precession. Imagine the vertical axis terminating in E to be the vertical axis of the gyroscope pillar; then, just as the gyroscope precessed round the vertical axis, so the Earth, with its polar axis terminating at P, should, one would think, precess around the vertical axis which terminates in E. In other words, the point P will very slowly describe a circle around E as centre, with a radius of $23\frac{1}{2}$ degrees. And, further, just as the gyro. varied its precessional motion by a little nodding motion termed Nutation, so the Earth, under the pull of the Moon, will vary its precession by Nutation, which will cause the pole to trace a wavy line, as illustrated in Fig. 6, in place of the smooth circular arc one would expect. Each nod of the Nutation movement takes 19 years to complete, and for purpose of calculation the pole is assumed to trace the smooth circular arc, correction being made for Nutation as necessary. The precession is supposed to take 25,868 years to complete.

This precessional movement, however, was at the outset loosely defined and confusion has resulted. Sir John Herschel in his *Outlines of Astronomy*, Art. 316, at first stated that the pole "describes a circle in the heavens around the Pole of the Ecliptic as a centre, keeping constantly at the same distance of $23^{\circ} 28'$ from it in a direction from East to West, and with

such a velocity . . . that the whole circle would be described by it . . . in 25,868 years." But, later on, in Art. 640, he showed that it had long been recognized by astronomers that the obliquity (which is the same thing as the Earth's tilt) was decreasing, *i.e.* the radius of the precessional circle was decreasing and could not therefore be constant.

Some 60 years ago, Capt. A. W. Drayson, F.R.A.S., who was for 15 years Instructor in Astronomy at Woolwich, was challenged by a Cadet as to the meaning of the contradiction, *a constant radius that continually diminished*, and from that day he set himself, by hard work of investigating, to clear up the mystery. It would take too long to describe his method in detail—I have here a leaflet giving particulars, of which any who desire may have a copy—but a brief reference to Fig. 7 will help. Drayson first procured all the old star catalogues he could, going back 1,400 years or more; then he prepared a very large plan, on which he traced the assumed course of the pole round E, the Ecliptic Pole, as centre. Then by selecting stars that for the time being did not vary their distance from P, he obtained a number of intersections, and, after "trial and error" extending over five years of intensive study and observation, he ascertained without doubt that, in place of tracing its circle round E as centre, the pole had been, for the past 1,400 years, tracing a circle round a point C, 6 degrees away from E, and with a constant radius of $29^{\circ} 25' 47''$. This he tested over and over again, till satisfied that it represented a true fact of Science. His figures are available to any who may desire them.

From this fact flow vastly important issues. It will be obvious to anyone that such a disclosure must immediately modify many processes in Astronomy, and cut across some cherished theories. From the first, Drayson's discovery proved unwelcome, and to this day it has never had any official investigation worthy of the name. I merely state the fact, but will couple therewith the hope that ere long it will be made the subject of a genuinely scientific inquiry.

If you will refer to Fig. 8 now, two of the more obvious issues will appear. C is the centre of the Drayson arc; E the Ecliptic Pole and centre of the supposed precessional circle; P is intended to show, very roughly, the position of the pole at the present time. If it moved round E as centre, the pole would follow the dotted circle of $23\frac{1}{2}$ degrees radius, and would finish its round in 25,868 years; but, since the actual centre has been

established by strict geometry to be C, and not E, the pole will follow the larger circle of radius $29\frac{1}{2}$ degrees and take about 31,686 years to get round.

Now, however, you will note that E-P, $23\frac{1}{2}$ degrees, is our old friend the Obliquity, or tilt (you see it in elevation in the celestial sphere, Fig. 5). If, therefore, the pole really did follow the dotted circle, the Obliquity would remain constant (save for the very small effect of Nutation); but since it follows the larger circle, it will be obvious that the distance from E to P, as it moves round the larger circle, will vary continually. For instance, when P is at Z, in line with E and C, the distance E-Z or E-P will be a minimum (actually $23^{\circ} 25' 47''$); whereas when at W, the distance E-W or E-P will be a maximum, or $35^{\circ} 25' 47''$. The plain meaning of this is, that when the pole was at W, the far end of its beat, the Obliquity was nearly 12 degrees greater than it is at present.

Now do you begin to see the meaning of it all? The Obliquity, which is now about $23\frac{1}{2}$ degrees, must, at 13548 B.C., have been about $35\frac{1}{2}$ degrees: *i.e.* the Earth had 12 degrees more tilt, the Polar Circles were 12 degrees nearer the Equator, and the Frigid Zones were 12 degrees wider than now. The effect of this will be illustrated by the next slide.

Here, to help the eye, I have reproduced Fig. 8, with its two circles as before, and these two circles, the small and the large, I have applied to the two globes below, making them look uncommonly like Scottish thistles. The left-hand globe of Fig. 9 shows the kind of Frigid Zone the Earth would have if it precessed round E as centre; but the right-hand globe shows the expansion of that Frigid Zone when at maximum Obliquity, due to precessing round C instead of E. You see the difference.

Therein lies the chief (I do not say the only) cause of the Glacial Epoch, in the greatly intensified cold conditions of winter, spread over 12 degrees more of the temperate zones (North and South) than now, succeeded by greatly intensified heat of summer, causing melting and moving of the ice formed in winter. Both are essential, for without melting there can be no movement of the ice-sheet, or relatively little.

The next slide, that of the Eastern Hemisphere, shows us that at date 13548 B.C., the whole of Scotland, and of England down to Durham, was within the then Arctic Circle, which is amply confirmed by the facts of glaciation. The next, that of the

Western Hemisphere, shows the Arctic Circle as then including the whole of Hudson's Bay, which it undoubtedly did.

Turn now to another consideration. There is a word employed by astronomers to denote the fraction of incident sunlight which is reflected by a heavenly body. They call it the ALBEDO, a word I would like you to remember. It is a question of percentage. Thus, if sunlight be denoted by 1·00, the Albedo of a particular Planet might be ·5, say, or more or less. Standing in the lime-light, my face may possibly reflect 10 or 15 per cent. of it, and you could, if in a merry mood, say that was my Albedo. But if I were to deliver a ton of coal to your coal-cellar and trim up the mess afterwards, 1 per cent. would likely cover all you would see of my Albedo at the end of the business.

Now let us look at a few Planets in such slides as I have been able to get together :—

JUPITER,	with a tilt of 2 degrees,	has an Albedo of	·62.
MARS	„ 25 „ „		·22
			(notice the ice-caps).
SATURN	„ 27 „ „		·72.
VENUS	„ 75 „ „		·76.
URANUS	„ 80 „ „		·6.

You will notice that Venus is the most brilliant of all, having an Albedo of ·76, and you will appreciate the intensity of the light she reflects when you learn that it is nearly six times as bright as that of the Moon, the Albedo of which is only ·13. The figures are from Dr. Spencer Jones's admirable book on *General Astronomy*, and now I will read you what he says about it, in Art. 137 :—“The Albedo of Venus has the high value of ·76, which is about equal to the reflecting power of freshly fallen snow. As few, if any, rocks or soils have so high a reflecting power, the value would seem to indicate that the Planet is mostly or entirely cloud-covered.” Cloud-covered? and with Frigid Zones coming down to within 15 degrees of the Equator, and an Albedo of freshly fallen snow—conditions of extreme glaciation!

The same distinguished writer, referring to the ice-caps of MARS (Art. 139), says :—“These polar caps, whose interpretation as formed of ice and snow, can hardly be doubted, etc.” MARS, with a tilt of 25 degrees and undoubted ice-caps to correspond, has an Albedo of ·22 only. VENUS, with three times the

tilt and three and one-half times the Albedo, is thought to be "cloud-covered." Pray, why should it not be covered with ice and snow?

Dr. Jones has not hitherto been quite a protagonist of the Drayson doctrine. I welcome, therefore, the more readily this unconscious testimony to its correctness; though, to Major Marriott belongs the credit of first interpreting the brilliance of VENUS as a link in the chain of evidence of glaciation.

Please remember that word ALBEDO, and when you get home to-night, turn up 2 Cor. iii, 18, write Albedo in the margin and think about it.

Return now for a few moments to Fig. 8, and, regarding the larger circle as a "Great Year" divisible into four Seasons, you will have its mid-winter at W when the glaciation was at its height; autumn at A when it was beginning; spring at S when it was coming to an end; and we are now nearing the mid-summer period when, with Obliquity at its minimum, winter and summer contrasts will be least marked. This is in part confirmed by the researches of Dr. Ernst Antevs, of the University of Stockholm, in his recent publication entitled "The Last Glaciation" (American Geographical Society),* and, further, in a recent paper on "Historic Climatology," by Dr. C. E. P. Brooks, F.R.Met.Soc., who shows that as we go farther back, the range of temperature, winter and summer, widens out.

The worst phase of the Glacial Epoch would thus have run from about 21000 B.C. to about 5600 B.C., and you will readily understand that the piling up of these enormous ice-caps must have robbed the sea of a tremendous quantity of water, all of which had to be refunded. Thus the melting of snow and ice year after year, with cumulative effect, at or near 5600 B.C., must have furnished a very large quota to the universal deluge of Gen. vii, which may well have occurred any time after that date.

One more slide and we have done. We have recently had many references in the Victoria Institute to the structure of the Atom, which, on Sir Ernest Rutherford's hypothesis, resembles a Solar System in miniature, having a central orb or nucleus, composed of two kinds of particles, *protons* or units of positive electricity, held together, *i.e.* surrounded, by *electrons*, or particles of negative electricity, which circulate

* Particulars of confirmations from Antevs are given in the lecturer's reply (pp. 139 and 140).

round the nucleus in orbits, as Planets circulate round the Sun. Atoms are many and various, from the Hydrogen atom, a single proton with a single electron circulating round it as the Moon revolves round the Earth, to Uranium, with 238 protons, plus 146 electrons and 92 planetary electrons. Between these extremes we have as many varieties of atoms as there are elements, and hence as many varieties of solar systems in miniature, no two alike, all revolving at incredible speed in their courses, and, as we would judge, probably answering to the same laws as prevail in the greater systems, some of which are measurably demonstrated by this gyroscope.

Whether the little orbs have their winters and summers, their nights and days, their temperate and glacial epochs, we must leave to the imagination. But, one thing stands out clearly amid such inferences as we are able to draw, viz. that whether we survey the infinitely great, or study the infinitely small, we trace infallibly the design of Him who, though He contemplated His works from the beginning, "and behold they were very good," rested not content with any of His works of creation till He had come Himself and dwelt among us full of grace and truth. Well may we say with the Psalmist of old:—

"The heavens declare the glory of God ;
And the firmament showeth His handiwork,
Day unto day uttereth speech,
And night unto night showeth knowledge."

It is for us to hear, to heed, and to bow our hearts in wonder and adoring praise.

Addendum.

In the time at my disposal it has not been possible even to mention a large array of facts in support of Drayson's discovery: for particulars reference should be made to his own works:—COMMON SIGHTS IN THE HEAVENS (1862); THE LAST GLACIAL EPOCH OF GEOLOGY (1873); THE MOTION OF THE FIXED STARS (1874); THIRTY THOUSAND YEARS OF THE EARTH'S PAST HISTORY (1888); UNTRODDEN GROUND IN ASTRONOMY AND GEOLOGY (1890)—all of which are to be seen in the Library of the British Museum and other scientific libraries; and DRAYSONIA, by Admiral Sir Algernon De Horsey, K.C.B. (1911).

More recent publications are procurable in inexpensive pamphlet form as follow:—From Wm. Pollard & Co., Ltd.,

Exeter, THE DRAYSON PROBLEM, by A. H. Barley, Esq.; WARMER WINTERS AND THE EARTH'S TILT, by Maj. R. A. Marriott, D.S.O.; also from W. E. Baxter, Ltd., Lewes, Sussex, THE ICE AGE: ITS DATE, DURATION, AND ASTRONOMICAL CAUSE, by A. H. Barley, Esq., Maj. R. A. Marriott, D.S.O., Maj.-Gen. Sir Wm. Salmond, K.C.B., and others.

DISCUSSION.

The CHAIRMAN (Lieut.-Col. F. A. Molony) said: We have to thank Colonel Skinner for bringing to our notice a very intriguing subject, which he has presented with remarkable clearness. Those of you who have taken astronomical observations, for navigation or other purposes, will want to know what the *Nautical Almanac* says about it. I have taken out the obliquity from that impartial compilation at intervals of ten years, and find that for the last 100 years it has been decreasing with great steadiness at the rate of 4.7 seconds every ten years. Drayson published his theory in 1873. Our lecturer has told us, on p. 127, what Drayson based his prediction upon; as far as I can calculate he is now only 2 or 3 seconds of arc out. This is such a very small angle of arc that one cannot fairly say that Drayson is proved to be wrong. Reckoning that you would like to hear what professional astronomers have to say about the matter, I obtained an interview with one, and then wrote out the gist of what he told me. This he has very kindly corrected, and here it is:—

Views of Modern Astronomers on the Causes of the Ice Ages.

“It is believed that the very small diminutions in the obliquity of the ecliptic now taking place, are due to changes in the plane of the earth's orbit under planetary influences. The obliquity is not likely to have ever been so great as Drayson supposed, and has had very little effect upon the Ice Ages. Astronomers refuse to tie themselves to any definite theory about these, but some are inclined to believe that the changes in the eccentricity of the earth's orbit have had much to do with them. That is, that sometimes, and at very long intervals, the earth's orbit is more elliptical than at other times, this being due to planetary influence.

As the sun is at a focus, either the North or South Pole (but not both simultaneously) will experience extra cold for many winters in succession. Some think that the slipping of the earth's crust over its liquid core may have influenced the matter. This would cause the North Pole to lie, say, sometimes in Canada and at others in Siberia. This possible explanation would have to be considered if it could be proved by geological evidence that the Ice Ages in those two countries were not simultaneous."

These are the orthodox astronomical views. You will note that they say, "The obliquity is not likely to have ever been as great as Drayson supposed" (*i.e.* $35^{\circ} 25' 47''$). Now, our lecturer has reminded us that, whereas staid Jupiter only allows himself 2 degrees divergence from the perpendicular, giddy Venus rotates at well-nigh as great a difference from the upright as is possible (*i.e.* 75 degrees), compared with which Drayson's maximum heel-over is but small.

I hope that you also noted that the astronomers' theory that the Ice Ages are chiefly due to eccentricity of orbit is dependent on the ice-caps at North and South Pole *not* receding together, but there is much evidence that they *are* both receding at the present time.

Now geology confirms Drayson, as I shall presently show, but probably Drayson himself would not have claimed that he had propounded the whole truth in the matter. Geologists are demanding a cycle even greater than Drayson's, which shall throw the glacial epochs into groups of at least four each, and which may be due to alterations in the plane of the earth's orbit, while gyroscopic action keeps the pole steady.

I concur with our lecturer in claiming that geology confirms Drayson, who calculated that the last Ice Age was at its height 15,000 years ago. Swedish geologists, by counting annual darkenings in hardened mud, calculate that the glaciers near Stockholm *began* receding 12,000 years ago, while Canadian scientists reckon that Niagara has been receding for 7,000 years *since* the last glaciation, and American men give a somewhat larger figure. All this agrees with Drayson remarkably closely.

Those who wish to go into the mathematics of Drayson's theory should study *Draysonia*, by Admiral Sir Algernon de Horsey, published by Longmans. Be Drayson right or wrong, it seems clear that the last Ice Age was ending only 5,000 years B.C. Archbishop

Usher puts the Deluge at 2448 B.C., but we do not tie ourselves to his datings. It is clear that ice-meltings may have had much to do with that flood; but I doubt if the connection is as our lecturer gives it, and for two reasons: I reckon that the rise in the oceans would only be an inch or so per year, even when the melting of the polar ice-caps was at its maximum. Suppose that this calculation is wrong, and that the rise was 20 or 30 feet a year, still it would be annual, would begin gradually, and would be expected, and therefore not likely to endanger life. But, as Marriott points out, the general melting would cause the sudden bursting of glaciers which had formed lakes by damming up valleys, and these would cause very destructive river floods. The little Marjolen See, in Switzerland, is held up by a glacier whose crevasses allow the water in the lake to lower itself at times which cannot be foreseen; these floods have caused so much damage in the valley of the Rhône below, that an expensive tunnel has been cut to lower the level of the lake permanently.

We were all much interested lately in hearing about the damming by a glacier of the Shyok, a tributary of the Indus. We were told that so sudden a flood was expected whenever the dam should burst, that the great Attock bridge might be endangered. Also that a Sikh army was once overwhelmed in Cashmere by a flood similarly caused. Now, at the head of the waters of the Tigris is Lake Van, of 1,500 square miles, with mountains 11,000 feet high to the south of it. It has no outlet, but a slight rise would cause its waters to flow out through a gorge at its west end. A rise of 460 feet would allow of its waters finding outlet by the Bitlis gorge, a few miles west of the first. A further rise of 525 feet would send the outlet to the south-east corner of the lake, 52 miles away.

When these topographical conditions prevail, geologists argue that the gorges were temporarily blocked by glaciers similar to the block which we lately heard of at the head-waters of the Indus, thus compelling the water to cut other outlets. Some of the Swiss glaciers to-day push their way down to a lower level than Lake Van, so it seems clear that a much smaller alteration of climate than Drayson proves might bring a glacier down to that lake. If the gorges south-east of Lake Van were thus blocked, when the dam broke it would send down from 200 to 400 *cubic miles* of water, and

as the height of the lake is 5,270 feet, the water would not be long in finding its way down to the great plain of Mesopotamia. Some 60 miles north-west of Mosul, or Nineveh, the Tigris comes out of the hills, and from there to 20 miles south of Mosul the contoured map shows low rounded hills all rising to about the same graded plane, and looking very much as though they were made of the silt deposited by some tremendous flood.

In short, it seems to me to be certain, reasoning on scientific data only, that a terrible and unexpected flood or floods swept over the great plain of Mesopotamia between the years 7000 and 2000 B.C. If caused in the way I have suggested, it would naturally happen during the rainy season.

The Biblical account, by stating that all the fountains of the great deep were broken up, hints that the flood was not caused by rain only. Gen. vii, 11, says that the flood began on a definite day. The Babylonian version says, "A whole day long (the flood descended), swiftly it mounted up." The Bible says that it took many months to run off, but this is not counter to the foregoing explanation, if we remember how flat the great plain of Iraq is.

Permit me again, in your name, to thank Colonel Skinner for his extremely interesting paper.

Major-General Sir WILLIAM SALMOND, K.C.B., said: Colonel Skinner has shown how the second rotation of the earth, as proved by General Drayson to exist, has necessarily brought about glaciations in the past, and will continue to do so in the future, unless different conditions should come into force: such, for instance, as a change in the position of the centre of gravity of the earth. Colonel Skinner has explained that great meltings must have occurred during the period 2600 to 2100 B.C.

I have found corroboration for this in reliable Egyptian records covering those years. They were published in English in 1863, in a book which I have in my hand. It is entitled *Hekekyan Bey on Egyptian Chronology*. At p. 15 the author says: "The Memphis Astrological Observatory, which is still in function, and is known by the appellation of The Mekias or Nilometer of Roda (a small island near Cairo), counts the year A.D. 1861 as the 7,563rd Nile inundation, observed and recorded." A continuous and reliable record like

that, over so many years, has a special value in relation to the effects on the earth itself when journeying through the 32,000 years' cycle called The Great Year. On p. 96, Hekekyan Bey gives the date, in Nile years, of the Deluge. This date, when adjusted to the value of present-day years, works out to be 3232 B.C. If we consider Fig. 8, as shown on the screen, in the light of a clock-face, and assume that the earth, having started from Z (zero year) on its 32,000-year travel, has arrived at S (which would be 6 at the bottom of our clock), it will then enter the last 8,000-year lap of the cycle. In about 6 clock-minutes, *i.e.* at about 6.36 by our clock, the earth will pass through the years of great meltings, *viz.* 3232-2600-2100 B.C. 6.36 on our clock will be about the end of April in the Great Year.

Here, then, we have a detail which tends to corroborate Drayson's curve for the 32,000 years of the Great Year. So far as I know, Drayson was the first man to envisage—as he has done—the cause of the climatic conditions of the earth in the past and as they will be in the future. I submit that Drayson deserves well of his country.

Colonel J. B. STRACEY-CLITHEROW, C.B.E., said: Drayson's discovery has been so amply described by Colonel Skinner, and extended by General Salmond, that I will not dwell on this part. All I wish to say is, that for those who like to study Drayson's theory it does help them to understand the true movement of this earth, and to realize what has taken place, is taking place, and likely to take place in the future. I will just give you one instance of what I mean. On October 18th, 1923, I wrote a letter to the *Yorkshire Post*, on the erosions that are taking place round our coasts, and pointing out that the cause of this was the annual decrease in the obliquity of the axis of our earth with its orbit. As the decrease in the angle takes place, so does the mean level of the sea increase, from the melting of the ice at both poles, an average of nearly a mile a year of ice off the circumference of the poles.

At the end of my letter I added, "I fear we have in the near future to look forward to many serious erosions on our coast-line, and also up our arterial rivers. How long will it be before the waters of the Thames top the Embankment? Personally, I should be sorry to give it anything like fifty years." The London papers took

this latter part up, and went to the Meteorological Bureau to ask if there was this danger to the waters of the Thames. They replied that there was no danger of this happening; if there was more water in the oceans in one place, there was less in another. That, of course, is quite true with regard to tides, but was no answer to my point. Owing to the decrease in the obliquity of the axis, there was an increase in the mean height of the seas. We all know what did happen five years later, on January 6th, 1928, when the waters of the Thames came over the defences of the river, and went almost as far as Victoria Street, Westminster, when several people in their basements were drowned. So I think I may say that my prophecy came true, which was entirely worked out on Drayson's theory, that the true centre of the Pole of the Heavens is 6 degrees removed from the Pole of the Ecliptic.

Major R. A. MARRIOTT, D.S.O., said: I attended this afternoon's lecture for the purpose of replying to any points that might be raised adverse to the facts so ably explained by the lecturer, but as there seems to be no opposition, I will show how this present campaign in favour of Drayson's discovery started.

After reading *Thirty Thousand Years of the Earth's Past History*, by Drayson, I was convinced that it was an important discovery; and in 1911, when I found that Scott, after his first expedition, reported that the ice was retreating in the Antarctic, and being aware of the retreat of the Arctic ice in this hemisphere, I bethought me that Sir Robert Ball had written, in his book on the subject, that if the Ice Ages in both hemispheres could be shown to be contemporaneous, the astronomical theory (Croll's) would have to be *forthwith abandoned*.

I wrote a small pamphlet pointing this out as in every way favourable to Drayson, and that glaciers were receding all over the world, thinking that it would set geologists agog to bring pressure on astronomers to investigate Drayson's theory. Unknown to each other, Admiral Sir Algernon de Horsey published his *Draysonia*, the very same month, dealing with the astronomical side. We were, however, equally unsuccessful in producing scientific interest in the matter.

On writing to two late presidents of the Geological Society, I was met by the contention that even the 80,000 years of astronomers was not sufficiently long ago for the Ice Age to have passed away, and on pointing out to another leading geologist that Dr. Holst's computation of the Swedish evidence gave almost *exactly* similar dates for the duration of the last Ice Age as did Drayson, the reply was, "I have just come from Stockholm, and think they are right about Sweden, but it does not apply to the British Isles!"

I also wrote to Dr. G. F. Wright, a leading "glacialist" of North America, and was encouraged by his reply: "Your theory is correct and most welcome." In spite of this, in a book published two years afterwards, *The Ice Age in North America*, he went out of his way to say that astronomy could lend no aid to geology in this question.

Again, Dr. Holst, the Swede, though I pointed out to him Drayson's exact agreement with him as to dates, said, "If Drayson is right, there have been many glaciations, and I maintain there has been only one." He came to London some years after and propounded his doctrine, but met with no active opposition. Having found traces of a recent Ice Age all over the world, my difficulty was to find some evidence in my own country. It was only after perceiving this difficulty that I discovered that we had all round our coasts the submerged forests, which supplied as strong evidence of a recent glaciation as did any land relics. In fact, the geological evidences, which I have not time to go into, are numerous enough without the aid of astronomy. Drayson's discovery throws light on other sciences as well.

THE LECTURER'S REPLY.

I desire to thank the Members, Associates and friends for their most kind appreciation of the paper. Our hearty thanks are due to Sir William Salmond for his presence here, as well as for his interesting and valuable note on Nile chronology; to Colonel Stracey-Clitherow also, whose original research with regard to the continued rise of sea-level must surely ere long receive the attention so serious a disclosure demands; also to Major Marriott for reminding us of Scott's south polar confirmation of the general retreat of the ice; and to Colonel Molony, alike for his able handling of the

meeting, his own most valuable contributions to the discussion, and, in particular, for having obtained the views of a qualified astronomer, Dr. W. M. Smart, M.A., F.R.A.S., of Cambridge Observatory, whose courtesy in meeting Colonel Molony's request places us under a very real obligation.

From Dr. Antevs' recent work it would appear that, allowing for the difficulties and uncertainties of long-distance correlation, he is satisfied that the glaciations in Europe, Asia, and North America were simultaneous; while, in the southern hemisphere, he finds in Australia and South America like evidences of two or three Pleistocene glaciations that clearly suggest synchronism. Relating the southern hemisphere to the northern, while unable to say that synchronism is definitely proven, he finds it, nevertheless, on the available evidence highly probable.

As to this I submit that more weight may safely be attached to the undoubted simultaneous retreat of the ice in Arctic and Antarctic at the present time than is usually accorded to that fact. If retreat of the ice be due, as Drayson affirmed, to the decreasing obliquity, one has only to reflect that such retreat will be continuous throughout the whole period between maximum obliquity and minimum. To put it another way, the Ice Age, though shorn of its former impressiveness, is still with us, and, strictly speaking, cannot be said to terminate till a definite point is reached when the obliquity is either stabilized at a minimum, or starts on another increase. Thus viewed, the waning of ice at the poles is no other than the last lingering phase of the great retreat, and this fact of simultaneous shrinkage is thus, I submit, decisive for confirmation.

In this connection it is reasonable to ask, "Why should synchronism ever be in doubt? Is there any *evidence* in disproof?" Are we not rather hypnotized by the pure assumptions of the past, the legacy of the early theory of glaciation being due to former great eccentricity of orbit; a theory which, though it places the Ice Age 100,000 years farther back than modern glacialists can allow, is still employed as an argument against the Drayson thesis?

Antevs, it is true, puts the last glaciation several thousand years farther back than does Drayson's ideal cycle, illustrated in Fig. 8; but as to this, there is more elasticity and possibility of adjustment than appears on the surface: in all his works Drayson adumbrated

possible variations from the ideal, and a somewhat wider range of dates.

Another theory in competition, Wegener's theory of a migrating pole—indicated by white dots on the polar chart—would seem to be ruled out altogether by Antevs.

Finally, as to the belief that "the very small diminutions in the obliquity of the ecliptic now taking place are due to changes in the plane of the earth's orbit under planetary influences," it need only be said that every movement of the ecliptic plane carries with it a corresponding movement of its pole; and thus, whatever may be the physical cause of decrease of the obliquity, the radius of the supposed—*i.e.* the orthodox—precessional circle must decrease *pari passu*. The vital fact, however, is, not that these decrements are small, but that they are known to have been in continuous operation for 1,400 years, with strong confirmations carrying it back another 6,000 or even 14,000 years, a period surely long enough to determine with accuracy the real arc, its centre, and its radius.

With regard to the Noachian Deluge, apart from the general rise of sea-level due to annual meltings, the most that can be argued from anything I have sought to establish in this paper is a partial contribution to the general Flood in the sudden release of enormous volumes of flood-water about the spring-time of the Great Year, a possibility well implemented by our Chairman in his study of Lake Van and its outlets. For a full explanation of the Deluge we must fall back upon the account given us in Gen. vii, 11, and accept it that, in addition to unprecedented rains, seismic disturbances of great magnitude in the ocean bed had caused tidal waves sufficient to engulf the entire land surface.

I may add that I am now in communication with a highly placed astronomer with regard to investigation of Drayson's claims. He is meeting me with heartiest good-will, and I feel hopeful that ere long the matter will be fully gone into.

FIG. 1.

THE SOLAR SYSTEM

The planets on the orbits point the direction of the elliptical motion, right hand round the Sun, the centre of their Revolution.

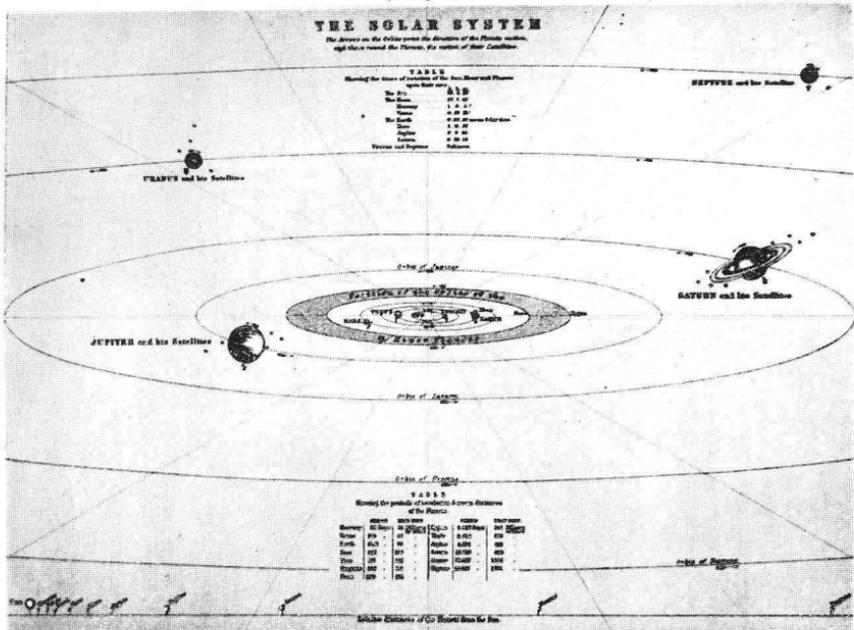
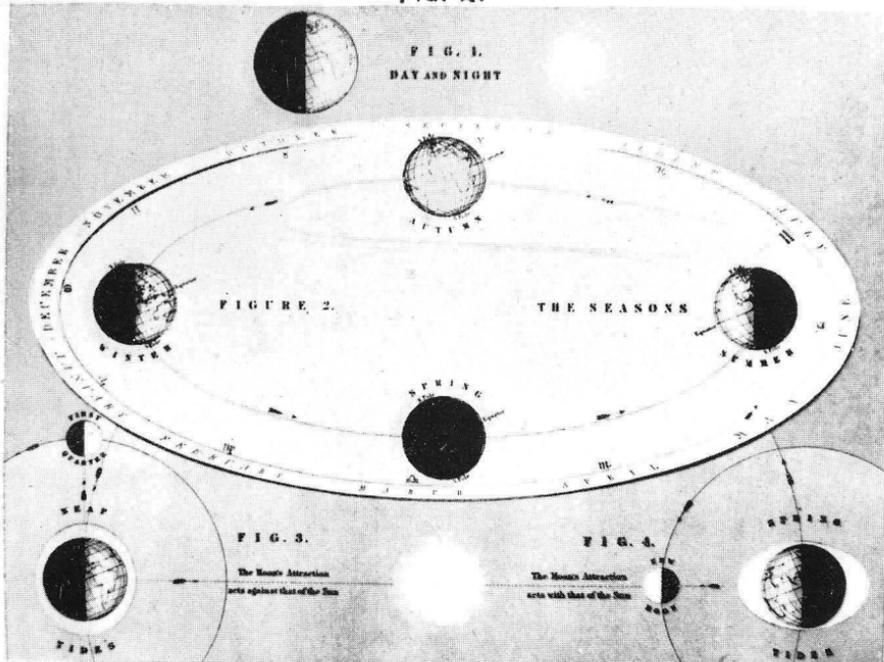


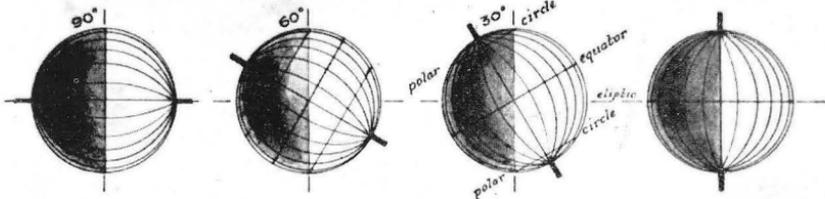
FIG. 2.

FIG. 1.
DAY AND NIGHT



OBLIQUITY, TILT and POLAR CIRCLES

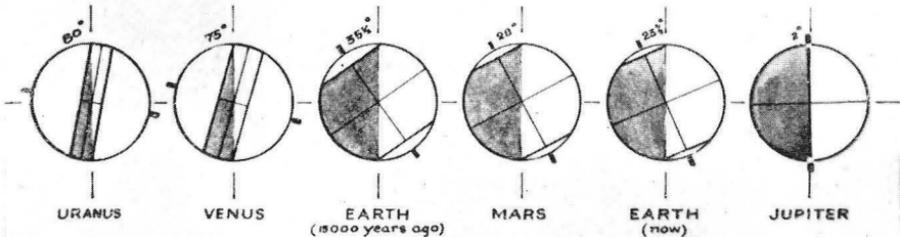
FIG. 3.



ANALOGY OF THE SOLAR SYSTEM

FIG. 4.

SOME PLANETARY TILTS

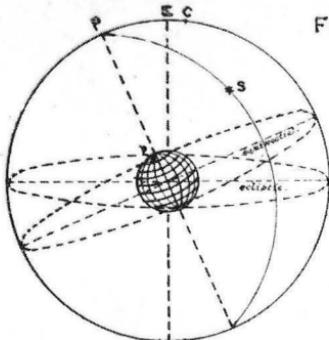


T.C. Shimmer (1914/1915)

DRAYSON'S PRECESSIONAL CYCLE.

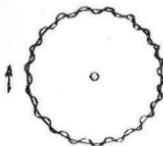
THE CELESTIAL SPHERE.

FIG. 5.



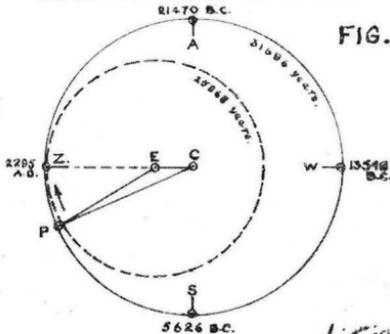
MUTATION.

FIG. 6.



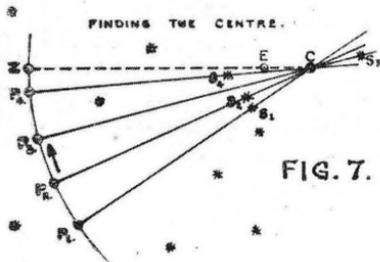
THE SUPPOSED CENTRE AND THE TRUE.

FIG. 8.



FINDING THE CENTRE.

FIG. 7.



T.C. Shimmer (1914/1915)

FIG. 8.

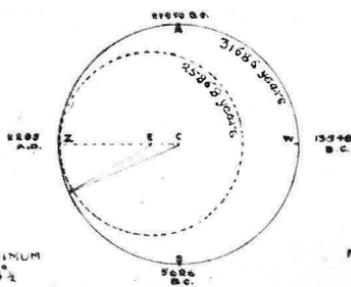


FIG. 9.

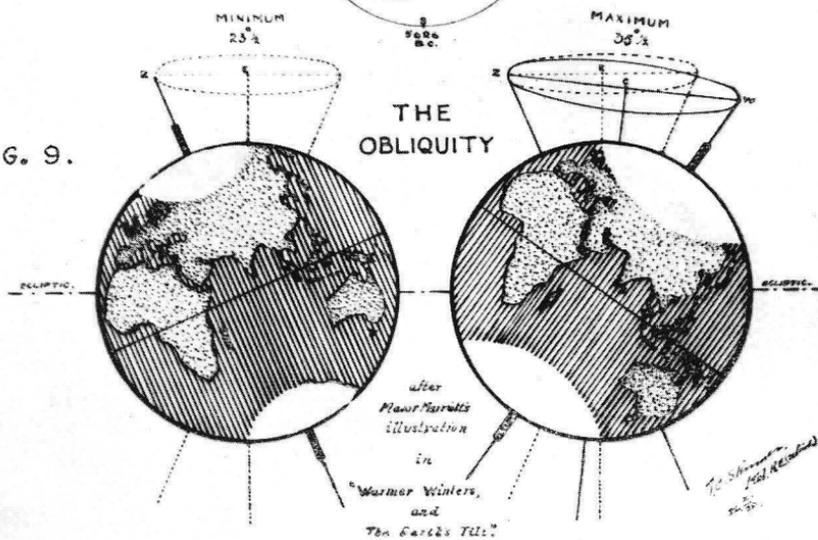
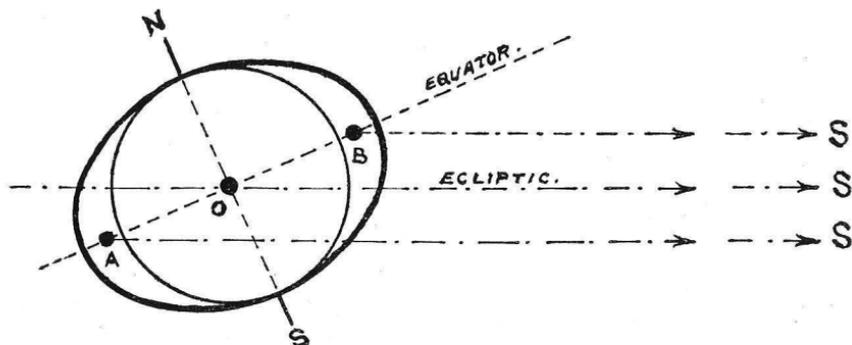


FIG. 10.



720TH ORDINARY GENERAL MEETING,

HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, MARCH 4TH, 1929,

AT 4.30 P.M.

SIR AMBROSE FLEMING, D.Sc., F.R.S., IN THE CHAIR.

The Minutes of the previous Meeting were read, confirmed, and signed.

The CHAIRMAN then introduced Dr. A. Rendle Short, B.S., B.Sc., F.R.C.S. (himself a member of the Council of the Victoria Institute) to read his paper on "Some Recent Literature Concerning the Origin of Species." Before doing so, Dr. Short offered congratulations, in which he knew all would concur, to the Chairman on the honour of Knighthood which His Majesty the King had been pleased to confer on him.

*SOME RECENT LITERATURE CONCERNING THE
ORIGIN OF SPECIES.*

By A. RENDLE SHORT, Esq., M.D., B.S., B.Sc., F.R.C.S.

IT will be necessary at the outset to make it clear what the writer's standpoint is. It has come to be widely believed that there is an inevitable and hopeless clash between the facts of biological science and reasonable deductions therefrom, on the one hand, and, on the other, the course of events as set forth in the earlier chapters of the Bible. It has therefore become a commonplace to regard the one as all wrong and the other as completely reliable. Popular science, with the eager

concurrence of liberal theology,* regards the Darwinian theory as completely proved, and relegates the Genesis account of the Creation to the category of myth and folk-lore, totally useless as a record of facts. Some stalwart Fundamentalists, in their turn, have little use for the discoveries and less for the theories of biological science, and strongly suspect wilful falsification. Neither of these parties will find much to interest them in what follows. We are persuaded, however, that there is a considerable body of opinion ready to agree with us that the truth usually lies between two extremes; that it is never safe to neglect any source of information; that the Bible bears too many marks of being the Word of God to be treated as mere folk-lore, but that it is hopeless and misleading to bring wholesale charges of inaccurate observation and deduction against all the students of natural science. It is our present purpose to attempt to show that there has arisen a school of biologists whose conclusions are not so difficult to reconcile with the Genesis narrative, as were the teachings of Darwin, Huxley, Haeckel, and the rest.

Let us approach the subject historically. Up till the end of the eighteenth century, there was fairly general agreement with the barest and most literal interpretation of Genesis and with the chronological deductions therefrom, by Usher or Hales, that the world, the sun, and the moon were created in six literal days, about 4,000 years before the Christian era. As the new-born science of Geology became better known, and evidence accumulated of the immense antiquity of the rocks and of the fossils contained therein, room was found for this by a reinterpretation of Genesis which put a great gap between the first and second verses in Gen. i. Then came Darwin and Wallace, followed by Huxley and Haeckel, and there emerged the theory of Evolution by Natural Selection, which practically eliminated the necessity for a Creator in the world of living creatures; though this was not Darwin's original opinion, and Wallace, in his last book, *The World of Life*, came forward with a notable argument for Theism. The conflict between Huxley and the older theologians was acute, and this was the period

* For which eager support the scientists appear to be none too grateful. Thus, J. T. Cunningham (*Modern Biology*, p. xi), referring to the Bishop of Birmingham, says: "It seems to me that he is unconsciously encouraging dogmatism in biology, while he repudiates it in theology."

when, as it was wittily remarked, "bishops had sleepless nights when they heard of a very hairy man, or a particularly intelligent ape!"

The main contentions of the theory of Evolution by Natural Selection were:—

(i) That all forms of life, fossil and recent, animal and vegetable, including man himself, were derived from one (or very few) very simple, original form, like branches and twigs spreading out from the bole of a parent tree.

(ii) That the effective force in bringing new species, genera, families and orders into existence was Natural Selection. That means that all (or nearly all) living things show incessant variations from the normal: some of these variations chance to be helpful to the organism in the struggle for existence, and their fortunate possessors are more likely to survive and to pass on their happy improvements to their offspring, so that a new and better species gradually supplants the older one, as the descendants of the one or two favorites of fortune crowd out their less enterprising and poorer relations. Brilliant colouring and some other characters were attributed to sexual selection.

The main arguments for the theory were:—

(i) *Variation and Domestication*.—Extraordinary modifications have been brought about by human selection in animals and plants under domestication. Witness, for instance, amongst pigeons, the pouter, the fantail, and the tumbler, derived by breeding from the wild rock-dove; and the countless varieties of modern roses.

(ii) *Island Life*.—There are marked modifications of plant and animal life inhabiting distant islands, certainly or apparently derived from mainland plants or animals, but showing such differences that they have to be described as new species and genera. Examples include the giant tortoises of Galapagos Islands, with a different species on each island. More striking still is the persistence in Australasia of whole groups of animals rarely to be found elsewhere, representing the fauna of past geological ages: for instance, the marsupials, Monotremes (*e.g.* duckbill platypus), shellfish (*Terebratula*, *Trigonia*), and air-breathing fish (*Ceratodus*) of the Mesozoic period, and the absence of other mammals, except recent human introductions.

(iii) *The Argument from Geology*.—In general terms, the fossils in the newer rocks represent forms progressively more complex than those in the older. Thus we find Crustacea in the oldest (Cambrian), fish next (Silurian), mammals later (Rhætic), and man last. Occasionally a series of closely connected forms, with all the intervening links, can be traced as we study the fossils in a succession of geological strata, lying the one on top of the other. That such series are not the rule, but the very rare exception, is attributed to the imperfection of the geological record—that countless forms perished without a memorial.

(iv) *Mimicry*.—In a few special cases, *e.g.* when for purposes of self-protection a creature closely mimics inanimate objects (*e.g.* the stick insect, butterflies with wings like a leaf), or a harmless and edible insect such as the hover-fly develops black and gold bands like a wasp, it was easy to conclude that natural selection might be operative in perfecting the mimicry. The less successful imitators would be detected and eaten by enemies.

(v) *Law of Recapitulation*.—Haeckel emphasized his Law of Recapitulation, that the embryology of every animal (ontogeny) is a condensed version of its ancestry (phylogeny). That in their individual development mammals, including man, begin as a one-celled ovum, and pass through a stage with gillarches, is taken to prove that in past time the precursor of the mammals was first a one-celled organism like Amœba, and later a fish.

(vi) *Vestigial Remains*, and occasional freaks, in animals, such as the rudimentary pelvic bones of whales, now serving no obviously useful purpose, are alleged to prove derivation from an ancestor which had a use for the organ now nearly lost.

After the early conflicts with theologians had died down, the great majority of scientists came to accept all this without question, and saw no difficulties in the way. Of late years the criticisms of orthodox Darwinism have increased thick and fast, but probably there is still a majority, though not of the most active minds, who hang on to it grimly.

“It was Bateson who showed us there were difficulties in Darwinism, that the problems of Evolution were far from settled” (D’Arcy Thompson [1]).* He rediscovered old Abbot Mendel experimenting with tall and dwarf peas, and proving that variations are not due to chance, but follow a well-defined

* See references, p. 159.

law. "The great growth of our knowledge of genetic constitution, derived from Mendelian experiments, so far from clearing up the question of the origin of species, has only shown that our old Darwinian conceptions are unproven, and that all is again in the melting-pot" (Scott [2]). Bateson pointed out that the reason why such amazing variations can be secured with domesticated animals and plants is because they are usually hybrid in origin, *e.g.* modern dogs are derived from the wild dog, the wolf and the jackal. Almost the only widely varying cultivated flower that comes of a pure stock is the sweet pea. [3]

We may refer here to the work of Tornier [4] on the goldfish. A visit to a fresh-water aquarium will introduce us to many strange varieties (the "veil-fish," the "bullhead," etc.) derived from the goldfish by Chinese breeders, but Tornier shows that all these modifications can be explained by the effects of oxygen starvation on the fish embryo. In other words, most "fancy" varieties of domestic animals and cultivated plants are pathological, due to some defect, and would stand no chance of survival in a state of nature. It is evident that here one of the main props of Evolution by Natural Selection falls away.

For a moment it appeared that de Vries, who observed the sudden appearance of a new variety of Evening Primrose, had solved the problem of the origin of species by his Mutation Theory. But it has since become clear that these mutations, too, are pathological freaks (Scott [5]). The number of chromosomes (the elements which carry the inherited characters, and which should be constant in number) in the germ-cells of his evening primrose was anomalous. Professor T. H. Morgan has bred a number of very curious modifications of the banana fly (*Drosophila*), which often provide excellent illustrations of Mendel's Law, but they are not new species. In the main, they show defects, either of the eyes or of the wings.

Weissmann [6], seeking to establish Natural Selection, yet dealt it a well-nigh mortal blow by showing both on theoretical and experimental grounds that acquired characters cannot be inherited. For instance, the children of parents both blinded by accident will have normal eyes. The habit of foot-binding for many generations amongst Chinese women has not led to any inherited deformities of the foot. How could such acquired defects possibly influence the germ-cells in the sex-glands? Experiments on plants and animals confirm. If from a handful

of "pure line" beans the smallest are chosen from which to raise a crop, the resulting beans will be normal, not small (Johannsen*). Similar results have been obtained with a waterflea (Agar*) and paramœcium (Jennings*). Thus, Natural Selection, as Berg and others point out, does not tend to advance the race along some definite direction, but to crop off every deviation from the normal standard. So far from producing a new species, it effectually preserves the old one. Immense efforts have been made, with very indifferent success, to prove that acquired characters *can* be inherited. The nearest approach to success, amongst innumerable failures, is perhaps Kammerer's [8] conversion of a yellow into a black salamander, and vice versa.†

The features that distinguish a species from its relations are by no means always helpful in the struggle for existence, rather the reverse, yet natural selection has suffered them. Berg [9] gives pictures of various excrescences in insects which can serve no useful purpose, and must rather be a handicap. Even when a perfected organ is of value to its possessor, *e.g.* its electrical organ to the electric eel, it is impossible to see how the earliest stages could have been of any survival value, assuming as Darwinism does that these stages were gradual. "The non-utility of specific characters is the point on which Natural Selection, as a theory of the origin of species, is believed to fail" (Scott [10]).

Palæontology (study of fossils) has made great strides since Darwin's time, and it is futile nowadays to lament over lost evidence from the imperfections of the geological record, when so many undisturbed and highly fossiliferous strata have been thoroughly explored in a vertical direction. The general results are as follows. Many of our modern plants and animals can be traced far back in geological time. Living genera of mammals can be found in Miocene formations, and living species in the Pliocene. Of 147 species of Pliocene plants, all found before the Ice Age, and including the violet, buttercup, blackberry, colts-

* Quoted by MacBride [7].

† Professor Kammerer committed suicide in 1926 at Vienna, because it had come to light that some of his published results (of experiments on toads) were fraudulent. Apparently he had been imposed upon. Some experiments by Pavlov on mice are often advanced as proving inheritance of acquired characters, but more recently (1927) the very distinguished and conscientious author seems inclined to withdraw them.

foot, etc., all but 30 are still growing in this country (Clement Reid). The walnut, oak, plane, and maple go back as far as the Chalk (Scott [11]). The Nautilus is very old, and a shellfish (*Lingula*) may be found to-day practically unchanged from the earliest fossiliferous beds (Cambrian). Occasionally, especially in the Oligocene of the Colorado district of the U.S.A., skeletons of an animal can be recovered from a vertical succession of different layers, and a continuous series of slight changes in a definite direction made out, *e.g.* reduction of toes and increasing complexity of the teeth. A few series of Ammonites, or of Gastropods, have been described, behaving in the same way. But the all-prevailing and dominating feature revealed by Palæontology is this—we find in a particular stratum thousands of forms of some fossil all exactly alike, then, perhaps only a few inches above, it has been entirely replaced by a more or less similar but different form, as though a mass-transformation of the one species into the other had taken place. This was first emphasized by Waagen [12]. The changes, as we follow a species upwards into newer strata, are all in a determined direction, although they advance by leaps. Osborn [13] remarks that this is the greatest contribution which Palæontology has made to Biology and Natural Philosophy, and that it was “unknown to the master-mind of Darwin in 1845–58.”

Grand'Eury, who had worked for a quarter of a century at the fossils of the French coalfields, and who began by expecting to find a continuous variation, says that his researches “suggest the idea that their mutations have acted in the manner of metamorphoses, or even perhaps, in opposition to the well-known axiom, by leaps.” Zeiller, another distinguished palæobotanist, came to the same conclusion. (*See* Scott [14].)

Berg shows that there is a similar phenomenon exhibited in different geographical regions by several kinds of fish to-day. In Southern Europe, chub, roach, etc., have fewer rays in the fins than in Northern Europe, for no obvious reason. The same observation may be made about geographical variation in birds. The red grouse of Scotland seems to represent the willow grouse of Norway. Again, time may witness widespread changes in a species; thus, musk appears to be losing its scent the world over.

This evidence is all against the theory of Evolution by Natural Selection; that a favoured few became improved little by little, and gradually ousted the rest. As a rule it is impossible to see

in what way the new, superjacent forms are better fitted for life than the older, subjacent. After all, fossils were mostly denizens of the sea, and conditions in the sea do not change much. Life in the sea makes for stability, not constant adaptation to new circumstances.

Again, Palæontology shows us that quite ancient forms may be very complicated and highly modified, sometimes even more so than their modern representatives. In such cases there is no evolution from the primitive to the more highly organized. For instance, the Trilobites of the oldest (Cambrian) fossiliferous rocks are as complex as the modern crayfish. The seed-bearing ferns and club mosses of the Coal Measures are much more highly developed than modern ferns or lycopods.

Fossil plants are known from the Devonian rocks, older even than the Coal Measures, with all their internal structure wonderfully preserved and capable of microscopical study. Some of them are highly developed and specialized, including big trees. Others are relatively simple (*e.g.* Rhynia), but so are many modern plants.

THE RECAPITULATION THEORY.

That the affinities of an animal may occasionally be shown better by its embryonal stages than by the fully grown form is unquestionable. Thus, some toothless whales have teeth in the foetal state. Sacculina, apparently a very lowly parasite, is proved by its larval stage to be a degenerate Crustacean. But the evidential value of the theory is greatly clouded by what Balfour calls "falsifications of the records." The alleged ancestral stages in various life-histories seldom correspond to any real proved ancestor. For instance, the earliest known Crustacean is the Trilobite, found in the Cambrian, which is segmented, but the embryo (Nauplius) of the modern Crustacea is not segmented. The early embryo of the Spiders is segmented, so if the Recapitulation Theory is to be trusted, the Spiders and Scorpions on the one hand, and the Crabs and the Lobsters on the other came by totally different ways, which is a very unwelcome conclusion to the zoologist. How absurd it would be to conclude that because a butterfly passes through the stages of caterpillar and of chrysalis, that therefore, at some remote geological period, the ancestors of butterflies were motionless, unsexed, not feeding, composed of a creamy mass of cells showing no organs

at all (except in the tiny embryonic area) like a modern chrysalis! Another of the difficulties of the Recapitulation Theory is instanced by Garstang [15], who remarks that before it can leave a trail for a new species derived from it to recapitulate, an animal has first to follow up the track of its own development (ontogeny) and then to add something more, which is absurd.

The theory does not fare any better, but rather worse, at the hands of the botanists. "The so-called law of recapitulation might be assumed to apply less stringently in plants than in animals, and detailed comparison shows that this is actually the truth" (Bower [16]).

Professor V. L. Kellogg [17] says: "The proof that man is descended from a fish because he has gill-slits at one period in his individual development is not of the sort to rely on too confidently. The recapitulation theory of Fritz Müller and Haeckel is chiefly conspicuous as a skeleton on which to hang innumerable exceptions. . . . The recapitulation theory is mostly wrong." H. Bergson [18] said: "It has been necessary to reject the almost classical theory of the specificity of embryonal gills." Professor A. Sidgwick, in the article on Embryology in the *Encyclopædia Britannica*, writes in a similarly cautious strain.

CONVERGENCE.

Perhaps the most remarkable modern contribution to the problem of the Origin of Species is by Dr. Leo Berg, a professor in the University of Leningrad. His book, called *Nomogenesis*, or *Origin by Law*, was published in English in 1926. He summarizes some of his conclusions in contrast to those of Darwinism, as follows [19]:—

Darwinism.

- (1) All organisms have developed from one or a few primary forms, *i.e.* in a mono- or oligo-phyletic manner.
- (2) Subsequent evolution was divergent,
- (3) based on chance variations,

Nomogenesis.

- (1) Organisms have developed from tens of thousands of primary forms, *i.e.* poly-phyletically.
- (2) Subsequent evolution was chiefly convergent (partly divergent),
- (3) based on laws,

- | | |
|---|--|
| <p>(4) to which single and solitary individuals are subject ;</p> <p>(5) by means of slow, scarcely perceptible, continuous variations.</p> | <p>(4) affecting a vast number of individuals throughout an extensive territory ;</p> <p>(5) by leaps, paroxysms, mutations.</p> |
|---|--|

The evidence for Berg's conclusions is enormous, and ranges so widely over Zoology, Botany and Palæontology that to do it justice here is difficult. One of his main points is the abundant evidence in Nature for what is called Convergence, that is, two totally unrelated forms of animals or plants may come to present a strange similarity. Everyone, Darwin included, has had to make some allowance for Convergence ; Berg sees it everywhere. The deduction, of course, is that *resemblance is no proof of relationship or inheritance*, a deduction which cuts away the root of all the tables of ancestry (phylogeny) of living things. Only a very few of Berg's illustrations of Convergence can be given :—

(i) The spermatozoon of vertebrates, *e.g.* toad, is, down to minute details, like a free-swimming, lowly form of life called Trichomonas. But no one imagines that vertebrates are descended from Trichomonas.

(ii) The extinct (Mesozoic) plants called Bennettitales show a sort of flower, with male and female elements and pollen, but they are Gymnosperms, allied to modern Cycads, and cannot possibly be ancestors of modern flowering plants.

(iii) The Coal Measure "ferns" are very like our modern ferns, and were long supposed to be their ancestors. But they are now proved to be reproduced by seeds, not spores ; *i.e.* they are far higher up in the scale than modern ferns, and can in no sense be ancestors.

(iv) Common wheat exists in several varieties, bearded and beardless ; white, red or black-eared ; winter and spring. But just the same varieties are found of other wheats, spelt, rye and barley. This must be an inherent law of the grain ; it cannot be chance.

(v) The Dipnoi (air-breathing fish living in mud or water) cannot be the ancestors of frogs, toads, etc., but they share with them the paired lungs, the partitioned auricle (of the heart), and many other characters. That both Dipnoi and Amphibia

should "by means of accidental variations of characters" change over from breathing by gills to breathing by lungs is "a miracle no naturalist ought to credit" (Berg).

(vi) The octopus has eyes just like a vertebrate, with cornea, iris, ciliary body, lens, and retina; but it is not an ancestor. Lowly vertebrates have no eyes (amphioxus) or a very elementary eye (the hag). Darwin himself was staggered at his own proposition that so complicated a structure as the eye was brought about by accidental variations. Is it credible that chance has worked this miracle also, both in the octopus and in the vertebrate?

(vii) Three types of fish, the electric eel, torpedo and *Malapterurus*, can give powerful electric shocks, but they are quite unrelated.

(viii) The claws of a lobster and of a scorpion are on the same pattern.

One of the most remarkable examples of Convergence is furnished by the marsupials (pouched mammals of primitive type) of Australasia. There are forms that mimic most of the common types of the mammals of Europe, Asia and Africa. There is a volplaning opossum like the flying squirrel or flying lemur, the flesh-eating *Thylacine* like a wolf, another marsupial like a rat, another like a jerboa, another like a shrew, another like a mole, and another like a bear!

Nor is it only in outward form that Convergence is seen. The crocodile, like the bird, has a four-chambered heart. The extinct flying lizard, the pterosaur, had air-filled bones, and the foramen admitting the air situated just where it is in birds.

Other modern writers besides Berg are impressed by Convergence. Bower points out that both plants and animals are bisexual, but it is scarcely credible that they have a bisexual common ancestor. Osborn [20] calls attention to the strange parallelism between extinct reptiles and modern mammals; the huge dinosaurs with horns (*Triceratops*), like a rhinoceros; *Ichthyosaurus*, like a whale; pterosaurs, like a bat; flesh-eating *Cynodonts* with teeth like a dog; *iguanodon*, walking on its hind legs and tail like a kangaroo; the turtle, armour-plated like an armadillo or the extinct *glyptodon*. Surely all this must be law, not chance. Especially when we find that each of these types requires not one, but many, coincident modifications; *e.g.* the heavy-headed rhinoceros must have massive

legs and a strong neck; the flesh-eating Thylacine, the wolf, and the extinct Cynodont must have the agility to hunt their prey. Many examples of Convergence, besides those mentioned by Berg, will occur to the reader (an excellent token that the exponent of a law is on sound lines). Man and the parrot (and a few other birds) share the power of articulating. The frog, the squirrel and many other totally unconnected forms hibernate in the winter, which necessitates several complicated physiological adjustments to avoid starvation.

The trump-card of the advocates of Natural Selection is Mimicry for purposes of protection. Berg shows that the argument has been greatly overstated. Nearly all the alleged cases break down on strict enquiry, and prove to be examples of Convergence. Does anyone, for instance, really suppose that a bird is deterred from eating a mosquito for fear it may get stung? If not, of what advantage is it to insects, such as *Cheironomus*, to mimic it? Or take Wallace's classic case, the butterfly *Papilio polytes*. It now transpires that the mimics and the mimicked are not found in the same locality. The "imitated" forms, amongst insects, are usually not worth imitating; they are often eaten by birds quite readily. And are birds such fools as to be so easily taken in? It will be remembered that Darwin found that ants always detected and killed strangers put in their nests, while accepting their own kin even when steeped in asafetida. Some harmless snakes in Central America are black-red-yellow, like the poisonous Elaps. This was described as an admirable example of Mimicry, until it was discovered that they were all nocturnal.

POLYPHYLETIC ORIGINS.

Berg's next main point is that attempts to derive animals (or plants) from extinct common ancestors almost invariably break down. He gives numerous instances of such attempts, but it nearly always turns out that the supposed common ancestor is in some way more complicated than its alleged descendants. Thus, all the varieties of modern ferns used to be derived from the so-called ferns of the Coal Measures, but we know now that these were seed-bearing plants, much higher up than our modern spore-bearing ferns. Even in the earliest fossiliferous rocks (Cambrian), there are already three quite distinct groups of Brachiopods (shellfish) with no evidence of a common ancestor.

The number of classes and orders of plants and animals described by naturalists is constantly increasing, because authors realize the impossibility of deriving one group from another. Thus, in Darwin's time, there were six sub-classes of fishes, now there are at least ten. Here again Berg's conclusions are powerfully supported by distinguished British scientists, and especially by the experts on fossil plants. Scott [21] remarks that in Cretaceous times Angiosperms (flowering plants) "appear suddenly, in their full strength, like Athene sprung from the brain of Zeus. We know nothing of their evolution." Seward believes that the Mesozoic plants were entirely new formations, not descended from Palæozoic forms at all. "Persistence of a type, and from time to time the apparently sudden influx of new types, rather than a steady progressive development, are amongst the outstanding features of the history of plant evolution" [22]. Scott [23] adds: "We are compelled to face the conviction that we really know very little of evolutionary history." Bowers [24] writes: "The present view of the lines of descent for vascular plants is more like a bundle of sticks than a connected tree. . . . The morphological problem of descent is regarded by many as being again in the melting-pot." We may sum up in the words of D'Arcy Thompson [25]: "How species are actually produced remains an unsolved riddle; it is a great mystery. Here at least is a conclusion that few men of our time will venture to dispute." And again, with the great authority of H. F. Osborn [26]: "Darwin's law of selection as a natural explanation of the origin of all fitness in form and function has lost its prestige."

ORIGIN OF MAN.

So far we have been considering the Origin of Species in general, but without doubt the species whose origin is of the greatest interest to us all is *Homo sapiens*. And if it be true, as Berg puts it, that there have been tens of thousands of original forms of life, or, to use Bower's analogy, that the descent of living things is better represented by a bundle of sticks than by a tree with branches, it is more than probable that Man has had one of these separate origins. If Convergence is so prevalent in the animal kingdom, it will suffice to account for the anatomical and physiological resemblances of the human body to that of other mammals, and notably the anthropoid apes. Even the resemblance between human and ape blood may be thus

explained, for, after all, it is only a resemblance, a common reaction to certain tests. No sane physician would dare to transfuse an ape's blood, in bulk, into a living man.

It is often maintained that man's body contains numerous functionless relics which can only be accounted for by his animal ancestry, but these dwindle to little or nothing on examination. Certainly there are atrophic glandular structures, like the thymus and pineal, but they appear to function in infancy. There are functionless relics in the adult male, and in the adult female (*e.g.* mammary glands, parovarium) that function in the opposite sex, but that is not to the point. The coccyx is the homologue of the tail in animals, but it is not functionless, it gives rise to important muscles. A study of embryology introduces us to difficulties, as well as supports, for the theory of animal ancestry. If man has come up from an ape-like ancestor, by the Law of Recapitulation the human embryo will show a projecting muzzle, a low receding forehead, a small brain, and a thumb-like great toe. As a matter of fact, it shows nothing of the sort; indeed, the foetal ape is more like a man than the human foetus is like an ape. Sir A. Keith [27] wrote: "Now the appearances of the embryo at all ages are known, the general feeling is one of disappointment; the human embryo at no stage is anthropoid in appearance." Either, then, the Law of Recapitulation cannot be trusted, or man did not rise from an ape. The surgery of deformities lends no support to the theory of descent from ape or monkey. One would expect that there would be frequent "throw-backs," recalling the characters of an ancestor. What are the common congenital defects? Hare-lip, cleft palate, webbed fingers, club-foot, six toes, ectopia vesicæ, spina bifida—yet none of these are characteristic of apes. We never see the aforesaid projecting muzzle, the thumb-like great toe, nor the huge canine teeth, nor the absence of chin. A universal shaggy coat of hair seldom or never occurs, except perhaps amongst the Ainu people. Berg [28] remarks: "The presence of branchial arches in the embryo of man is no proof that man in his phylogenetic development has at some time passed through the stages of a fish; it simply shows that, in mammals, in certain conditions of embryonic development, an organ resembling the branchial arches of the lower vertebrates *must* be found."

Evidence from the discoveries of fossil man is hard to interpret. The only form deviating widely from the modern type which is

well known from fairly abundant and complete bony remains is Neanderthal man, and certainly the stooping gait and huge eyebrow ridges gave colour to the notion that here was a genuine missing-link. But in some respects, *e.g.* the teeth, Neanderthal man is too specialized to be anything of the sort; he had a full-sized brain, made stone tools, used fire, and buried his dead. The other remains (*Pithecanthropus erectus*, *Eoanthropus dawsoni*, Heidelberg and Rhodesian man, etc.) are too fragmentary for dogmatism. It is by no means certain that the cranium, the teeth, and the femur (found fifteen yards away), that go to make up *Pithecanthropus*, all come from the same animal. It is quite probable that the femur is human, and the skull that of a large extinct gibbon. There is another difficulty, that specimens of a modern type of skull have been described (*e.g.* Galley Hill, Calaveras, Castenodolo), as old as, or even older than, these so-called missing-links, which cannot therefore be their ancestors. But the subject is far too big to be discussed at all adequately just now.

Even if we were convinced that man's body were derived from the apes, there remains his mind. To quote Professor McDougall [29]: "It is now widely recognized that the strict neo-Darwinian theory of organic evolution is inadequate. This theory ignores mind or purposive activity as a possible agent of evolution. . . . It finds itself at the conclusion of its attempt with mind upon its hands as an enormous remainder or surd that cannot intelligibly be brought into the scheme, or ignored, save at the cost of the absurdity of the whole scheme." It has been maintained by some that the gradual evolution of man's brain is proved by the increasing skill displayed in the manufacture of stone implements, first rude eoliths, then better and better chipped flints, then polished stone, then metals. This argument is very precarious. It makes the improver always more intelligent than the originator. On the same principle, the designer of a modern locomotive like the "King George V" has a much finer brain than Stephenson, because his engine is a great improvement on the "Rocket"—a very dubious proposition. The Christian, of course, believes that what principally distinguishes man from the beasts is the possession of an immortal soul, but that is, perhaps, not sufficiently tangible to advance in evidence.

The theory of descent from an ape-like ancestor has received some rude shocks of late. Professor Osborn [30], perhaps the

world's greatest authority on fossil skeletons, speaking last year in Philadelphia, said Haeckel was to blame for ignoring "the profound cleft between the ape and the man. It is our recent studies of the behaviourism of the anthropoid apes as contrasted with the behaviourism of the progenitors of man which compel us to separate the entire ape-stock very widely from the human-stock." The ape-human ancestry theory was, he asserted, greatly weakened by recent evidences, and he was inclined to advocate "an independent line of the dawn-man, whose ancestors sprang from an Oligocene neutral stock." He added that the ape-stock is "totally disconnected with the human family from its earliest infancy." Tilney, at the conclusion of his monumental work on *The Brain from Ape to Man*, published in 1928, says that "apes are quite as unconcerned in the origin of man as they are innocent of participation in it."

CONCLUSION.

Now, finally, how may the tentative conclusions of the biologists whose names we have mentioned lessen the difficulty of reconciling science and the Bible?

First, and mostly, by showing that, instead of crying with Darwin, "All's Chance," we must recognize that "All's Law." And Law demands a Law-giver. Since the marvellous adaptations found in Nature cannot be due to Chance, they must be due to Purpose. The theoretical systems will not work without a Creator, who foresaw His ends from the beginning, and steadily worked towards them. The common occurrence of Convergence is no surprise to the Christian biologist. Just as a skilful sculptor may reproduce a successful model in clay, in marble, or in bronze, so a wise Creator may ordain processes of development in the world of life that repeat a successful type. Colour and scent may have arisen in flowers to improve their powers of attracting insects, but that still leaves abundant room for Christ's saying, "If *God* so clothe the grass (*i.e.* the flowers) of the field." "For thy pleasure they are and were created."

Again, there may be a reasonable and fair interpretation of the first chapter of Genesis, which does not indeed solve every difficulty, but brings it quite close to the conception of the origin of living things held by, shall we say, an important minority of eminent biologists. If (in spite of the difficulty that one cannot

give a very convincing explanation of the phrase "the evening and the morning were the . . . day") these "days" are understood to mean prolonged periods of time, there is certainly a remarkable correspondence between the order of events in the record of the rocks and in Genesis. Geology would not deny that the earth might at first have been all under water; then light diffused through a cloudy atmosphere; then the dry land appeared; then vegetable life; then the sun and moon broke through the clouds and became visible from the earth's surface. It used to be thought that the older plants were spore-bearing, but modern research shows that Genesis was right in putting the seed-bearing plants very early. Genesis does not mention animals of humbler type than fish, but it is interesting to observe that Trilobites, which appear in the earliest rocks, before the "fourth day," have either very large eyes or none at all, like modern deep-sea fish that live in a very dim light. Fish appear in the Silurian (Ordovician?) age, and the great sea monsters of Gen. i may well refer to the Labyrinthodonts (amphibians) of Carboniferous times. A difficulty has been found in that "fowl" appear too early in Genesis: in Palæontology birds come in rather late, after mammals, in the Jurassic, but this difficulty disappears when we learn from Lev. xi, 20, that עוף ('*oph*), the word translated "fowl," includes insects, which have been found fossil in the Silurian and Carboniferous. Land animals and mammals come next, and finally man. It is true that the biologists whose utterances we have been quoting all believe that one species may in past geological times have been transformed into another, whether by a gradual process or by "leaps," in obedience to some mysterious law, and it has been held that this is inconsistent with the phrase in Genesis "after his kind," which has been interpreted to mean that every one of our known species of animals (about 790,000) was created out of nothing, separately. But the same phrase occurs repeatedly in Lev. xi, where the true significance appears to be "in all their varieties." The Hebrew is לְמִינֵהוּ (l'*mînehû*), literally, "according to its likeness."

We are very conscious, that in attempting here to narrow the gap between the teachings of Biology and of the Bible, some difficulties have been left unsolved. We do not believe that at the present time the data exist for solving them. Nor need that surprise us. Every natural science is edged with mysteries,

and facts are known that seem to clash. It is one of the intellectual comforts of the Christian's position, that he can believe that there does exist an absolute standard of Truth, and that in the latter day, perhaps in this life, perhaps beyond, he shall understand. In the meantime, we welcome every research that throws light on God's handiwork, not greatly cast down even if for the moment it does not fit in with some cherished opinion, for, in the words prefixed by Lord Rayleigh, late President of the Royal Society, to his Collected Papers,

“ The works of the Lord are great,
Sought out of all them that have pleasure therein.”

* * * * *

GEOLOGICAL TABLE OF FIRST APPEARANCES OF LIFE.

Pleistocene ..	(Ice Age)	..	Man.
Tertiary ..	{	Pliocene ..	Living species of mammals.
		Miocene ..	.. genera ..
		Oligocene ..	.. families ..
		Eocene ..	.. orders ..
		Paleocene — ..
Mesozoic ..	{	Cretaceous ..	Flowering plants (Angiosperms).
		Jurassic ..	Birds.
		Triassic ..	Mammals.
Palæozoic ..	{	Permian —
		Carboniferous ..	Giant Amphibia (Labyrinthodonts).
		Devonian —
		Silurian ..	Land plants; insects; fish.
		Ordovician ..	Fishlike vertebrates (Ostracoderms).
		Cambrian ..	Trilobites; Brachiopods; Seaweeds.
Archæozoic —	..	Invertebrates; Seaweeds (?).
Eozoic — —

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- [30] Osborn, *The Times*, May 3rd, 1927.

DISCUSSION.

Sir AMBROSE FLEMING (President) said: I am confident I am expressing the feeling in the minds of all present in saying that we are greatly indebted to Dr. Rendle Short for the paper he has just read to us. Not only has he given us strong arguments against the validity of the Darwinian theory of the Origin of Species, but he has framed them with copious knowledge of detail and with keen insight into the erroneous deductions which some of Darwin's followers have made from the facts of biology.

Darwin's theory professes to give an explanation of the great variety of animal and vegetable species at present existing on our globe. Darwin himself does not appear to have considered that his theory dispensed entirely with Creative Power, for in the last paragraph of his book *The Origin of Species*, at any rate in the early edition published in 1859, he uses words to the effect that there is a grandeur in the view that from certain primal types into which the Creator breathed life at first, the processes he (Darwin) described had multiplied them into endless beautiful forms.

Darwin's followers have, however, aimed at making the whole process of the production of animal and vegetable species auto-

matic from beginning to end, so as to shut out altogether the need for a supreme Intelligence and Creative Power. The self-acting machinery, whether included under the terms Natural Selection, the Survival of the Fittest, the Struggle for Existence, or Sexual Selection, was before long postulated to include the human race, and to cover mind as well as body. Hence human intelligence was regarded merely as an improved kind of animal intelligence. Then a further step was taken in the denial of mind or spirit as a separate entity from body; and mental operations, now commonly called "behaviourism," were regarded as merely the brain in operation. Finally, Darwinians in some instances arrived at the position, taken up lately by Sir Arthur Keith, that nothing in the human being survives the death or destruction of the brain.

That duality which long-established philosophies had recognized between Matter and Mind was declared not to exist, but the statement substituted for it that living matter was "purposive" and can "plan as well as execute," and that material substance naturally possesses qualities which we call mental. In brief, the order we find in the Universe was held to be, either the creation of our own thoughts, or else to have been self-produced. The final outcome of this teaching is disastrous. It reduces much of the Bible to a mere record of folk-lore, myth, or fable, or embroidered narrative, and its special teaching on the origin, destiny, and future existence of human beings is replaced by the simple inculcation of morality or philanthropy. This evolutionary philosophy is now taken for granted in much popular writing—and even in many of the pulpits of our places of worship—as so completely demonstrated that any one who disputes it is regarded by its ardent advocates as deplorably ignorant. Nevertheless, there are an increasing number of investigators, some of the first rank, who regard it as an incompletely proven or even false theory, not sufficient to cover all the facts of observation.

Even in sciences more exact than Biology, we are from time to time compelled to abandon or alter accepted theories. Thirty to forty years ago all physicists thought we knew exactly the nature of a ray of light, *viz.* that it was a transverse vibration in a space-filling ether. Now more complete research has made it clear that there are many facts which cannot be explained at all by a wave theory of light, but only by some form of corpuscular theory. The most acute minds are at present searching for a theory of light which

will cover all the facts of optics and electricity. In the same way, Einstein has compelled us to reconsider old-established ideas of space, time, force, and gravitation, and to remodel them.

Any theory of natural phenomena which is neat, simple, and easily understood is very unlikely to be the whole truth, or even part of the truth on the matter, because neatness and simplicity are not the primal qualities of this Universe. Darwin took for granted that small differences in the progeny of living organisms could be accumulated into large differences by the advantage these small differences bestow in the struggle for existence. But it is only the large differences which give any real advantage in life, and the small differences are therefore ineffective for the end or result claimed for them. The result of much searching criticism of Darwin's theory has been to show that the foundations of it are not strong enough to bear the weight of the evolutionary superstructure erected on them. Dr. Rendle Short has shown us clearly that we are yet very far from having solved the mystery of the production of species in the animal and vegetable kingdoms, by any processes which do not demand a Personal Creator to make them workable.

It is extremely valuable to have at command a record of carefully collected information, such as that which Dr. Rendle Short has given us, information that will assist readers without special knowledge of recent biological research to see that evidence for Darwin's hypotheses is not so complete as to compel submission to its conclusions, even in spite of the confident assertions of some of its advocates. This especially applies to its extension to the human race. The few and fragmentary remains of anthropoid skeletons, so far found, are not sufficient, in the opinion of some eminent zoologists, such as Professor J. Graham Kerr, Regius Professor of Zoology in the University of Glasgow, to form a firm bridge on which we can pass backward from modern man to some ape-like ancestor, as assumed by Darwinians.

I have in another place drawn attention to the way in which awkward gaps are filled up by the use of the word "acquired." If the existing Universe is not a self-produced entity, but is the outcome of the Creative Power of a Supreme Intelligence, it is in a very high degree probable, as the Bible states, that there have been many creative acts or points of new departure at intervals of time.

No one has yet been able to give the slightest suggestions as to the spontaneous origin of Matter, Energy, Life, and Mind. Careful analysis of mental phenomena indicate that Mind is something more than the operations of material brain.

If, then, the thinking, emotional, and creative abilities of man point to something other than mere matter in his composition, we have to find a beginning for this, and we have nothing to point out a sufficient cause other than a creative act of God, who formed man of the dust of the earth, that is, gave him a material body formed of the same elements which occur in the earth, but breathed into him the breath of life, imparting to him an immaterial constituent, or spirit, by which he became "a living soul."

I will ask you, then, to adopt the vote of thanks which I have now the pleasure of proposing for the suggestive and valuable paper given to us this afternoon by Dr. Rendle Short, and to signify your agreement if you think fit by your applause.

Mr. W. E. LESLIE congratulated the Institute on the very valuable lecture to which they had listened, and expressed an earnest hope that it would be given a widespread circulation.

Mr. AVARY H. FORBES said: I heartily endorse Sir Ambrose, and submit that this is one of the best papers we have ever had.

I am myself no scientist, though why physics should be allowed to monopolize that term I fail to see. Psychology and ethics are equally branches of science—a fact clearly recognized by Dr. Short in his paper, when he quotes Professor McDougall as saying that the Darwinian theory "ignores mind or purposive activity as a possible agent of evolution."

The evolution of man's moral nature is surely by far the most important part of the whole problem: whereas, the biologists have ignored that subject, and almost confined their attention to bones, and skulls, and fossils. I say man's *moral* nature, rather than his intellectual: because, while there is no question that man's intellect far excels that of other animals, that is a blessing or a curse solely as it is governed by his moral nature.

The possession of vast mental power without moral restraint is the most fearful danger that can be imagined. It is the character

of Satan in Milton's *Paradise Lost*. It is the character of the devil, by whomsoever conceived. Macaulay, in his essay on Warren Hastings, refers to the "most frightful of all spectacles—the strength of civilization without its mercy." Yet that is the prospect that Evolution sets before us! For no candid person familiar with history will dare to say that man's intellectual development spells moral progress. The history of savages—could it be written—would no doubt be full of cruelties. But the history of civilized pagan nations is worse, teeming as it does with human sacrifice, infanticide, and wholesale slaughter. With the development of "civilization" these cruelties grow worse! The persecution and tortures of the Inquisition far exceeded the cruelties of which paganism had been guilty.

Since the invention of gunpowder, Science has been devising methods of taking life in much more deadly ways, and on a more colossal scale. The record in atrocities was reached in the Great War, when the most scientific nation in the world invented and used a poison-gas which doomed to death, with sufferings awful to witness, thousands of unwounded soldiers; while those who survived have been afflicted for life. That, however, was not the climax; for since then far more deadly poisons, and pathogenic germs by the billion, have been cultivated, capable of wiping out the population of the largest city in the world in a few hours! And so we are threatened with a time, when—as Lord Grey of Falldon put it—"the resources of science end by destroying the humanity they were meant to serve."

Most aptly does Dr. Short cite Professor McDougall further, saying, that evolution "finds itself, at the conclusion of its attempt, with *mind* upon its hands as an enormous remainder or surd that cannot intelligibly be brought into the scheme, or ignored, save at the cost of the absurdity of the whole scheme." The convinced evolutionist ought to be the most horrified pessimist in the world; for the logical outcome of Evolution is the production of an almighty devil!

Mr. PERCY O. RUOFF said: It has been a charming experience to have listened to this learned and informing lecture by Dr. Short, delivered without reference to the manuscript, and thus giving considerable instructive variation beyond the text of the printed

lecture. It is also an intellectual achievement upon which the lecturer may be congratulated.

It will be within the recollection of members that Bishop Butler, in 1736, wrote that it had come to be taken for granted by many persons that Christianity was not so much a subject of inquiry—it was discovered to be fictitious, and nothing remained but to set it up as a principal subject of mirth and ridicule. There is a modern analogy to this. Certain eminent theologians have, during recent years, proclaimed with a clamant dogmatism that no educated person can believe the early chapters of Genesis to have any basis in facts. This lecture dispels such a sweeping and unreasoned statement, and clearly shows that there are substantial reasons for accepting these disputed chapters; but Dr. Short rightly advocates caution and reserve in the question of interpretation. We can certainly afford to wait for further knowledge.

It is to be hoped that the lecture will be widely circulated, as it affords many valuable arguments as a contribution to a Christian apologetic. There is an ignorant dogmatism abroad which often brings into contempt the dignity and glory of Holy Scripture, and it would be an advantage if some extremely dogmatic teachers followed the example of one man who said: "There was a day in my life when I attended the funeral of my own dogmatics."

On p. 154, the lecturer presents a forceful and vital alternative when he says, "Either, then, the Law of Recapitulation cannot be trusted, or man did not rise from an ape." This is an issue which should be faced and not evaded. One other remark may be made. It is, according to the evidence of this lecture, practically certain that Darwin would have presented a very different problem to the one in *The Origin of Species* had he possessed the facts which since his day have appeared, enumerated by Berg and others.

WRITTEN COMMUNICATION.

From Col. HARRY BIDDULPH: Nature presents to our view the works of God, and the Bible gives us the Word of God, which in many places impinges on His works. The Christian knows that there is no real discord between God's Word and His works, and that any apparent difficulty is due to misinterpretation of one or the other. It is perhaps significant that misinterpretation of the

works of God has a marked tendency to lead to infidelity, probably on account of the innate pride of the human mind, whereas misinterpretation of His Word, where it deals with His works, has no such effect.

In interpreting the Bible, Westerners are very liable to error in this point, because they have to deal with an ancient Oriental language, very poor in its grammar, but peculiarly rich in feeling and imagery: the language, too, of an Eastern people, whose mind was of the qualitative rather than the quantitative type. In the case of the older books, the consideration of the root-meaning of a word rather than a derived meaning may often be necessary, e.g. *ûph*, to fly; *cf.* our word "fly," which denotes our commonest insect, whereas the verb has most frequent reference to birds and has now been extended to men.

In the phrase, "the evening and the morning were the — day," we have to remember that a more correct translation is, "and there was evening and there was morning, *one* day," "a second day," etc., until "*the* sixth" and "*the* seventh day." The use of "one" instead of "first" implies that this day was not the beginning of time, and the subsequent use of the indefinite article for the second, third, fourth, and fifth days is also significant. The definite article in the case of the sixth and seventh days appears to be due to the important occurrences on those days. Another implication from this repeated phrase undoubtedly is that Creation was a series of ordered steps and sustained progress, like that from fading twilight to increasing dawn: while from it must have arisen the Oriental method of calculating days from sunset to sunset.

Further, in interpreting this most ancient record, we have to remember the definition of the word "day," which it contains, for we read in Gen. i, 5, "God called the light day." Fully and correctly to interpret the phrase we lack as yet sufficient knowledge or comprehension, but one thing is clear, it was never intended by the writer to mean successive rotations of the earth on its axis.

721ST ORDINARY GENERAL MEETING,

HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, MARCH 18TH, 1929,

AT 4.30 P.M.

DR. JAMES W. THIRTLE, M.R.A.S., IN THE CHAIR.

The Minutes of the previous Meeting were read, confirmed, and signed, and the HON. SECRETARY announced the following elections:—As Associates: Mrs. Louisa Wilson-Smith and James Verdier Stevenson, Esq., C.B.E., M.V.O.

The CHAIRMAN then called upon the Rev. A. H. Finn to read his paper on "Conjectural Emendations in the Psalms."

CONJECTURAL EMENDATIONS IN THE PSALMS.

By THE REV. A. H. FINN.

MANY have tried their hands at endeavouring to suggest corrections in the Hebrew text of the Old Testament, and some have pushed their conjectures very far indeed, as may be seen in Professor Cheyne's *Psalms* and Canon Box's *Isaiah*. It is only fair to say that Dr. Melville Scott, in his work *Textual Discoveries in Proverbs, Psalms, and Isaiah*, has been much more cautious, and claims that he is "contending for a method, regarded as scientific" (p. 100).^{*} Our chief concern now will therefore be with the methods followed in that work, not with examining the details of all the "individual emendations." That would be far too long a task for a single paper, even though limited to the Psalms alone.

^{*} Page figures in *italics* are to Dr. Scott's volume, and not to folios in the Journal.

It is very rightly laid down as "a fundamental principle of textual criticism that no emendation ought to be accepted unless graphically probable" (p. 154). It is doubtful whether that principle has always been strictly adhered to in this work.

No doubt, in the square Hebrew character the letters *Beth* (ב) and *Caph* (כ), *Daleth* (ד) and *Resh* (ר), *He* (ה) and *Cheth* (ח), *Vav* (ו) and *Yod* (י) are a good deal alike, and might easily, especially if badly formed, be confused. The possibility of that confusion ought, however, to be only suggested rather than taken for granted. The likeness between *Mem* (מ) and *Pe* (פ), *Lamed* (ל) and *Resh* (ר), *Samech* (ס) and *Caph* (כ), *Tsaddi* (צ) and *Aleph* (א) is at least no so obvious. When this is definitely asserted as though indisputable, one has an uneasy feeling that our author may have relied rather on his own "discoveries" than on independent proofs. But when we are asked to believe that אסרו has been turned into נארו (xxii, 17); ירחם into היים (xxx, 6); פגעו into מעוג (xxxv, 16); ארמון into צלמן (lxviii, 15); and מלאו into אסרו (cxiii, 17), one may be pardoned for feeling a little doubtful whether "graphical probability" has been quite made out.

In the proposed emendations the letters ו (*Vav*) and י (*Yod*) are frequently ignored as mere "vocalization," or are as frequently introduced where the received text has not got them. It is true that elsewhere these letters are sometimes omitted when words are written defectively, or inserted to indicate the vowel required, but often they serve a more important function. At the beginning of a verb the י indicates the tense (in lxviii, 15, where this letter is ignored in the "emendation," it is actually one of the three radicals of the verb), and at the end of a word is the sign of the first person singular. So also an initial ו is the conjunction "and," while at the end of a word it is the sign of the plural. In such cases these letters are not merely vowels, and ought not to be treated as altogether unimportant. It is difficult to believe that any scribe, however careless, would ever have written נעים defectively as נעם (xxxvi, 2), or חסיד as חסר (cxli, 5). The words were much too familiarly known.

Not only are these "vowels" treated as not worth considering, even the acknowledged consonants are shifted about as though their order was of little consequence. For instance, it is suggested that שפלתו should be read instead of שפתלו (lxxxix, 6), and בישימן for ימישון ב (cxli, 5).

Again, it is laid down that "Far too great weight has been attributed to the MSS., and too little to the Versions" (p. 152).

There may be something to be said for this, but the author seldom refers to any Version except the LXX, and in one instance (xxii, 17) actually throws over the evidence of the LXX, Vulgate, Arabic, and Syriac (which all support the Hebrew reading), and relies on a reference to Jerome and Abraham of Zante!

Even as regards the evidence of the LXX, the use made of it is strange. In about a dozen passages the Greek reading is eagerly adopted in preference to the Hebrew. In over a hundred instances the Greek agrees with the Hebrew against the proposed "emendation," yet of these no notice is taken, except that in two of them the fact is just mentioned as showing that the "mistake" is an early one. In the immense majority of instances, then, the very Version chiefly relied on is contrary to the contentions of this volume.

Moreover, this selecting of a very few instances for approval really inverts the true force of the evidence. For in the Psalms the Greek translators have very often differed from the Hebrew, sometimes omitting words, sometimes inserting others, sometimes paraphrasing (*e.g.* the Greek, "A body hast Thou prepared for me" is manifestly a paraphrase, not a translation, of "ears hast Thou opened for me," xl, 7). Most of these variations are not accepted by anyone, not even in this work. This lack of accuracy on the part of the translators is found also in the Penta-teuch, as the Samaritan clearly shows. Hence it is precisely on the Greek *variations* that suspicion should rest, while the *agreement* of the Greek with the Hebrew ought to prove that the reading is the right one.

Dr. Scott, then, has taken no notice of most of the Greek variations, or of the adverse testimony of the Greek in something like ninety per cent. of the passages he considers "corrupt," while he has eagerly snatched at a few readings which he happens to approve.

Even in these there are some that only partially support his contentions. In xvi, 2, he insists on the one word *ἐθαυμάστωσε* as justifying his emendation "magnifieth" in place of the Hebrew "the excellent," but says nothing of the Greek (like the Hebrew) reading "not" where he would read "all," or of the Greek having *αὐτοῦ* which lends no support to his contention that *הַפֶּה*, "a defence" (but really "a canopy"), is the true reading.

In lxxxv, 9, the literal rendering of the Hebrew in the last clause is "and let them not return to folly," and of the Greek, "and upon those that turn back unto Him (their) heart." The differences are (1) where the Hebrew reads "not" the Greek has "upon" or "unto"; (2) the Greek inserts "unto Him"; (3) the Greek has taken the first syllable of "folly" for a word meaning "heart," and omits the rest of the word. The proposed emendation, "And to the broken in heart. Selah," accepts (1), disregards (2), and partly accepts (3), but adds "Selah," which is not in the Greek.

In cxli, 5, the Hebrew has, "Let the righteous smite me, a kindness; and correct me, oil to the head; let not my head refuse: for still is my prayer against their wickedness." The Greek, dividing the clauses differently, and substituting "wicked" for the first "head," has "Let the righteous correct me in mercy and reprove me; but let not the oil of the wicked anoint my head; for still and my prayer is in (or against) their approvals." The proposed emendation deserts both of these in the opening clause, "They smite the righteous, and condemn the godly"; accepts the Greek for the next clause, and the Hebrew for the final one. That is to say, the "emendation" follows the Greek in one-third of the passage, the Hebrew in another, and rejects both in the remaining third, and yet is called following "the most ancient authorities"!

Still more, it is claimed that this "restores the whole passage from absolute incoherence to a real continuity of thought" (p. 166). When it is remembered that Hebrew parallelism is often by way of antithesis rather than likeness (*see* i, 6, "The LORD knoweth the way of the righteous, but the way of the ungodly shall perish"), the verse so unsparingly condemned becomes an expression of the Psalmist's readiness to bear the reproach of the righteous rather than be associated with the "workers of wickedness" of v. 4. There is a "real continuity of thought" and no "incoherence."

Sometimes in this work assertions are made that are not quite accurate. The literal translation of xxx, 8, is not (as asserted on p. 112) "Thou . . . didst make strength to stand for my mountain." The Hebrew order is quite different and might be rendered "Thou didst establish my mountain strength."

The assertion that "רעים [Ra'im] cannot be the noun 'evils'" disregards the fact that this is the regular plural of רע [Ra'], which can have the meaning "calamity, misfortune."

“Angels (or messengers) of calamities” gives a perfectly good sense, and it is altogether unnecessary to substitute “thunder,” which is negatived by the LXX *πονηρῶν* (evils).

The line, “He is gracious, and full of compassion and righteous” (cxii, 4), is said to be “ambiguous,” because it may “refer either to God or to the godly man” (p. 158). There can be no ambiguity, for the meaning is absolutely determined by the subject of the Psalm, which is one of a carefully balanced pair of acrostics. Ps. cxii sets forth the glory of God, and in it the corresponding line states explicitly “Gracious and compassionate is the LORD”: cxii deals with the happiness of the God-fearing man (see the opening verses of the two Psalms), and therefore the line in question can only refer to the godly man. Hence the suggestion that the line ought to read “He (God) . . . justifieth the righteous” (the word “justified” having dropped out as being thought a reduplication) is entirely out of the question, and is negatived by the LXX. For the same reason (p. 162) the same verb is supposed to have been omitted from cxxix, 4. It is not needed, the sense “the LORD is righteous” being quite sufficient, and is not found in the LXX.

Then there is the unusual word *Golem* which begins cxxxix, 16, concerning which it is alleged there is “the damning fact that it is a singular noun followed by a plural verb” (p. 164). That plural verb, “they saw,” is absolutely required by “Thine eyes” which is the subject of the verb, the other word being its object. The plural verbs in the next two clauses, “were written” and “were fashioned,” are equally required by the plural “all of them.” What are these? The word objected to by him means something wrapped together, not unfolded, or (as used here for the human embryo) undeveloped. Obviously this is pictured as consisting of several parts or “members,” and it is these, “all of them” not only “bones,” which were written in the book and fashioned day by day. Also in the LXX the word used is not “*ὑπόστασις*,” but “*ἀκατέργαστον*”—unwrought, imperfect—which gives no sanction to the guess that the true reading should be “my bones.”

On p. 167 it is asserted that “Selah” is “an expression rather of triumph or of fierce indignation than of calm resignation and trust”: yet in p. 147 it is suggested that the two last lines of lxxxv, 9, ought to read, “He will speak peace to His people and to His saints; and to the broken in heart. Selah.” There is not much “triumph or fierce

indignation" about that. The two estimates of the use of "Selah" hardly seem consistent.

Actually the word is considered to be a musical term (probably marking a direction to the instrumental accompaniment), which need not interrupt the current of thought. It occurs in the middle of lv, 20, "God shall hear and answer (or afflict) them—and He is enthroned of old. Selah—those to whom there are no vicissitudes"; in lvii, 14, "He shall send from heaven, and save me, when he that would swallow me up reproacheth;—Selah—God shall send forth His mercy and truth"; and at the end of lxviii, 33, between "O sing praises unto the LORD," and "To Him that rideth upon the heavens." It is then something of an over-statement to say that in lxviii, 8, "The Selah occupies a very unusual position, being in the middle of an incomplete sentence" (p. 132). That may not be common, but it is not unparalleled. Nor does it follow that because it happens to come here and in lv, 8, after "wilderness," and in cxliii, 6, after "a weary land," that therefore "Selah seems to have a peculiar attraction to any word meaning wilderness" (p. 167). As the word occurs some seventy times in the Psalter it is not so very wonderful that two of these are after "wilderness" and one after a similar phrase. There is no good reason for altering it in these three passages to the "graphically" doubtful **בַּלְיָה**, which means "salty" and not "barren." That word would be inappropriate in lxviii, 8, and not very suitable in the other two passages. In cxliii, 6, **עֵיפָה** means "weary" not "thirsteth," and the word "land" is separated from Selah.

We may now notice in fuller detail six passages that demand special attention.

(A) Ps. ii, 12—"Kiss the Son" (pp. 101-2).

The LXX rendering "receive instructions" is dismissed as "a mere paraphrase," and another, "in purity," adopted by Aquila, Symmachus, Jerome (text), and Rashi, is thought to be a translation "without probability." The English rendering "the Son," found also in the Talmud, Aben Ezra, and Jerome's *Commentary*, is rejected on the ground that **בַּר** (*Bar*) "has the meaning of 'son' only in the Syriac or Aramaic," (Phœnician might be added). Then it is suggested that the letters **ב** (*Beth*) and **ר** (*Resh*) may "mask the true reading," and "of the two letters the *resh* is the one most liable to suspicion." Yet **ב** is

as much like כ as ר is like ד, and there is no "graphical" reason for suspecting the latter more than the former. Still it is thought that the *resh* "stands for an original *daleth*," and that "the real word was בִּיר ('with' or 'on the hand')." This would require that an original בִּיר was written defectively בַּר, and that in turn mistaken for בַּר. But it is very doubtful that any scribe, however inattentive, would ever have omitted the medial י, for here it is no mere vowel but an integral part of the word *Yad*, "hand." It is also doubtful that the verb for "kiss" would be followed by the preposition ב, since elsewhere it takes ל, "to," even in the very passage here cited (Job xxxi, 27). As the Versions, which translated the word by "in purity," show that *Bar* (not *Bad*) was read, it will be seen that the proposed emendation, besides being improbable, deserts the evidence of the Versions as well as that of the MSS.

Still, it may be asked Why should the foreign word *Bar* be used in *v.* 12, when the ordinary Hebrew *Ben* is found in *v.* 7 ?

Since the word is followed by *pen*, "lest," it has been suggested elsewhere that *Bar* may have been chosen to avoid the awkward sound of *Ben pen*. There is, however, another, perhaps a stronger, reason possible. This section of the Psalm (*vv.* 10-12) is addressed to "kings and judges of the earth," clearly referring to the "kings of the earth . . . and the rulers" in *v.* 2, and these were (*v.* 1) of the nations and peoples, *i.e.* Gentiles. It is then possible that a foreign word was used intentionally in a message to foreigners, while the Hebrew word was retained in Jehovah's address to His Anointed.

(B) Ps. xxii, 17.—"They pierced" (*p.* 109), כֹּארוּ (*Ca'aroo*).

The present Masoretic text reads כֹּאֲרִי [*Ca'arey*], "like a lion," and this has sometimes been thought a deliberate Jewish alteration to avoid the Christian interpretation. We need not go so far: it is possible that the MS. they relied on had an imperfectly formed כ which they honestly took to be י, and accordingly reproduced. Yet that leaves the clause without a verb and gives no intelligible sense.

"The Versions," it is admitted, "mainly read כֹּאֲרוּ," but it is objected that "no such verb is known to exist." Since it is allowed that there is "a verb כָּרָה (to dig or bore)," it is a little inconsistent to object to the insertion of an *aleph*, and at the same time to maintain that the "copyists always considered legitimate the addition of an *aleph*." The assertion

is somewhat sweeping, but it may be admissible that in this case the **N** only indicates the vowel sound.

A further objection is, "The punishment of crucifixion was a Roman custom," and piercing the hands and feet would not "have been done to the Psalmist by his enemies" (p. 109). There is no reason to suppose that the Psalmist was alluding to crucifixion at all, though he was led to use a word which would apply to it. He is complaining of ill-treatment by "the company of evil-doers," and it is possible that they had inflicted injuries on hands and feet which might rightly be described as piercing.

The LXX "*ῥοπήξαι*," Vulgate "foderunt," Jerome "fixerunt," the Arabic, and the Syriac all support the reading "pierced," yet here it is suggested that the original reading was **אסרו**, "they bound." To make this possible it is alleged that "There are many instances of confusion between *caph* and *samech*, and of the consequent mutation in the consonantal order." It would be interesting to learn what instances of this confusion can be produced which are not due to the author's own conjectures.

Lastly comes the conclusion, "When graphical probability goes with strong versional evidence the result is moral certainty." Perhaps, but when the "graphical probability" is dubious, and the main "versional evidence" is against the proposed alteration, the "moral certainty" is likely to be different.

(C) Ps. lxxviii, 15.—"It snoweth in Zalmon" (pp. 133-4).

Because commentators have differed much in their explanations of this clause, it is here thought "best to treat it as having no meaning at all"—not a very logical inference. An allusion in a very ancient poem may well be obscure and hard to explain without being meaningless.

Next it is laid down that "the one guiding principle to be relied on" is to be found in the "many traces of Deborah's song" in the whole Psalm. That they are found in "this stanza in particular" does not hold good unless the "emendation" proposed is accepted. That v. 14 is an allusion to the song is generally admitted, but that "the women that publish good tidings" (v. 12) refers "primarily to Deborah and her fellow-singers" is very doubtful. Barak is the only "fellow-singer" mentioned, and there is no hint of other women. It would be much more plausible to refer the verse to Miriam "and all the

women" who went out after her (Exod. xv, 20). So also "Kings of armies did flee" (v. 13) cannot apply to the rout of Sisera's host, but would suit the victories over Sihon and Og. The dividing of spoil is only mentioned in Judges v, 30, and in v. 13 of this Psalm, so it is an exaggeration to say, "There is much in both passages about the division of spoil" (p. 133). At the very utmost the "traces of Deborah's Song" can only be made out in three verses out of thirty-six, if, indeed, there be any except in the one verse 14. It is not true that "the whole Psalm . . . shows many traces of Deborah's song," and therefore, "the one guiding principle" is without foundation, nor does there seem any particular reason for dragging a mention of Sisera's mother into a Psalm chiefly concerned with the achievements of the Almighty.

How can that intrusion be made out? It has to be assumed that בַּה [bah] of the previous clause really belongs to this; that it is a shortened form of יַבַּב [yabab], the verb used in Judges v, 28; that the initial ת of the next word ought to be ה; that ג and ל have changed places; and that the first two letters of the final word have been altogether misread. What a complicated case of "corruption"!

Out of all this tangle of supposed errors is evolved the sentence, "The queen-mother cried out in the palace." That has no kind of connection with the preceding, "When the Almighty scattered kings": kings were not scattered in Sisera's defeat; there is no authority for calling his mother a queen of any kind; Shegal is rather queen-consort than queen-mother; and there is no hint that she was in a palace.

As the proposed "emendation" does not cohere with what goes before, so also it has no connection with "A mountain of God is the mountain of Bashan" which follows. On the other hand, the rejected "It snoweth in Zalmon" fits well with both. An armour-strewn battlefield when kings were scattered, perhaps in some of David's victories, might well be compared with the unusual gleam of snow on dark-hued Zalmon, and the mention of that hill might well suggest the thought of mighty mountain ranges looking askance at the comparatively low mountain which God desired.

The Hebrew reading, supported too by the LXX, is quite in place: the reading offered in its place requires a good deal of doubtful correction, and is out of keeping with the context on either side.

(D) Ps. lxxiii, 10 (pp. 137-8).

The reading "Therefore his people return thither" is also called "meaningless," and is said to be "excellently emended" into "Therefore are they satisfied with bread." How that emendation is arrived at is not explained, beyond a remark that "לֶחֶם [lechem] (bread) seems peculiarly open to mistake." That points to הָלֹם [halom] "thither," being a perversion of that word. Also it would have to be assumed that יָשׁוּב עִמּוֹ, "his people return," has displaced יִשְׁבְּעוּ, "they are satisfied," a double error which hardly seems likely. When this "emendation" has been made it becomes possible to refer what follows to "the wicked" of v. 3. Then arises a further objection: "the questions asked in the next verse are hardly likely to be asked by the ungodly." Therefore it is suggested that v. 11 should begin "and I said" instead of "and they say." In favour of this, three considerations (p. 138) are mentioned: (1) The change was "the work of some scrupulous scribe who was shocked at such words being attributed to a pious Israelite"; a deliberate alteration, therefore, and no accidental misreading; (2) "The divine name 'the Most High' could hardly have been used by the ungodly"; (3) "The LXX actually reads the words 'and I said'" before v. 13. Yet (1) assumes that the "scrupulous" scribe, instead of faithfully copying the text before him, was unscrupulous enough to substitute what he thought ought to have been written, and that all existing MSS. have been derived from his falsification; (2) forgets that the title *El-Elyon* is first found on the lips of a Canaanite, Melchizedek; (3) supposes that the LXX translator had before him "two sets of MSS.," one giving the original and the other the later reading, and was stupid enough to put the wrong word in the right place, and the right one in a wrong place two verses further on!

All this trouble arises from assuming that the previous "emendation" is correct. Let us see how it will read if that line is left undisturbed. "Therefore (because the wicked are so prosperous) His People (former believers, λαός μου, not the ungodly) return (turn back) hither (to the position of the ungodly) . . . and they (these misled people) say, 'How doth God know?'" There is no need to substitute "I said," or to imagine an erring scribe and a foolish translator. The "and I said" in the Greek of v. 13 is simply the insertion of a translator who wished to make it clear that the Psalmist is now returning to his own perplexity in v. 2.

(E) Ps. lxxvii, 7 and 12 (p. 141-3).

Two separate sections of the book deal with *vv.* 7 and 12 of this Psalm. They affect (a) one word in *v.* 7; (b) two words in *v.* 12. Later on the two results are compared.

(a) In *v.* 7, נְגִינָתִי [neginathi], "my song," is considered "difficult and I think meaningless." As the Greek has ἐμελέτησα, it is proposed to substitute וְהִגִּיתִי [v'hagithi], "and I meditate." This, it is said, "merely involves the dropping of an נ before ג," but it really involves adding a ו ["and"], changing נ into ה, and dropping the second נ before ת. Curiously enough, the LXX reading ἀλλοίωσις in *v.* 11 is rejected, so the Greek is to be right in one verse and wrong four verses later, a strange way to value its evidence!

(b) In *v.* 12 it is thought that "what is wrong must be sought in the line 'I will remember the deeds of the LORD,'" and it is proposed that מַעֲלָלֵי יְהוָה [m'a'leley Yah], "the deeds of the LORD" ought to be עִמִּי לַיְלָה [immi lailah], rendered "within me by night" (but literally "with me night") (p. 142).

When "I meditated" has been introduced into *v.* 7 it resembles *v.* 13, where the word actually occurs; and when "within me by night" is introduced into *v.* 12, that resembles "in the night" of *v.* 7. So, certainly, "as restored" the two passages closely resemble one another. It would be strange if they did not. Then it is specially noticed that in the two passages "the same three verbs, 'remember,' 'meditate,' 'muse,' occur . . . in the same order, thus making a free refrain" (p. 143). The idea of a "free refrain" will bear examination.

In this Psalm, Selah occurs thrice, at the end of *vv.* 4, 10, and 16. Here are two groups of six verses each, but as the first Selah comes at the third verse of the actual Psalm (omitting the heading), these really form five stanzas of three verses each.

The close of the first stanza, "I remember God, and am disquieted: I muse and my spirit fainteth" (*v.* 4), is echoed at the close of the next, "I remember my song in the night: with my heart I muse, and my spirit searcheth" (*v.* 7). The next stanza (*vv.* 8-10) takes up the thought of the "song in the night," expressing the mournful burden of it, "Will my Lord cast off for ever . . . Hath God forgotten to be gracious?" The bare memory of God only intensifies the sense of being forgotten and deserted, and that is emphasized by Selah. Then follows the

corrective (*vv.* 11–13). Not “the years of ancient times” (*v.* 5), but “the years of the right hand of the Most High.” It is the *deeds of Jehovah*, His wonders, His works, His achievements, that are to be remembered, meditated, mused upon, if courage and confidence are to be restored. These, then, culminating in the redemption of His People (*v.* 16) form the subject of the fifth stanza, and that, too, is emphasized by *Selah*. The introduction of “meditate” in *v.* 13 serves to strengthen the “remember” and “muse” of *vv.* 4 and 7, a delicate touch wholly obscured by thrusting another “meditate” into *v.* 7.

The received text gives a finer sequence of thought than the “restored.”

(F) Ps. cxviii, 27.—“Bind the sacrifice with cords” (pp. 159, 160).

Here the LXX, though interpreting the words differently, shows clearly that the translators had much the same Hebrew text as we have. Yet, as so often, the evidence of this early Version is simply disregarded. Instead it is proposed that words meaning “Fill the bowl with measures (of wine)” were originally written. This requires that מלאו has been turned into אסרו, and הגביע בתם into הנ בעבתים. How far so radical a change can be deemed “graphically probable” is dubious. In xxii, 17, נארו is thought to be a mistake for אסרו, which here is taken to be a mistake for מלאו. How can it be that the same word could be confused with two words so utterly different? No wonder the “emendation” is said to be “avowedly speculative”! (p. 160).

Yet the “passage is evidently corrupt” and “the existing text is desperate.”

Three reasons are given: (1) “*Chag* properly means a festival or pilgrimage, not a sacrifice.” Yet two independent writers (Exod. xxiii, 18; Mal. ii, 3) appear to think it can be used of a sacrifice. (2) “Grammatically, the preposition ב (to) is never found with the verb translated ‘bind.’” It is actually so used in Ezek. iii, 25, “They shall lay bands (the same word as ‘cords’) upon thee, and bind thee with them.” (3) “The horns of the altar were never used for such a purpose.” How is that known? The most that can be said is that Scripture does not mention it. Moreover, the Hebrew text does not speak of binding to the horns, but ער “up to, as far as.” According to Lev. i, 5, 11, the one who brought an animal to be sacrificed was to slay it. Presumably it would have to be tethered to something

and when there were many victims some might have to be brought up close to the horns of the altar.

If the objections were really sound then the scribes responsible for the present text were not only careless and guilty of a gross misreading; they must have been ignorant of their own language, using a word in a wrong sense and a wrong preposition, and ignorant of the usual sacrificial procedure. What a pity they did not have Dr. Scott to enlighten them!

There are also other objections to the proposed reading. It is laid down that "The ordinary use of the horns of the altar was for pouring libations." But in Lev. iv, 25, 30, upon the horns of the altar the blood of the victim (not a libation of wine) was to be put with the finger (not poured from a bowl). Then *Gebhi'a*, used of Joseph's silver cup (Gen. lxiv, 2, 5), of the cups of the lamp (Exod. xxv, 31), and of bowls of wine (Jer. xxxv, 5), would not have been of any great size. The "bowl" of the emendation must have been huge if it could contain "baths" (measures), for, according to Josephus, the bath held some $8\frac{1}{2}$ gallons. Also the usual quantity of the drink-offering was a quarter of a hin, and a hin was one-sixth of a bath.

Perhaps the received text is not so "desperate" as the "avowedly speculative" emendation.

Dr. Scott is quite confident about the merits of his emendations. He describes them as merely "small changes," a "simple redivision," "the slightest possible interference with the text," and even says "the alteration is absolutely microscopic." He eulogizes them as giving "an added force to the sentence, and an added beauty to the comparison," or "an admirable meaning to the whole verse"; or says, "both the grammar and meaning are improved"; "renders the whole passage consecutive and tremendously powerful"; "improves both sense and metre," etc. He is equally sure that the passages he discusses are really corrupt, calling them "meaningless," "peculiarly weak," "incredibly weak," "untranslatable," or "evidently corrupt." Yet there may be some doubt about it.

At the outset the large amount of corruption alleged—over 130 instances in the Psalter alone, four instances in eighteen verses of Ps. x, and five in twenty-three verses of Ps. lxxiv—raises a suspicion that the list may have been unnecessarily swollen.

There are passages in which difficulty has been found where the ordinary reader would find none. A few specimens out of a good many must suffice :—

(1) In cxix, 91, “for all are Thy servants” follows quite naturally on “according to Thine ordinances they stand (or, are established) this day,” which in its turn refers to v. 90, “Thou hast founded the earth and it standeth.” The plurals in both clauses of v. 91 clearly belong to the earth and all that therein is. It is futile to object that the plural “servants” occurs nowhere else in this Psalm: elsewhere it is not needed, and here it is. It is equally futile to object that the transition to the next verse is “abrupt,” for abrupt transitions are not uncommon in acrostic psalms.

(2) The word translated “unless” at the beginning of xxvii, 13, is marked for omission in the Masoretic text, and is actually omitted in the LXX. Without it the verse reads, “I believed to see the goodness of the LORD in the land of the living,” which leads up to v. 14, “Wait on the LORD.” With the omission all difficulty vanishes.

(3) In xlii, 5, “These things I remember” has to do with what follows, “How I went with the throng.” The word translated “remember,” really means “bear in mind.” God had in no way forgotten when He “remembered Noah” (Gen. viii, 1).

(4) In cxxvii, 2, “So He giveth His beloved sleep” contrasts sharply with the restlessness of those who rise up early and late take rest. Substitute “treasure” for “sleep” and that contrast is lost.

When corruption is alleged it is sometimes necessary to see what the Hebrew actually says, for the English renderings may be faulty or inadequate. Again, a few instances must suffice :—

(1) The opening words of xxxvi, 2, need a little explanation. *Naom*, like the cognate Arabic word, means “affirmation” not “revelation” or “oracle.” *Pesha’a* means wilful “wrong-doing,” as distinguished from *Chataah*, “error,” and *Avon*, “innate sinfulness.” The verse then reads, “Wilful wrong-doing affirms to the wicked within his* heart, (There is)

* As afterwards pointed out by the Chairman, the true reading is “within *my* (not *his*) heart.” The verse then should read “The affirmation of wilful wrong-doing (as regards the wicked) within my heart is There is no fear of God before his eyes.”

no fear of God before his eyes." There is no "personification of transgression": the act of deliberate defying of God's law is in itself the declaration that "there is no fear of God." To the question, "Can anyone possibly believe that this verse is otherwise than corrupt?" the answer is, the startling, arresting form of the utterance is itself a mark of originality. To substitute "Transgression is sweet to the wicked," turns it into a commonplace, and robs it of all vigour.

(2) Ps. lvi, 5, "In God will I praise His Word" (of promise), repeated with double emphasis in *v.* 11, leads up to "in God I have trusted, I fear not: what can flesh do to me?" (cf. *v.* 12). Praise for God's faithfulness to His Word is just what is wanted, not prayer. "I wait for His word," would be incongruous.

(3) "The sin of their mouth, the word of their lips, yet they shall be taken in their pride" (lix, 13), may sound incoherent in English, but in Hebrew the first clause may be taken as exclamations, "The sin of their mouth! the word of their lips!" implying how bold, how overweening are they, "yet shall they be taken in their pride." As both "sin" and "word" are in the construct state, preceding "mouth" and "lips," the proposed "Their mouth is sin, their lips are a pestilence," is grammatically impossible.

(4) In "a lip (word) I knew not, I heard" (lxxxii, 6), the "I heard" refers, like the subsequent verbs, to God. It has been admirably suggested that "I knew not" is an allusion to Pharaoh's arrogant "I know not Jehovah" (Exod. v, 2).

It must always be borne in mind that difficulty in translating need not mean corruption of text. In dealing with poetry, especially ancient poetry and Oriental ancient poetry to boot, we must expect to find some obscurity and some turns of thought unlike our own.

Much stress is laid on "parallelism" in this work. It is said to be "weak," "imperfect," "defective," "deplorable," or even totally absent in the received text, while it is claimed that the emendations give "an excellent," "a better," or "a real" parallelism. That feature undoubtedly figures largely in Hebrew poetry, but not always. Absence of parallelism is no proof of corruption.

(1) "Arise, O LORD; O God, lift up Thine hand, forget not the poor" (x, 12) is accused of "a total absence of

parallelism." Is it any worse than "Arise, O LORD; save me, O my God; for Thou hast smitten all mine enemies" (iii, 8).

(2) The first line of xxx, 6, "gives an imperfect parallelism." The Hebrew may fairly be translated, "a moment in His anger, a life in His favour," which balances well with the next line, "In the evening lodgeth weeping, and at morning rejoicing." "Life" makes a better parallel to "a moment" than the suggested "mercy" would be.

(3) In lxxiv, 3, "the parallelism of the couplet is deplorable," and "Now at length restore all" is put forward in place of "Lift up Thy feet unto." If "lift up Thy footsteps" be taken to mean "hasten," then "Haste unto the desolations of old" becomes quite as good a parallel to "All the evil the enemy hath wrought in the sanctuary" as "Now at length restore all the ancient desolations."

There is a development of parallelism which may be called alternate or introverted. When there are two pairs of clauses, a, b : c, d, they are sometimes arranged a, c : b, d, forming a parallelism of whole verses instead of clauses. An excellent example of this is found in xl:—

- | | |
|-------------------------------|---------------------------|
| v. 7. Sacrifice and offering | My ears hast Thou opened. |
| Thou hast no delight | |
| in : | |
| v. 8. Burnt-offering and sin- | Then said I, Lo, I come. |
| offering Thou hast | |
| not required : | |

To rearrange and bring together the corresponding clauses is far less effective.

A similar rearrangement in lxxv, 10, also spoils the double parallel:—

- | | |
|-----------------------------|-----------------------------|
| Thou visitest the earth, | Thou greatly enrichest it ; |
| and waterest it, | |
| The river of God is full of | Thou providest them corn— |
| water ; | |

In this case it is the last two clauses which it is proposed to transpose.

"Similar misplacements" are alleged (p. 121) in lxxx, 16 ; cvii, 40 ; and cxvi, 14 (? cxvi, 2). Only the second of these is such a "misplacement." When then it is added "Thus mis-

placement is frequent," it only means that our author has found three or four passages in which he thinks (perhaps not very correctly) that lines or clauses have been misplaced.

There are two instances of later Psalms reproducing a portion of earlier ones. Ps. lxxi, 1-3, largely agrees with xxxi, 1-3, and it is taken for granted that the former is a quotation of the latter, only, by a complication of errors, lxxi, 3, has been badly corrupted. Actually lxxi, 2, is not identical with the corresponding clauses of xxxi, showing that the passage is an adaptation not a precise quotation. In the other instance it is conjectured that in cxv a line has been dropped out from *v.* 7 which is supplied in the corresponding cxxxv, 17. A comparison of the whole of the two passages shows that cxxxv, 15, 16, are all but identical with cxv, 4, 5; the first half of cxxxv, 17, is only slightly varied from cxv, 6; the second half, containing some words that are the same, conveys a somewhat different meaning from that in cxv. Ps. cxxxv, 18, is the same as cxv, 8. Ps. cxv, 7, does not appear at all in the other Psalm. All that has happened is that the later Psalmist, quoting freely (perhaps from memory) has left out one of the five verses, which he did not wish to reproduce.

There are two instances in the Psalms of incomplete sentences ("He that teacheth man knowledge . . .," xciv, 10, and "Let my right hand forget . . .," cxxxvii, 5), and in both cases it is presumed that a word has dropped out. Now in Exod. xxxii, 32, there is a remarkable instance of a broken sentence, "Yet now, if Thou wilt forgive their sin . . .," where clearly the reader is left to supply the wanted word from the context. Possibly, too, the broken sentences, "Cain said unto Abel . . ." (Gen. iv, 8), and "Moses went down unto the people and said unto them . . ." (Exod. xix, 25), are to be explained in the same way. The sentences then in the Psalms may also have been left unfinished intentionally.

There are several instances of words being denounced as "corrupt" because they seldom or never occur elsewhere. If every rare word or peculiar construction is to be suspect the whole Bible will need a good deal of "emending." "The sides of the north" (xlviii, 3) is pronounced corrupt, and "a reference to the topography of Jerusalem . . . is quite unworthy" (p. 122). A little better acquaintance with the topography might have obviated this remark, for the very finest possible view of "the city of the great King" is that obtained from the northerly height of Scopus."

It is to be feared that a desire to find corruption leads to finding it where it need not be suspected. Those who form a theory are often tempted to look for more and more evidence to support it.

Dr. Melville Scott's work undoubtedly shows great industry, a considerable knowledge of Hebrew, and much plausible ingenuity. Yet his methods are not always unimpeachable nor his conclusions unassailable, and at times his ingenuity seems a little over-ingenious.

DISCUSSION.

The CHAIRMAN (Dr. Thirtle) said : It gives me pleasure to preside on this occasion, if only to recognize—as I do with all sincerity—the good work of the learned lecturer upon that portion of the Holy Scriptures which has commanded my special attention during a long period of years. I am not unfamiliar with the work of Dr. Melville Scott, work in which, with other features, there has been combined a stimulating scholarship and great diligence. I examined his volume when it first appeared, and formed the judgment which I still hold, that in this case the tendency of the annotator has been to lose his way in the work of textual emendation. When coming up against difficulties, whether of words or phrases, whether as to sense or application, it is, as we well know, easy to suggest “corruption of the text.” Of such procedure, however, after long years of experience and close observation I have a profound distrust; and accordingly I find myself in large sympathy with our lecturer this afternoon, whose past work and latest endeavour have commanded my warm appreciation.

I need not, on this occasion, discuss the many points of criticism and interpretation that have been introduced; rather, I will confine myself to two distinct matters, in which, as I trust, some interest may be excited. To begin with, I call attention to the opening verse of Ps. xxxvi (p. 180). In showing a failure to understand this passage, Dr. Melville Scott was in large company; in fact, the very general failure, and that from an early date, to reach the correct point of the Psalmist, has led to a misreading of the text, which appears in certain Hebrew manuscripts, in some early versions, and, moreover, has had the support of a host of commentators. For myself, I would suspect at the very outset

any such thought as that an oracle from God or a sacred revelation should arise in the heart of a *wicked man*. On the contrary, it is in the heart of the man of God, in this case within the heart of the Psalmist—note the words “within my heart”—that there arises, and is given forth, a solemn declaration as to the way of the wicked, with an explanation of his transgression.

The Authorised Version of the passage before us reads: “The transgression of the wicked saith within *my* heart, that there is no fear of God before his eyes.” The superficial reader may see nothing distinctive between “my heart” and “his heart,” but there is a profound difference. The words stand clear, however, and they are “within my heart”; that is, not within the heart of the wicked transgressor, but rather within the heart of the God-fearing Psalmist. Is this a *difficult* reading? Then, most assuredly, it is to be preferred on that very account, for it is a well-known principle of textual criticism that the difficult is to be accepted in preference to the simple and commonplace. What, then, is the message of the “transgression of the wicked”? What does it say to the Psalmist? Just this—that “there is no fear of God before his eyes”; in other words, absence of the fear of God explains a man’s wanton sinfulness. Accordingly, the Psalmist goes on to speak of such men as devoted to sinful courses in an all-round sense, being wicked in word and deed (*see* the verses which follow in the Psalm).

Need I remind you that, in the Hebrew idiom, also in Semitic languages generally—the *heart* has its place, not only among bodily organs, but in well-defined relations to mental and moral activities. Accordingly, to “say in one’s heart” is to purpose, or plan; to “speak to a man’s heart” is to assure him, or impress him; and, further, for a solemn affirmation to “reach a man’s heart,” to find lodgment therein, is for such a man to *become convinced*. The heart may plan, may be assured, may become convinced. Surely the idiom is one that needs no apology; and the explanation requires no elaboration. Now look at our passage, with the figure of speech resolved into a term of psychological significance. The words of the Common Versions are adequate for our purpose—“The transgression of the wicked saith within my heart”—the transgression of the wicked, his sinful course of life, *convinceth me*—“that there is no fear of God before his eyes;”

he does not tremble in the presence of God, no terrors arise in his mind from a consciousness of God.

In spite of what commentators have said, we do not hesitate to conclude that the passage is one which admits of no thought of illumination coming to the heart of the wicked man himself. "To say within the heart" is to *convince*; and in the passage before us the saying is within the heart of the Psalmist, and not the heart of the wicked man. Toward the close of the Psalm we read of the divine loving-kindness being continued for those who *know God*, and His righteousness for *the upright in heart*. And it is to the hearts and minds of such, and only such, that light is given as to "the transgression of the wicked." Reading our passage with the figure of speech duly resolved we find no reason to alter the Massoretic reading of the Hebrew text, which is so clearly "*my heart*"; no reason to accept in its place such an impossible change as "his heart." It is for us to appreciate the theology of the Psalter: though the Psalmist might be oppressed with his conviction regarding the wicked and his transgression, he had no doubtful thought in regard to the case of the enemies of God: he speaks of them (*v.* 12) as "fallen": "they are cast down, and shall not be able to rise." It has seemed to me of urgent importance to make a special point of explaining a passage that has been very commonly misinterpreted.

Now I proceed with a few remarks on a subject that is widely different, but nevertheless may not be overlooked. The word "Selah," dealt with on p. 172, is beyond question an old acquaintance, and but little understood. I do not hesitate to say that the formula has suffered much at the hands of expositors, though, as I freely admit, until quite recent times, there have been few facts upon which to form a judgment as to the meaning and use of the word. There is no need now to rehearse explanations that have been advanced, from the familiar "Pause" to the adventurous imperative "Think of that!" Quite generally these explanations, made more or less at random, have been employed to suggest emphasis on the part of the writers of the Psalter; and on occasion they have been held to mark some kind of direction to an instrumental accompaniment. It is difficult to make a case for the use of the word, now in connection with the poem, and again in connection with the music; surely there must be unity in

some direction. I speak with confidence, however, when I say that, on a survey of the Psalter as a whole, no one of these suggestions can be declared to "work."

Accordingly, I pass on an explanation which was committed to me many years ago, by a distinguished Orientalist, the late Colonel Conder (shortly before his death in 1910). Calling my attention to the cross-lines found on the cuneiform tablets—lines which, while dividing up a poem served to preserve alignment in the script, he maintained that by this word "Selah," proof is furnished that the older Psalms were, in the first place, inscribed on clay tablets. Let it be remembered that in the Assyrian inscriptions one meets such cross-lines at intervals, and not always at regular intervals; and let it be clear that, in the cuneiform inscriptions, these lines have no bearing on the substance of the poems themselves. In the light of these facts, Colonel Conder held that early copyists of the Psalms, on encountering the cross-line, marked its occurrence by inserting the word "Selah," "a pause," for with them no doubt the line expressed a pause, or rest—not a pause for the work of the poet, but a pause in the process of copying. As showing to what extent the word "Selah" has stood outside the text, it may be added that, in some versions of the Bible, including that of Coverdale in English (1535), the word is given indifferently at the opening or the close of sections, a fact which seems to suggest a feature that is mechanical rather than logical.

In the light of this observation by Colonel Conder, I suggest that "Selah" indicates the place where a cross-line occurred in the poems as originally inscribed, and that it had no mystical purpose—certainly no relation to versification or musical performance. From the mere presence of the word, however, I reach a conclusion which is not without importance, namely, that whatever defects may have been attached to the work of copying, we must allow that the scribes were conscientious to a fault, inasmuch as, in the execution of their labours, they passed on with fidelity, by the use of the word "Selah," the familiar cross-line, although in their judgment such line made no contribution to an understanding of the text or its use in temple worship. In this light, may I add, we may possibly find an explanation of the LXX translation of the word "Selah." That translation is *Diapsalma*, which means "across a psalm," that is to say, a cross-line, and no more! The cross-line was found

by the Hebrew copyists, and they indicated it with "Selah"; and the Greek version tells us no more regarding the much-discussed word. What is more, the Greek lexicographers are unable to throw any light upon the formula as found in the LXX.

Feeling sure that some of my hearers will appreciate the points which I have developed, I forbear further remarks, and have great pleasure in proposing a vote of thanks to our esteemed lecturer.

Lieut.-Col. SKINNER, thanking the lecturer, asked if he would kindly give an opinion as to whether the phrase "To-day if ye will hear his voice," which occurs in Psalm xlv and is quoted in Heb. iv, might be regarded as a "broken sentence" akin to that of Moses, "Yet now if thou wilt forgive their sin . . .," or if it should be rendered as in the R.V., "To-day, O that ye would hear his voice"?

Referring to the "Selah," while welcoming Colonel Conder's explanation, which he thought probably the true one, he ventured to suggest another simple one, that had always appealed to him personally, viz., that, the Psalms being set to music, the "Selah" merely indicated the gap or pause between verses or stanzas which was to be filled by the instrumental refrain; the practice being common in southern and eastern countries for musicians to "carry on" with their guitars or zithers while soloists paused to regain their breath or improvise fresh verses. Would the lecturer kindly say if such explanation could be held to fit the facts?

Mr. PERCY O. RUOFF said: This learned paper, with its many instances cited from Dr. Melville Scott's work of emendations in the Psalms, many of which are supposed "to restore the whole passage from absolute incoherence to a real continuity of thought," adds to the already long list of Bible critics who do not hesitate to correct the text rather than accurately translate it. This method should always be resisted, as it certainly is not scientific, and is a violation of the principles of evidence. It is not new, for in Jerome's Vulgate there are instances of corrections, which are not translations. Mr. Finn has ably dealt with the bizarre treatment of a number of Psalms by Dr. Scott, and has riddled his contentions for the emendations he proposes. The paper also shows how con-

tinuous is the need for constant vigilance lest those who claim authority in Biblical emendations should seek to saddle on the public conclusions which have no really valid or scientific basis.

On p. 183, Mr. Finn says, referring to Dr. Scott's book: "There are several instances of words being denounced as 'corrupt' because they seldom or never occur elsewhere." This principle applied to Biblical writings, having regard to their unique claim as the oracles of God, is dangerous and unsound as criticism, because many instances can be quoted of single and isolated references to a matter in words not found elsewhere which have never been "denounced as corrupt." If this principle is adopted in some cases, it ought to be applied in all cases.

Mr. WILLIAM C. EDWARDS said: The learned paper to which we have just listened is quite beyond my powers of criticism. I should like our worthy Secretary to send a copy to Dr. Scott, and learn in detail what he has to say in reply to *each* of the points raised. Many of the critics seldom get properly criticised; it would appear that they read little but the praises of fellow-critics. I should like to refer to the "broken sentence" of Exodus xxxii, 32. This verse has seemed to me one of the many and convincing proofs of verbal inspiration. The prayer of the man of God is here *verbatim*, just what Moses said. Have you never had the experience? We make half a request, and stop almost in the middle of the prayer, for we cannot finish the sentence. Moses prayed, or almost gasped out, "Oh, this people have sinned a great sin, and have made them gods of gold, yet now if Thou wilt forgive their sin . . .," then he hesitates, the agitation of his mind is too great, the request too much, he cannot believe that they can be forgiven. There must be punishment. Then he adds, "and if not," that is to say, if they are to be destroyed, as they *must* be, and deserve to be, I cannot survive it, I cannot bear it, in time or eternity—then I must go *with* them in punishment—"blot me I pray Thee out of Thy book." How absolutely, how wonderfully—how psychologically exact! One seems to be at the side of that man of God, hearing his groans and beholding his agonies and tears. It is only comparable to that of the Eternal Son of God in the garden called Gethsemane.

LECTURER'S REPLY.

Rev. A. H. FINN, after thanking the Chairman for his kindly appreciation of the paper, remarked about the word "Selah." I greatly doubt that the Hebrew of the Old Testament was in any way affected by cuneiform. If Colonel Conder's explanation of the word, as indicating the cross-line of alignment (found in cuneiform inscriptions) were correct, one would expect that it would occur frequently in most of the Psalms of any length. Actually, it only occurs seventy times in the whole Psalter.

As to Colonel Skinner's suggestion, that it marks where one singer leaves off, that would not account for its being found in the middle of a sentence.

In the sentences, "if Thou wilt forgive their sin—" (Exod. xxxii, 32), and "To-day if ye will hear His voice" (Ps. xcvi, 7), the Hebrew word is "Im," which simply means "if." Yet that may suggest an unuttered desire in the mind of the speaker such as "would that!".

722ND ORDINARY GENERAL MEETING,
HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, APRIL 8TH, 1929,

AT 4.30 P.M.

THE REV. CHARLES GARDNER, M.A., IN THE CHAIR.

The Minutes of the previous Meeting were read, confirmed, and signed, and the HON. SECRETARY announced the Election of the Rev. Carment Urquhart, B.A., as an Associate.

The CHAIRMAN then called on Lieut.-Col. Lewis Merson Davies, R.A., F.G.S., to read his paper on "The Philosophic Basis of Modernism."

THE PHILOSOPHIC BASIS OF MODERNISM.

By LIEUT.-COL. L. M. DAVIES, R.A., F.G.S.

"(Know) this first, that there shall come in the last days scoffers, walking after their own lusts, and saying 'Where is the promise of His Coming? for since the fathers fell asleep, all things continue as from the beginning of the creation.'" (2 Pet. iii, 3-4.)

"(Hypotheses) on the origin of species are an indication of our mental tendencies, rather than the synthetic result of facts incontrovertibly ascertained. Let us admit it without further preamble: the success attained by the theory of evolution is not due primarily to its self-evident character, for even the most generally admitted facts cannot always be reconciled with it, but rather to the sympathy of the scientific world for the dogma of continuity of natural phenomena." (G. Fano, *Brain and Heart*, Oxford Univ. Press, 1926, p. 41.)

"The essence of Evolution is unbroken sequence." (Dr. W. W. Watts, *Geol. Mag.*, 1924, vol. 61, p. 532.)

THE NATURE OF THE BASIS.

"EVERY philosophy," says Le Roy, "presents itself in its initial stage as an attitude, a frame of mind, a method" (*A New Philosophy: Henri Bergson*, p. 12). Thus every philosophy is said to originate as a particular MENTAL ATTITUDE; and I have accordingly defined a "philosophy"

as being a "method, of explaining and co-ordinating facts, which suits a certain type of mind" (*Trans. Vict. Inst.*, vol. lviii, p. 216, footnote).

An illustration of what that means was afforded to the Members of this Institute when the Rev. Canon V. F. Storr read a paper before them, on the subject of "Revelation," in the course of which he showed that his own conception of Revelation was utterly unlike that of most of his hearers. When challenged to reconcile his views with the statements of the writers of Scripture, to whom the Revelation had actually come, and who alone could therefore give direct evidence as to the manner of its coming, Canon Storr declined to attempt any such reconciliation. He asserted, somewhat strangely, that his opponents "begged the question" by taking the testimony of the writers of Scripture at its face value; and he further declared (which is well worth noting) that he and his critics could not get into touch with each other, since they *started from different presuppositions* (*Trans. Vict. Inst.*, vol. lviii, pp. 135-6).

It was therefore clear that the Canon himself was admittedly starting from one or more *presuppositions*; presuppositions which, as Le Roy would point out, doubtless indicated, and were in harmony with, the Canon's "attitude" and "frame of mind," and determined the "method" by which he subsequently dealt with the facts. It was also clear that these presuppositions of Canon Storr's must have been of a nature altogether hostile to the acceptance of any testimony to an objective Revelation of His Will on the part of the Almighty.

I draw attention to this incident because, trifling as it may seem to be, it goes to the root of things. It shows that Modernism, as represented by the teachings of people like Canon Storr, is not a matter of science (as some suppose), but is purely a philosophy. It is not determined by objective facts, but by subjective *presuppositions*.

Nor is this all; for the incident also indicates the nature of the "attitude," the preliminary "frame of mind," which Le Roy would regard as the all-important "initial stage" of Modernism, and which I would prefer* to call its "basis." This initial stage, or basis, is seen to be purely negative; it apparently takes

* For the words "initial stage" seem to me to suggest something which may be outgrown, whereas the mentality originating a philosophy remains a permanent necessity to it, even in its most advanced form.

the form of a rooted antipathy to ideas of Divine Interferences with the natural courses of events. In other words: It appears that the "Philosophic Basis of Modernism" is the FRAME OF MIND* which is *opposed to belief in Divine Interventions.*

ITS INCOMPATIBILITY WITH CHRISTIAN BELIEF.

One sees its effects everywhere. Indeed it is a commonplace, among Christians, that their Modernist opponents are determined to rule "miracles" out of court when dealing with the Bible.† One has only to pick up a book like *Peake's Commentary* to see how the whole aim of its writers appears to have been to eliminate the supernatural from the Bible; to remove all idea that the natural courses of events could ever have been interfered with by Divine action. It also seems clear that, although he claims to be an "orthodox Liberal Evangelical," Canon Storr's own tendencies must be along much the same lines—if he is consistent‡; for if his "presuppositions" are of such a nature as to preclude his considering even the possibility that God has objectively revealed His Will to man, then the same presuppositions must be all the more opposed to belief in those far greater Interventions which comprise the Gospel story, and to which we will now turn our attention.

* Modernists themselves often instinctively recognize that their system is based upon their own frame of mind. How often we are told that "traditional" Christian beliefs are "repugnant to the Modern Mind." The remark is really very significant.

† And the fact is openly admitted on the other side. "We of the Churchmen's Union" says Dean Inge, "come into conflict with traditionalism chiefly on the question of miracles" (*Modern Churchman*, Sept., 1924, p. 227). Mr. Hardwick writes: "So long as the uniformity of nature is unrecognized, miracles tend to occur" (*ibid.*, p. 384); "We need to disencumber our religion of this incubus of the supernatural" (p. 392). Note the appeal to the supposed *uniformity of nature*; for this, as I try to show above, characterizes all Modernist attacks upon Christian doctrine.

‡ I say "if he is consistent," because Modernists are not always consistent, and some of Canon Storr's statements seem to leave room for hope that he believes in the Deity of Christ and His literal Resurrection. If Canon Storr really believes in these things, of course, he is to that extent not a Modernist but a Christian. But it seems clear that a man who can believe in the literal Incarnation and the literal Resurrection has no business to appeal to his "presuppositions" against believers in literal Revelation. In any case, we are concerned here with the logical implications of certain "presuppositions," and not with the providential inconsistencies of individuals.

THE GOSPEL OF JESUS CHRIST.

Some years ago, up in Simla (India), a group of Modernists began to show great enthusiasm in advertising what they called a "Social gospel"; something which they seemed to think they had newly discovered. This so-called "gospel" proved, however, on examination, to be simply a re-hash of ordinary Socialistic ideas; the old "Liberty, Equality, Fraternity" stuff brought up to date.*

A certain number of Christians, therefore, who were then living in Simla, resented this use of the word "gospel." They remembered the warnings against the acceptance of strange "gospels" (Gal. i, 6-9), and set themselves to find out, more exactly, what it is that the Bible calls the "Gospel." By comparing all the New Testament passages in which the word occurs, and tabulating the matters referred to in them, they found that the Gospel, as recognized in Scripture, is simply and solely the story of the Incarnation by a Virgin of the Eternal Son of God, His vicarious Death, physical Resurrection, Ascension into Heaven, sending of the Spirit, and future Return in the clouds to receive His resurrected and transformed saints to Himself.

It is noticeable, therefore, that every one of these headings involves Divine Intervention of the most pronounced order. So we see that if we are right in our identification of the *Philosophic Basis of Modernism*, then that basis must stand in direct opposition to belief in the Gospel of Jesus Christ.†

* There was much about brotherhood, and nothing whatever about Salvation, in their talk. It was typical that one of these Modernists, during the course of an address, entitled "Why I am a Christian" (*sic*), to a large gathering of Hindus and Mahomedans, told his hearers that at one time he used to think that he ought to try to convert people of other religions; but he had long since got beyond that idea, and now only tried to make them "better Mahomedans, better Sikhs, and better Hindus." Obviously the "Social" gospel could dispense with the Gospel of Jesus Christ.

† Thus the Rev. A. H. Finn, in a recent article entitled "The Case Against Modernism," declares that: "The Modernist rejects the Virgin Birth, atoning Death, bodily Resurrection, literal Ascension, enthronement at God's right hand, and personal Return" (*Bible League Quarterly*, Jan.-Mar., 1929, p. 40). On the previous page, Dr. Finn points out that the Modernists' Creed, as drawn up by the Rev. H. D. A. Major, "contains no mention of the birth, death, rising again, ascension, and return of our Lord. These," adds Dr. Finn, "have ever been believed to be the actual facts on which the Christian Church was founded. Are they now to be reckoned among the 'lies and legends' which must be 'jettisoned'?"

CHRISTIANITY IS A MATTER OF FAITH IN DIVINE INTERVENTIONS.

The fact is often obscured, in these days, that Christianity is a matter of *belief in Divine Interventions*. It suits Modernists, of course, to gloss that fact over, since they wish to pass for Christians without accepting any such belief. It is our duty, therefore, to see that the fact is not ignored; for it is vital. Indeed, it forms one of the chief differences between Christianity and all other religions.

In other religions, divine interventions tend to be arbitrary or fortuitous: if they are eliminated, the creed is not vitally affected. For all other religions are, at best, simply ideals of life and conduct; and the implication seems always to be found in them, that the person who lives pretty well up to the ideal acquires positive merit by doing so, and this merit can be used to offset his demerits of conduct. Interventions of the godhead, if they occur in such religions, seem to have no crucial place in the systems concerned. They may be supposed to accredit the teachings of the prophet, avatar, guru, priest, or other spokesman of the god or gods concerned; they may arouse wonder, fear, enthusiasm, etc.; but they are mere accessories to the scheme of things, not essential parts of the system itself.*

In Christianity, all is different.† Christianity is the most uncompromising of all religions, in its attitude towards sin and the sinner. Even to look on a woman with desire is to commit adultery with her in one's heart (Matt. v, 28); and men shall, we are told, give account of every idle word that they speak (Matt. xii, 36). There is no exaltation of any individual, for "There is none righteous; no, not one . . . all have sinned and come short" (Rom. iii, 10, 23). Yet, while morality of the strictest kind is severely enjoined, there is no positive merit to be acquired thereby, of a saving kind, to serve as a counterpoise to our misdeeds; for we are told that, when we have done all, we should say "We are unprofitable servants: we have done that which was our duty to do" (Luke xvii, 10). There is only

* Thus the belief of the Ephesians, that the image (or symbol?) of their goddess had fallen down from Jupiter (Acts xix, 35), certainly roused their enthusiasm, but could hardly have affected their doctrine.

† It is not denied that accessory miracles abound in the Bible; but the point is that, where the Gospel itself is concerned, the Interventions become the substance of the message and the body of the creed.

one sentence for sin, and it is a death sentence ; for " The wages of sin is death " (Rom. vi, 23).

It is here, then, that the Gospel of Jesus Christ comes in, with its unique character as a story of DIVINE INTERVENTIONS essential to man's SALVATION. The very Son of God, whose goings forth have been from of old, even from everlasting (Mic. v, 2), becomes Incarnate, to fight, as man, where the whole rest of Adam's seed has failed. He triumphs where all others have failed. As the Representative of the race, He disinherits the Serpent, who had disinherited the first parent of our race in the beginning. In Him, the Father can look upon the race of Adam and see it perfect—and only *as perfect* can eternal life be granted to it. As ETERNAL GOD this Incarnate One then went further and tasted death for every man. He who knew no sin, who need therefore never have died, allowed Himself to be " made sin " for us (2 Cor. v, 21 ; *cf.* Col. ii, 14), and laid down His Life—Infinite in its merits, as the Person who laid it down was INFINITE—on our behalf (Matt. xx, 28 ; 1 Tim. ii, 6). That the payment was complete is proved by the physical Resurrection of our Lord. As Paul said, if Christ be not Risen our faith is vain ; we are yet in our sins (1 Cor. xv, 17). If Christ is not Risen, He is still in process of paying for our debts ; and the least part of those debts still unpaid is sufficient to slay us by reversion. The *Resurrection* of the Christ, therefore, is the discharge certificate of those for whom He died.*

* This doctrine of a *completed payment*, by the Godhead Himself, for our sins, is emphasized in many ways in Scripture. Paul's references to the Resurrection of our Lord, in connection with our sins, cannot, as we have seen, be explained apart from it. Christ is also said to have offered Himself a RANSOM (Gr. *antitutron*, or " equivalent price ") for all (1 Tim. ii, 6). And we are told that we are *justified* by faith (Rom. v, 1 ; *cf.* 9) ; that God is not only a Forgiver of sins but also a *Justifier* of the believing sinner (Rom. iii, 26) ; that He is *Faithful and Just* to forgive us our sins (1 John i, 9) ; etc. Whence comes all this talk of " justification " ? God might be Merciful to forgive ; but how could He be *Faithful and Just* to do so, unless the price of guilt were fully paid upon condition of belief in the Payer ? Why this extraordinary choice of adjectives ? Some years ago, in India, I corresponded with a Modernizing Bishop, who was decrying the doctrine of Substitution, and soon found how utterly unable he was to account for these and other passages apart from that doctrine. And it seems significant that, whatever Modernists may say, full and assured peace with God is found nowhere outside of belief in the Bible story of the completed vicarious Atonement for our sins by the Son of God Himself.

And note that it is a *physical* Resurrection. The Bible hangs together. As the death of Adam was physical, so must the Resurrection of the Christ be also. And a physical resurrection implies that the death even of the body is not part of the normal scheme of creation. Death came upon us through sin, we are told (Rom. v, 12). But this is utterly contrary to all ideas of evolution; it is only compatible with belief in literal creation and a literal fall. So we may note, in passing, how the physical Resurrection of our Lord *implies* the Genesis story of the literal Creation of our first parents; while the story of that literal Creation both explains and *justifies* the physical Resurrection of the Christ.

To return. Our Lord having Risen, and proved the fact of His Resurrection to all His disciples, then Ascends to Heaven before their eyes, in order to send the Holy Spirit, and wait until a future day when, the numbers of His Church (a unique body, which is identified in Scripture in a peculiar way with Himself, and whose calling appears to be far above that of the righteous of all other dispensations, both past and yet to come) being completed, He will return in the clouds as He went, to receive His resurrected and transformed saints to Himself.

THE SCRIPTURE EMPHASIS ON THESE INTERVENTIONS.

Peculiar emphasis is laid, in Scripture, upon the above series of unique *Interventions*. For there were Modernists, of a sort, on earth before there were any Christians, and each of these gospel points needed stressing. The Apostles themselves were all Modernists, at least in regard to Christ, before they became Christians. They had all that our present-day Modernists can claim; a sincere devotion to our Lord's person, and a very great belief in His moral authority. But He was only a great *man* to them, until Peter openly avowed the first tenet of Christianity by declaring that Jesus was none other than the Incarnate Son of God (Matt. xvi, 16). And note how significantly our Lord welcomed this admission (*vv.* 17-19).

Peter himself, however, was still very largely a Modernist; for when our Lord went beyond the first tenet of Christianity in order to press the second—that the Son of God must DIE for our sins—it was none other than Peter himself who voiced the Modernist idea that the *life* of the Christ was of more importance to us than His *death* (for what Modernist to-day—to whom the

death of the Christ is simply a great tragedy, or a supreme "gesture" at most—would not urge, as Peter did, that our Lord had much better have continued to live and teach, than have deliberately set His face to a shameful death?). But the essential character of *this very death* is immediately stressed by our Lord, who did not hesitate to counter the well-meant but deadly* obstruction of His follower by the strongest language possible, showing the Devil at the root of the very attitude which Modernists are reviving to-day (Matt. xvi, 22-23).

Then, again, even when the disciples had probably all accepted the first tenet of Christianity, and mournfully acquiesced in the second, they were still Modernists enough not to understand the third—that our Lord should Rise again from the dead. Not until after the Emmaus talk, and the Appearances to every one of them in person, did the disciples at last accept belief in the Resurrection (Luke xxiv, 25-47).

The Ascension, which followed shortly afterwards, they could not well doubt: it was enacted before the eyes of them all (Luke xxiv, 50-52; Acts i, 6-11; 1 Cor. xv, 6-7). Similarly, Pentecost was not to be denied; it directly seized upon them all, in the presence of vast numbers of strangers in Jerusalem at the time, of whom three thousand were converted at the sight (Acts ii, 1-41).

It seems, however, that the yet future Return of our Lord, together with the attendant resurrection of the dead, and transformation of the living, believers which is linked up with it, was still doubted by some, until Paul showed the interrelation of this tenet with the other parts of the Gospel doctrine (1 Cor. xv, 12 ff.).

So we may note the continual New Testament insistence upon Divine Interventions. By no natural law, but only by postulating the direct Interventions of God, can we account for any one of the above facts, if we are to believe in them at all. Yet these are the essentials of the Gospel story, covering the period enclosed by the two Advents; that period to which our Christian rite of Communion belongs, looking back to the Cross and forward to the Return, "showing forth our Lord's death until He come" (1 Cor. xi, 26). Attack any one of these points, and you attack the very heart of Christianity; the finished

* For if Peter had had his way, our Salvation would never have been won.

Christianity of Paul's Epistles, as distinct from the confused Modernism of the days before Peter's great avowal.

THE MODERNIST BASIS FORETOLD.

It seems clear, then, that Christianity is a system of belief; of belief in a set of Divine Interventions representing the *Acts of God for our Redemption*.

Modernism, on the other hand, as it exists around us to-day, is founded upon "an attitude, a frame of mind" which is utterly hostile to belief in any such Interventions; a frame of mind which must, of necessity, compel its possessors to deny every one of those Interventions.*

And now let us turn to the Bible again. Has it anything to say regarding the rise of this singular "frame of mind"? It seems to the present writer that it has.

The Bible is full of statements regarding the condition of things which it says will be found to prevail in the "last days" of our present dispensation, just before our Lord returns to earth. For those are not to be days of faith, it seems, but of unbelief in the Gospel. Widespread apostasy is to be their leading characteristic. Men will, indeed, retain a form of what Paul could call "godliness," *i.e.* belief in the Gospel (*cf.* 1 Tim. iii, 16), but they will deny the power of it (2 Tim. iii, 5).† Evil

* According to the Moderator of the Free Church in Scotland, in 1925, Modernism taught that "the doctrines of Special Creation and the Fall of man were (to be) rejected. . . . The Supernatural or miraculous was set aside in the name of Science and the Reign of Law. The record of miracles in the Scriptures was not accepted as true, for miracles did not, and could not, happen. Hence the miracles of the Virgin Birth of our Lord, His bodily Resurrection, and His actual Ascension to Heaven were expressly repudiated by Modernists. . . . The God of Modernism is not the Triune God of the New Testament, but a monad, a single personality. . . . Christ . . . is in essence no more divine than any other man. . . . Christ can no longer be thought of as . . . the redeemer of men" (cited in the *Journal of the Wesley Bible Union*, April, 1926, pp. 79-80). It is characteristic that the Moderator opens his list of unbeliefs by appeal to the "modern mind" which, he said, "had rejected the orthodoxy of a former generation."

† It seems significant that Modernists like Dr. Major repeat the Christian creeds to-day, but with mental reservations which rob them of all significance. The Incarnation was no real Incarnation; the Resurrection was not a Resurrection at all; the Second Advent is not to be taken literally. The outer form, as Paul foretold, of Christian profession is still retained, while all that it once stood for is denied. When Dr. Major undertakes to say, in plain language, what he really believes, he omits all mention of Christian facts.

men and seducers are to wax worse and worse, deceiving and being deceived. The days are to be perilous ; marked by world-wide abandonment to blood and lust, as were the days before the Flood. People will be, pre-eminently, lovers of pleasures more than lovers of God ; ever learning, yet never able to come to a knowledge of the Truth ; disobedient to parents ; unthankful, unholy ; boasters, proud, blasphemers.* It is not a flattering picture.

There is also, it seems, to be a marked resort to spiritualism—or “spiritism,” as Dr. Schofield prefers to call it—at that time ; the results of which will be disastrous to Christian faith (1 Tim. iv, 1-3).

It seems clear that the bonds of Bible authority and warnings will sit lightly on the minds of people in the last days. All the prophecies testify that men will go their own ways, following their own lusts regardless of anything that Scripture may have said to prohibit their practices.

And now we come to a remarkable fact. If we turn to 2 Pet. iii, we will find the Apostle clearly indicating that these latter-day people are not only to be Modernists (for Modernists, of a sort, have always existed),† but MODERNISTS OF THE TWENTIETH-CENTURY TYPE, *i.e.* men with “presuppositions” of the identical kind adopted by Modernists to-day, and employing those presuppositions in the very manner that Modernists now employ them.

There is no mistaking this fact. I have pointed it out, time and again, in public and in private, to the teeth of Modernists themselves, and have never yet found a single one prepared to dispute my claim. Modernists, so far, have either been silenced, or they have tried to change the subject ; as one gentleman did, who reminded me that the authorship of 2 Pet. is disputed, and

* Matt. xxiv, 3-28 ; Luke xvii, 26-37 ; 2 Tim. iii, 1-iv, 4 ; 2 Thess. ii, 3-12 ; etc.

† A “Modernist,” by my definition, is simply an unbeliever in a Christian tenet, whose unbelief is founded upon a lesser or greater idea of uniformity ; for Christianity is a system of belief in certain Divine Interventions, and Modernism is founded upon belief in uniformity (which characterizes a frame of mind now called “Modernist”), which is incompatible with Christianity. Many minds are, it is recognized, Modernist only in patches, and Christian in other places ; for consistency is not by any means universal, and some early beliefs or unbeliefs often remain long after consistency should have disposed of them.

asked what right I had to assume that Peter wrote it. I reminded him, in return, that, whoever wrote the Epistle, its *early date* has never been disputed; and the exact fulfilment of the Prophecy, as exemplified by Modernists like himself, shows that St. Peter probably was the author, as the Epistle itself declares. Deliberate liars are not apt to prove true prophets. That apparently silenced this gentleman; for it brought him back to the fulfilment of the prediction, which he could not deny.

So I would again draw attention to this passage. Mark its importance. The Apostle urges us to place this fact *foremost*, when considering the conditions which will exist at the time of the end. We are to remember this "FIRST," he says, that in the last days scoffers shall arise, walking after their own lusts, and saying "Where is the promise of His Coming? for since the fathers fell asleep, *all things continue* as from the *beginning of the creation.*"

Pregnant words! How few they are; and yet, when we look into them, what a complete, universal, and exclusive dogma of uniformity they represent! It is clear that these prophesied scoffers have, in perfection, that twentieth-century Modernist FRAME OF MIND which excludes the idea of Divine Interventions in all space and all time.

To a geologist this prophecy is peculiarly remarkable, for it shows that the rise of the fundamental postulate upon which all modern geological theory is founded—the postulate which underlies all geological and biological attacks upon early Genesis to-day—was expressly foretold in Scripture more than eighteen centuries ago; and it is worth remembering that the prophecy was actually translated into our *present English form* (which expresses things so perfectly) nearly two centuries before geology itself began to exist as a science, or the men were born who first established this very dogma as a "scientific" axiom, and so fulfilled that prophecy.

For note that these prophesied scoffers are represented as doing exactly what our "scientific" opponents of Scripture are doing to-day. They are represented as claiming to know the history of all things, right back to the very beginning of creation itself: they speak as if they were quoting demonstrable fact: and yet Peter's very next words show that their assertion will not represent true science after all—it will not be founded upon proofs but upon prejudices—for the scoffers are to be "willingly

ignorant" of the fact of the Flood (2 Pet. iii, 5-6). Indeed, what these people are represented as doing is precisely what our geologists and biologists are doing to-day; they are represented as announcing an unproved and unprovable dogma of uniformity as a scientifically verified fact, and shutting their eyes to everything which conflicts with it. Nor is this all; for the very words "since the Fathers fell asleep," with which they introduce the dogma, are peculiarly significant in the light of the now known history of the rise and development of that dogma.

THE DEVELOPMENT OF MODERNIST DOGMA.

We should, perhaps, consider this point. We may remember, therefore, that the often fantastic talk of miracles, during the Middle Ages, by uncontrolled religious enthusiasts, encouraged by a clergy who made capital out of the same, led to reaction on the part of Protestants. This reaction, like all reactions, favoured a movement to the opposite extreme. Convinced Protestants, indeed, would not surrender the miracles of the Bible, but they were little concerned to defend belief in miracles which were not certified by Scripture; so they were on common ground with the more reactionary party in accepting the continuity of natural processes "since the (Christian) Fathers fell asleep." This agreement (clearly indicated in Peter's prophecy)* was then exploited by the new Deistic—or what would now be called the "Modernist"—party in working backwards into Scripture times, in order to attack beliefs which Protestants held as firmly as their Catholic opponents.

(a) *Hume's Contribution: The Denial of "Miracles."*

Now the first thing to be attacked, in thus working backwards from the admitted uniformity of the post-apostolic age, was belief in the miracles which are said to have occurred in the

* For the scoffers seem to be apostate Christians. In any case, they are addressing real Christians in regard to a Christian doctrine—that of the Second Advent. But Christians have, even from before the days of this Epistle, been a body of believers drawn from many nations. So who could these "Fathers" be but the Fathers of the Christian Church; in other words, the Apostles themselves and their immediate successors, exactly as we speak of them to-day?

Fathers' own day; the miracles recorded of our Lord and His followers in the New Testament. We can see, in the writings of David Hume, how belief in those miracles was attacked upon the grounds that nothing comparable to them could be shown to have happened in recent times. Thus he said that "firm and unalterable experience" was against belief in miracles, and that they were "most contrary to custom and experience" (*Essay on Miracles*).* Unless he deliberately meant to beg the very question at issue, he could only have been referring to "custom and experience" dating "since the Fathers fell asleep"; so we see how the characteristic Modernist doctrine was brought well to the front, that we must regard *the present as the key to the past* and the measure of all possibilities.

(b) *Hutton and Lyell: The Denial of the Flood.*

Matters, however, could not stop there. In progressing still further backwards, belief in the Deluge of Noah, which involves belief in a very definite Intervention of God, had to be got rid of. The task was not easy. The question as to whether we have evidence of the Deluge is mainly one for geologists to decide; and the early geologists (geology being then quite a new-born science) were emphatically of opinion—and remained so, as a body, until well on into the nineteenth century—that we have abundant evidence of the Deluge. St. Peter, however, had long before declared that belief in the Flood would finally be given up, and had even shown on what grounds it was to be given up; and in time his prediction was fulfilled to the letter. So eminent a geologist as Sir Archibald Geikie tells us how James Hutton and his supporters took up the principle of Hume, that "the present is the key to the past," and introduced it to the notice of geologists, who were told that "we are not at liberty to imagine new causes of change when those seem insufficient†

* To this day there is nothing the Modernist appeals to more often, after the "Modern Mind" itself, than the "regular order of nature," the "uniformity of nature," etc. When quoted as a disproof of Bible statements, this talk of uniformity, or continuity, becomes simply a formula for begging the question at issue, and is itself a mere product of the Modern Mind.

† Had he said "sufficient," instead of "insufficient," it might have seemed more reasonable.

which occur in our experience" (*The Centenary of the Geological Society of London*, p. 115). In other words, however much evidence the geologist may find as to abnormal events in the past, he is *not at liberty* to admit its apparent significance, but must explain it away in terms of present-day processes, however "insufficient" the latter may seem to be for the purpose. Is it not fitting that the Apostle should have described the men who support such an arbitrary dogma as being "willingly ignorant" of the fact of the Flood? And did he not predict their method accurately when he showed that they should measure the past by the present, and declare that nothing abnormal could be found anywhere?

Opposition, at first, was vigorous. The older geologists were strongly opposed to the acceptance of such an obviously unproved and unprovable dogma. Indeed, as I have shown elsewhere, leading geologists have, right up to within the current century and a few years ago, vigorously protested against the way in which the now orthodox school of geologists have shut their eyes to the plainest facts, when the same seemed to demand belief in the Deluge. But nothing could stop the advance of the long foretold (yet long postponed) movement in thought, when once it had fairly started. The pleas of Hutton were all too well suited to the "Modern Mind" (then rapidly becoming dominant) to be set aside. Both within the ranks of science and without, men in general were acquiring "an attitude, a frame of mind" which predisposed them to deal with facts after the "method" adopted by Hume in one sphere and Hutton in another. It only needed the eloquence of a really gifted pleader like Sir Charles Lyell to establish this method firmly as the orthodox one among geologists; and the result is that belief in the Flood has now, in spite of the protests of experts of recognized sound judgment, been generally surrendered by scientists on the exact grounds foretold eighteen centuries ago.

(c) *Darwin and his Successors: The Denial of Literal Creation.*

Even this, however, did not go so far as consistency demands, or the prophecy indicates. For the words put by Peter into the scoffers' mouths show that they do not simply deny the Flood: they carry their denials right back to the very beginning of the Creation, thus showing that they include creation itself in their scheme of uniformity.

And, again, the event has justified the prediction. For although Lyell was not inclined to tamper with belief in the literal creation of living forms, it was otherwise with people like Charles Darwin. Such men saw that Lyell had simply paved the way for themselves to go further. As Huxley said, Lyell was "the chief agent in smoothening the road for Darwin. For consistent uniformitarianism postulates* Evolution as much in the organic as in the inorganic world" (*Life*, vol. i, p. 168). It is obviously inconsistent to deny Divine Interventions in the matter of miracles, and deny the Deluge, if we are still to admit such Interventions in the course of creation. Men were thus forced to go further, and attack belief in Creation itself, so far as the latter implies Divine Interventions with the course of natural processes; and the success already gained by Lyell prepared the way for Darwin, just as the earlier successes of Hume had prepared the way for Lyell. So note how Darwin simply transferred the identical methods of Hume and Lyell into the sphere of organic studies. Just as Hume and his followers have tried to account for the reported miracles of Scripture (where they do not flatly deny them) in terms of

* Note that uniformitarianism "postulates" evolution. The modern belief in continuity is not derived from a proved evolution, but belief in evolution is derived from it. The doctrine of biological evolution is essentially one of unbroken genetic connections; and yet, as I tried to show in my paper on "Evolution" (*Trans. Vict. Inst.*, vol. lviii, pp. 214-36), the one thing which science is incapable of proving, apart from historic testimony, is the fact of a genetic connection between two supposed ancestors. So continuity, which is the essence of biological evolution, has of necessity to be assumed, for it can never be proved. Knowing, as a palæontologist, the impossibility of proving continuity; and knowing, as a Christian, that the rise of belief in unlimited continuity was expressly foretold, in Scripture, as a characteristic of the "last days"; it is interesting to me to see how constantly the modern man of science appeals to his *belief in continuity* in order to justify his evolutionary speculations. Thus Professor E. Blatter tells us that the first thing we have to take for granted, in talking of evolution, "is the uninterrupted continuity of birth in any series of descendants" (*Proc. Thirteenth Ind. Science Congress*, 1926, p. 199). Professor J. A. Thomson objects to belief that man's spiritual nature may have come from God, on the ground that "it jettisons continuity" (*The Gospel of Evolution*, p. 127), and he details the things we must believe in order "to obviate any suggestion of discontinuity" (p. 161); etc. At all costs the average modern man of science cleaves to the foretold doctrine that "all things *continue* as from the beginning of the Creation."

present-day events ; and just as Hutton, Lyell, and the more modern school of physical geologists explain away (where they do not ignore) the evidences of the Flood in terms of *current* geological processes ; so did Darwin attempt to explain creation itself in terms of what he considered to be *still existing* biological processes. For the great fundamental dogma of Modernism is that " the present is the key to the past " ; that the past must be explained by means of things that still continue to happen to-day ; or, as St. Peter puts it, that " All things continue as from the beginning of the Creation." Taking, therefore, " Natural " and " Sexual " Selections (processes supposed to be everywhere operating *to-day*), Darwin showed how the supposed operations of the same might be extended backwards in time, even to the heart of creation itself, in order to explain how a great part of creation might conceivably have been effected by purely natural processes, and without any Intervention by God.

I say a " great part " of creation ; for even Darwin did not carry things out to their logical conclusion, since he admitted (perhaps as a concession to his contemporaries) belief in the literal creation of a few simple forms of life to start with, from which all others have been developed by natural processes.* His successors, however, more consistent than he, have since carried the idea of continuity further ; demanding belief in the spontaneous generation of life, and postulating uniformity right back to the very BEGINNING of the Creation. Theories as to the evolution of chemical elements have recently helped to complete the Modernist scheme.

So we see how gradual the development of the dogma has been ; and how slowly, even in recent years, the opponents of Scripture have approached the complete formula of denial which Peter foretold, with crystal clearness, eighteen centuries before they were born.

(d) *Dr. H. D. A. Major : The Denial of the Second Advent.*

Peter's prophecy, however, goes still further. Brief as it is, it not only foretells the rise of the *perfected* Modernist dogma, but it also expressly indicates at least one of its corollaries. For those who deny that God has ever Interfered in the past, can hardly be expected to believe that He will ever Interfere in the future. Christ, to them, is just a man ; that He should reappear

* Concluding words of *The Origin of Species*.

physically from Heaven, two millenniums after He was crucified on earth, is an intolerable anomaly for which their ideas regarding the past afford them no precedent or excuse.

Modernists, therefore, in this third decade of the twentieth century (*i.e.* since the comparatively recent perfection of their dogma) are at last openly denying belief in the Second Advent, just as Peter foretold. The following will show how unblushingly this is now being done :—

“THE SECOND COMING.—‘*No Hope of Physical Manifestation*’ declares Dr. Major. *Evolution Faith*.—‘The hope that Christ will reappear in a physical manifestation is not held nowadays by educated people.’ So declared the Rev. H. D. A. Major, of Oxford, preaching the Advent sermon yesterday at St. George’s Church, Stuyvesant Square. Such people, he said, based their hopes of human progress on their conception of evolution.” (*The Daily Mirror*, 1/12/1925, p. 2.)

I have quoted the above before (*Trans. Vict. Inst.*, vol. lviii, p. 228), but draw attention to it again, not only because it represents the teachings of a leading Modernist (one of the foremost representatives of the movement; and Editor of *The Modern Churchman*, which is a principal organ of Modernism), but also because it indicates the connection between belief in the doctrine of Evolution and the denial of the Second Advent; both of which result from the acceptance of the one fundamental dogma of *continuity*, which was so clearly foretold in Scripture.

For if we deny that God has ever Interfered in the past, we can hardly admit that He is likely to Interfere in the future. Nor, if we deny God’s Interferences in the past, can Christ be anything to us but a man; and to expect people, who cannot accept the Deity of Christ in particular or the Interferences of God in general, to look for the physical return in the clouds of a man who died on a cross two thousand years ago, is simply impossible. On the other hand, if God has never Interfered in the past, then we ourselves cannot be creatures who were literally created: we must have evolved; and not only evolved, but evolved—*i.e.* risen—by the operation of still continuing processes (“the present being the key to the past,” by Modernist dogma; for only by appeal to known, or still continuing, processes can we profess to explain evolution on naturalistic lines, *i.e.* by appeal to natural “known causes”). But if we have risen by means of processes which still “continue,” then our

creation must still be going on ; and there is no knowing how far we may yet progress under the influence of those same processes.

So the man who accepts the dogma foretold in Scripture is compelled to re-orient his views. The Modernist, if he was once a Christian, rejects his Christian beliefs as impossible. He turns from the traditional Hope of the Church (Titus ii, 13) to new hopes based upon the doctrine of evolution ; hopes which are implicit in the very idea of uniformitarian CONTINUITY.

When Dr. Major, therefore, attributes this new orientation of hopes to " educated " people, he means people who have accepted the foretold dogma of *continuity*, put by the Apostle into the mouths of the scoffers of the last days. Those twin-fruits—denial of the Hope of the Church, and adoption of hopes based upon evolution—are derived from the dogma of continuity alone ; and from no species of " education " apart from that dogma.

SUMMARY.

There is very much more that could be said, for Paul's prophecies about the last days dovetail in with Peter's, reinforcing and amplifying them, and removing (to my own satisfaction, at least) all possibility of doubt that the Modernist movement was expressly predicted in Scripture, and its end foretold. We are clearly, to my mind, working up to that end now. Space, however, is limited, and my title also limits me to talk only of the Philosophic *Basis* of Modernism. I have tried, therefore, to show what I conceive a " philosophic basis " to be : I regard it as being the *frame of mind* which gives its character and shape to a philosophy.

In the case of Modernism, the characteristic frame of mind is one of hostility to all ideas of Divine Interventions. It finds its expression in various phrases, a popular one being that " the present is the key to the past." I have traced the rise and extension of this idea, starting from appeal to real or supposed uniformity in " present " times, and extending its real or supposed applications further and further into the " past," by successive stages of denial represented by Hume, Lyell, and Darwin ; until we find, in the mouths of the successors of Darwin, a dogma of uniformity pushed to the very beginning of creation itself.

I try to show how this identical dogma of uniformity, in its latest and perfected form, is expressly foretold in Scripture as a characteristic of scoffers at Christian doctrine, who shall appear in the "last days." There we find it clearly indicated that "present" events—the events of a recent historic period ("since the Fathers fell asleep")—are to be used as a gauge for measuring all "past" events, back even to the very "beginning of the Creation," to the entire exclusion of all belief in Divine Interventions subsequent to that beginning.

This summary, put into the prophesied scoffers' mouths, perfectly expresses the present Modernist "frame of mind"—the philosophic basis of up-to-date Modernism—by translating it into a quasi-scientific postulate, which underlies all Modernist teaching to-day. A postulate so completely excluding all ideas of Divine Interventions is not, I think, necessarily fatal to other religions; but it is certainly fatal to Christianity, which is essentially (as I have tried to show) a system of belief in a series of Divine Interventions representing the *Acts of God for our Salvation*. It is a matter of fact, which anyone can verify for himself,* that advanced (*i.e.* consistent) Modernists actually do reject belief in every one of those Interventions. We have seen in particular how they reject the doctrine of the Second Advent and the story of the Flood, both of which are instanced by St. Peter as true beliefs destined to be discarded, in the last days, by people who will accept this misleading postulate.

It will, I hope, serve a good purpose if we clarify our ideas as to the nature of Modernism.† It may serve a still better purpose

* "The Modernist," says Mr. Pryke, "believes in neither a descent, an ascension, nor a return of Christ" (*The Modern Churchman*, Sept., 1925, pp. 346-7). "None of the doctrines of Fall of Man and Atonement and Heaven and Hell . . . are credible to-day" (p. 359); "no doctrine of everlasting punishment can ever hold place in the Modernist creed" (p. 348); any "reference to the Flood" is "clearly legendary" (p. 337); "belief in the resurrection of a physical body is jettisoned by the Modernist" (p. 346); "he looks for no visible return of Jesus upon the clouds" (p. 347); "no instructed Christian still looks for a return of his Master" (p. 343).

† We will then know exactly what to expect of it *when consistently applied*. By its very essence, Modernism is a system of unbelief opposed to Christian belief. It is based upon a "frame of mind" which expresses itself in terms of a *dogma of uniformity* which excludes all idea of Divine Interventions, and so inevitably opposes acceptance of every essential of CHRISTIAN faith.

—confirm us in resisting Modernism—if we, as Christians, realize that Modernism was foreseen and perfectly summed up, two millenniums ago, in that wonderful Book which tells us of the Acts of God for our Redemption. It is a characteristic of the Word of God that it dissects its enemies and judges its judges. May we, in gratitude to the Spirit who foresaw this great present apostasy and directly warned us against it, remember that warning, and remember also the injunction towards the close of the passage containing it:—

“Ye therefore, beloved, seeing ye know these things before, beware lest ye also, being led away with the delusion* of the wicked, fall from your own stedfastness.” (2 Pet. iii, 17.)

DISCUSSION.

Rev. CHARLES GARDNER (the Chairman) thanked Colonel Davies for his paper, which he thought he might call “militant,” as was fitting from a soldier. The paper had the great merit of making the issues clear. Modernists so often used the same language as orthodox Christians to express another meaning. Christianity involved the belief of God’s intervention or intrusion into history. Intervention necessitates the supernatural and the miraculous. Give up God’s intervention, and little would remain of Christianity beyond the Sermon on the Mount.

Yet there is a gold thread running through the fabric of Modernism. It was in its beginning a reaction and protest against

* The Greek word here (*planē*) is the same as that used by Paul, when he prophesies that, because men in the last days will not receive the love of The Truth, that they might be Saved, “God shall send them strong delusion, that they should believe The Lie: that they all might be Judged who believed not The Truth, but had pleasure in unrighteousness” (2 Thess. ii, 11–12). I have no space to prove it here, but have shown elsewhere (*The Significance of Modernism*, Marshall Bros., 1927, pp. 17–27, etc.), that “The Truth” is, in Scripture, a technical expression for the Gospel of Salvation; and “The Lie” is a technical expression for the denial of the Second Death, the everlasting Lake of Fire, or Judgment to come. The old Lie of the Serpent, “Ye shall not surely die,” together with his old promise “Ye shall be as gods!” are both inherent in Modernism (as represented by the dogma of *Continuity*); and men fall to the combination to-day, just as our first mother fell to it in Eden.

a one-sided Christianity, which spoke as if God had made an exclusive revelation to Israel, and left the rest of the world in darkness. Modernism found in the deepest utterance of men of all nations the Voice of God. Christianity was but a still deeper utterance of the same Voice. It regarded revelation as a matter of experience rather than statement. In the older and stronger theology, God's diverse modes of revelation were recognized. To us Christians Christ is the full revelation of God, not only by His words, but by His actions and miracles.

Again, Christians often used to make the spiritual world appear arbitrary. In the nineteenth century the scientists, with their increased study of Nature, discovered everywhere the working of Law, and proclaimed its sovereignty. Gradually, men began to see that Law ruled in the spiritual world, and in the realm of morals.

Yet, after all is said of the sovereignty of Law, it must not be forgotten that Law is an abstraction. It involves a Law-giver. God is behind His laws. Deny the supernatural and miraculous, and you imprison God in Law: affirm them, and you affirm the free will and liberty of God.

Mr. Gardner added that there was just one question he would like to ask the lecturer. He said in his paper that Peter had declared that Jesus was none other than the Incarnate Son of God. Now, it is true that Peter said, in St. Matthew's Gospel, "Thou art the Christ the Son of the Living God." But in St. Mark's Gospel, which is usually considered the older, Peter says only "Thou art the Christ." A Modernist would say that Peter confessed the Messiahship of Jesus, but not that He was the Incarnate Son of God. What would Colonel Davies say?

Rev. H. C. MORTON, Ph.D., said: I have followed with the greatest interest Colonel Davies' paper, which is full of valuable things. But I am not at all certain that the wild variety of beliefs, which goes under the title of Modernism, is worthy of being credited with a philosophic basis; and, if we are going to seek for the affinities of Modernism with the permanent forms of philosophic thought, then my impression is that its affinities are with two philosophies, which are inconsistent with one another.

Colonel Davies has stressed the one, namely, the theory of Continuity, which is distinctly philosophic and not scientific, and

he has stressed the frame of mind which is induced by the idea of Continuity. But another frame of mind which is almost universal among Modernists is Subjectivity. They dislike the appeal to definite *fact*. They have no certainty as to what *truth* is. What is truth for me may not be truth for you. Truth must evince its verity to each individual by taking possession of that individual's mind. In keeping with this the real Modernist doctrine of the New Testament is not that it is the Word of God, but that it is the statement of the *experience* of the Christians of the first century ; and for themselves the Modernists are asserting upon all hands that the only truth they can be certain about is the truth of their own personal experience. This makes all truth relative to the individual.

Is there any basis for this Subjectivism ? Has it any warrant in any of the ultimate forms of philosophic thought ? These ultimate forms are four, and only four. All forms of philosophy can be classed under one or other of these four, viz., Materialism, Idealism, Scepticism, and Realism. Now Modernism has a distinct affinity with Kant's Ideal Dualism. The general assumption of Idealism is that our knowledge is only knowledge of subjective states. But Kant admitted the existence of the external object of Perception, though of that " thing in itself " we know nothing, and are only concerned with the impression which that external thing makes upon our own mind. In that philosophy there is an evident basis for, or at all events an affinity with, the Subjectivity of Modernism.

But are these two philosophic bases, namely, Uniformity and Ideal Dualism, consistent with each other ? The answer is an emphatic negative. Continuity assumes a real and unchangeable world of material things outside of, and capable of being definitely known to, ourselves. Idealism assumes that it is possible only to know the impression made upon the changing human mind by some external thing, which it is impossible to know in itself. The scientist must be a Realist, just as certainly as the Christian must be a Realist ; and it is upon this fact that the underlying sympathy between true science and the Christian Faith chiefly rests ; and the confusions of Modernism are well illustrated and in some measure accounted for by its two philosophic bases, and its affinities with such irreconcilable philosophies as Realism and Idealism.

Mr. W. E. LESLIE said : An investigation of the essential basis of Modernism has utility in these days, when it is so often disputed whether this or that person is, or is not, a Modernist. Unfortunately, the characteristics which Colonel Davies has ascribed to Modernism are not peculiar to that school. "Presuppositions" are common to all philosophies. The author himself is a firm believer in the doctrine of the "continuity of nature." If he planted an acorn he would be astonished to reap a geranium ! We cannot say that all Modernists deny all miracles, for every one knows that some Modernists admit some miracles.

Our difficulties are not diminished when we meet a writer who advances inconsistent views, for we have then to determine whether he is an inconsistent Modernist or an inconsistent Evangelical. The suggestion that a man can be partly a Christian is unfortunate. A man is either dead in trespasses and sins, or he has eternal life.

While Colonel Davies has failed to indicate any radical distinction between Modernism and Evangelical belief, it is difficult to believe that the difference is only a matter of degree. Perhaps the solution lies in the concept of objective and subjective revelation referred to by the Chairman. Here, too, is the distinction (not mentioned by the author) between the Modernist and Agnostics and others who admit no Revelation of any kind.

Mr. W. HOSTE said : I am glad to be in entire accord with all that is essential to the author's findings. As he says, the basis of Modernism seems to be "a frame of mind." This is with difficulty distinguished from "obscurantism," for it refuses to admit that there are some things in heaven and earth outside its philosophy. One is reminded of the Negro chief who laughed at a man who said it was possible in his country to walk on solid water ; to him it was unthinkable and so impossible. He was a Modernist. It is also, of course, true that Modernism, like certain mental afflictions (*e.g.* hallucinations, sane or insane) can affect a man in "patches." If a "hall-mark" were demanded by which the true brand of Modernism might be distinguished, I would suggest some points of unbelief—a denial of the fall, atonement, plenary inspiration of the Scriptures and "eternal judgment." These are out of harmony

with the modern mind and must be deleted ; one wonders they have not deleted *death* too !

There is one point, a secondary one, where I cannot quite follow the lecturer, that is, his use of the 2 Pet. iii passage—" all things continue as they were from the beginning of the Creation," as directly embodying the modern doctrine of Continuity. It seems to me that it is rather a denial of any future disturbance of the civilized order of things, as would arise from the coming of the Lord, based on the assertion that such a disturbance has never taken place, since the fathers (*i.e.* the early patriarchs) " fell asleep." The word for " continue " (*diamenō*) does not express the thought of a continual development, but as Grimm puts it, of things remaining permanently as they were. I hardly think scientists to-day have got far enough to be taken up with the Coming of the Lord, and therefore such would not be specially in view here. But in the religious world few things are more openly scouted than the idea of a personal return of Christ.

There is one other minor point : on p. 198, where the author has been speaking of the day of Pentecost, he adds " three thousand were converted at the sight." Strictly speaking, this took place only *at the preaching of the Word by Peter*. This is not without importance in these days, when there is a great thirst for the miraculous, and mushroom sects are bidding high for the suffrages of the religiously inclined by promising miraculous displays of tongues and healings. We cannot pretend to work miracles at will, but we can preach the Gospel. I think the contention of the Chairman, not out of harmony with the paper, as to God's care for all His creatures, to be important. God has not left Himself without a witness in any era or clime. He did not choose Israel to the *exclusion* of other nations, but to enjoy " a most-favoured nation clause " : " above all other people, for all the earth is Mine " (Exod. ii, 5). Also those who have never heard the Gospel will be judged on righteous principles, without prejudice to the fact that there is only one ground of salvation, the death and resurrection of our Lord Jesus Christ, according to the light they have had from the works of creation or the workings of conscience, which render them " without excuse."

Lieut.-Col. T. C. SKINNER said : The teachings of Modernism are

subversive of Christianity. And yet side by side with their subversive teaching we have the singular fact that many Modernists, if indeed not all, have a devotion to the Person of Christ that is unquestionably real ; they love the same Lord as we do, though, with strange inconsistency, they refuse to believe what He says. It is an attitude I find it quite impossible to explain ; yet there it is, and, paradoxically enough, their very inconsistency would seem to be their saving grace.

We have, as it seems to me, to recognize the fact that these men are more often misled than wilfully misleading, and we have somehow got to find a way of winning them back to the truth.

A question has been asked, "How are we to tell a Modernist when we see him?" Perhaps the only safe test is in the fruit-bearing. Modernism immobilizes the Gospel, and works havoc in the Mission field ; but, between the honest doubter, who, like Peter and his fellow-apostles, is groping his way towards the light, and the evil-worker who leads men away from the light into the outer darkness of unbelief, there is a gulf which we would do well to consider.

Mr. PERCY O. RUOFF said : Some references have been made to Darwin and Evolution. In future discussions, it will be well to have regard to the very remarkable facts cited in a recent paper by Dr. Rendle Short from Dr. Leo Berg's book *Nomogenesis*, otherwise a just accusation may be made of "flogging a dead horse."

The lecture seems to be based on a saying of Le Roy's that "every philosophy presents itself in its initial stage as an attitude, a frame of mind, a method." It is to be observed that the governing words in the sentence are "*in its initial stage.*" Le Roy does not say that every philosophy is an attitude, etc. The lecturer proceeds to a false deduction which interprets a philosophy as a prejudice, and gives a definition in accordance with prejudice by using the words "a method which *suits* a certain type of mind."

The references to Canon Storr's lecture on "Revelation" do not appear to be quite fair. Colonel Davies says that Canon Storr's presuppositions "must have been of a nature altogether hostile to the acceptance of any testimony to an objective Revelation of His will on the part of the Almighty." But Canon Storr affirmed

in the lecture his belief in predictive prophecy, which must to some extent involve an objective revelation. I joined in the protest against Canon Storr's lecture, but on other grounds.

What does the lecturer mean, on p. 196, by the words "disinherits the Serpent"? What inheritance had the Serpent? And again, what authority is there for saying "In Him (Christ) the Father can look upon the race of Adam, and see it perfect, and only *as perfect* can eternal life be granted to it"? I cannot discover either any such words or ideas as these in the Scriptures. On the contrary, instead of being perfect, all men are referred to as "dead in trespasses and sins." Life and perfection are in the Son of God, and not in the race of Adam—in Him (Christ), any of the race can by means of faith in Christ obtain eternal life and perfection.

In the footnote on p. 196, the doctrine of a "*completed payment*" is referred to. It has often been pointed out that such terms are objectionable, because they involve the idea of debtor and creditor, and it is doubtful if the doctrine of the Atonement is ever presented thus in the Scriptures. It seems incongruous to refer to Peter (p. 197) at Cæsarea Philippi as "still very largely a Modernist." This is a pure abuse of language, and nobody reading the record referred to would suppose that Peter remained for a single moment a so-called "Modernist" after the Lord's rebuke. There is at least no evidence that he did.

THE LECTURER'S REPLY.

The Chairman asks how I would defend my statement, to a Modernist, that Peter confessed that Jesus was the Incarnate Son of God. Apparently I must not avail myself of Matthew's Gospel. Well, I would, in that case, point out that the very word "Christ" implied, to the Jews of our Lord's day, "Son of God." It was not, to them, a mere surname, or just a generalized term for any anointed person. Thus, Ps. ii shows that the "Christ" was both King and Son of God. Ps. xlv shows that the "Christ" was God, anointed by God, and Heir to an everlasting throne. Hence we constantly find the term "Christ" used in the New Testament *in apposition to the expression "Son of God,"* which was

clearly its recognized equivalent.* Our Lord was crucified for the supposed blasphemy of declaring Himself to be "THE Christ, THE Son of God."† So clearly is it recognized that Deity is implicit in the very term "Christ," that John says that the characteristic of the Antichrist is the denial that "Jesus CHRIST is come in the flesh" (1 John iv, 2, 3). Now, "Jesus" being a Jewish name in common use, it seems clear that (in order to make sense of the passage) a declaration of Deity lay in the very word "Christ." To deny that CHRIST is come in the flesh was manifestly equivalent to denying that GOD is come in the flesh. This denial of His humanity, however, which might arise after His Ascension, could not (on the Modernists' own showing) have taken shape when Peter made his avowal. Nobody then doubted that the Jesus, who lived, ate, slept, and shared all the innocent weaknesses of the flesh before their eyes, was truly *man*. To call Him "CHRIST" to His face, therefore, could only mean, to those present, an avowal that He was the *Incarnate Son of God*.‡

The Chairman claims a thread of gold in Modernism. But this thread certainly did not manifest itself "at least 300 years" ago,

* John (who was probably present) quotes Peter as calling Jesus "THAT Christ, the Son of the Living God" (John vi, 29). We should remember that Mark's Gospel probably represents *Peter's own version*, and so passes lightly over things to Peter's credit, while emphasizing his failings. Thus, not only is Peter's bold admission here cut down to its simplest terms, but our Lord's warm commendation of it is entirely omitted; while Peter's soon-following fault, and its stern rebuke, are given without sparing him. Similarly, Mark withholds Peter's name, as being that of the only disciple who dared to draw sword in his Master's defence in the Garden; but gives his subsequent denials of our Lord in fuller detail (three denials before *two* crowings of the cock) than we find in any other Gospel (*cf.* Mark ix, 28-30 and 31-33; also xiv, 47 and 29-31, 66-72).

† Mark himself (Peter being here in the background) quotes the High Priest's words as being "THE Christ, THE Son of the Blessed"; the context showing that "the Blessed" meant God. Mark could hardly have recognized two "THE" Christs in his Gospel, especially when the same Individual is addressed in each case.

‡ When, too, and by whom, can the Modernist suppose that Jesus was *anointed*? For He was never officially anointed on earth. For a JEW to call Him "THE" Anointed, therefore, inevitably refers one to the Old Testament, to the Son of God, anointed in Heaven before any New Testament man was born.

when, as he himself shows,* the "Modern Mind" came into existence. It manifested itself in the 19th century, in the form of the (then quite new) study of comparative religions; the object being to prove that Christianity was not a thing apart from Paganism. I doubt if this movement is really commendable by us, although it excuses its existence by pointing to a fact, never questioned by Christians, that God has given lesser revelations to other nations, which they have corrupted out of sight (Rom. i, 21-32).† This recent movement seems to be simply part and parcel of the general Modernist system. If God has never Interfered, then the differences between Christianity and Paganism can only be matters of degree, not of kind. This proposition, I fear, is not a thread of gold, or anything like gold. Nor is it a basis of Modernism. It is a late sprig from the dogma of CONTINUITY.

Dr. Morton points to the wild vagaries of Modernism, and the many philosophies represented by its advocates. All that he says is true. One can, if one likes, legitimately distinguish many philosophies in Modernism, as represented by the various schools of thought contained within the same. But when one considers the elements *common* to all, and upon which all are ultimately founded, one finds that the frame of mind to which I devote my paper lies *at the back of all* and is presupposed by all. For *all* forms of Modernism postulate the non-Interventions of God. All would become untenable if those Interventions were allowed. (Thus, if

* See his Address entitled "The Philosophy of Modernism" (*Trans. Vict. Inst.*, lvi, p. 258). I read this paper after writing my own, and was interested to find how often it seemed to bear me out. The Chairman there shows how the "Modern Mind" rejects supernaturalism; how this rejection is common to Determinist, Pragmatist, and even to Dean Inge, whom the Chairman can only compare to Augustine "*before he became a Christian*" (p. 271; the italics are mine). The whole of the Chairman's most interesting and able paper deals with successive schools of thought, all of which accept that *bias against the Supernatural* which he himself spontaneously calls "the time-spirit—the spirit of the age"; whose equivalent is belief in "a uniform nature" (p. 268, etc.). The Chairman takes a narrower view of the term "Modernist" than I do; but he has only to take it, as I do, as meaning one possessed of "the modern mind, the time-spirit, the spirit of the age," as described by himself, to find his own paper anticipating mine in almost every particular—except that I show how the rise of this "Modern Mind" was *foretold in the Bible*.

† Until John could declare that the whole world, outside of Christianity, "lieth in the Evil One" (Gr. *ponēros*, 1 John v, 19).

we grant the Interventions of God, then God, who knows all things, can doubtless shape His message to give the right impression to the minds receiving it. Hence Idealism is discredited at once.) Every one of these philosophies also *obtains its prestige* from its supposed *support by science* in denying those interventions. And we find that the denial of those interventions is the admitted characteristic of the "Modern Mind," as claimed by *all* schools of Modernism. So we find that the dogma of CONTINUITY, foretold by Peter, lies at the roots of the whole Modernist system, on the testimony of Modernists themselves. Determinist may be succeeded by Pragmatist, Realist by Idealist, older Psychologist by later Behaviourist; but these are simply related to each other as trunk to branches, or greater branches to lesser ones. Peter laid his axe at the roots of the whole. (By the way, I do not "stress the frame of mind which is induced by the idea of Continuity," but the other way about. The dogma either arises from, or is accepted as suiting, the frame of mind; and the frame of mind is a matter of the HEART.)*

Mr. Leslie's objections imply: (1) that "presuppositions" are not worth noticing, since they are "common to all philosophies"; (2) that a characteristic error cannot take the form of an *illegitimate generalization*; (3) that there is no "radical distinction" between belief in God's interventions and flat denial of the same; and (4) that the "Modernist" who talks of "subjective" Revelation (*i.e.* does not believe in a literal Virgin Birth, Resurrection, etc.) is better than "Agnostics and others," who also do not believe, but say so in plainer terms.

All of these propositions are obviously untenable. Mr. Leslie does not think that a man can be partly a Christian; by *my* definition of a Christian, he *can be*. If Mr. Leslie thinks that people who deny the fundamental truths of the Gospel are not dead in

* "My son," says Scripture, "give me thine *heart*" (Prov. xxiii, 26). "With the *heart* man believeth" (Rom. x, 10). The "strong delusion" of Continuity is sent upon the men of the last days because they "received not the *love* of The Truth, that they might be saved" (2 Thess. ii, 10-12). The Gospel being a story of Divine Interventions, the *heart* that rejects it exhibits a *frame of mind* which welcomes a *dogma of continuity* excluding all idea of Divine interventions.

trespasses and sins, I do not agree. It is by faith that we are saved, not by Modernist unfaith.

Mr. Hoste offers a valid criticism. He shows how my statement, that the 3,000 at Pentecost were converted "at the sight" of the miracle, might be taken to mean that I denied the effect of Peter's speech in securing that conversion. My words were never intended to deny that Peter's sermon afforded the "hearing" by which "faith" came to the 3,000 (Rom. x, 17). I was treating of the evidences of Interventions; and my words meant that the 3,000 would never forget the obvious miracle which forced their attention to the Word of the Cross, in which they found eternal life.

Mr. Hoste's criticism, however, of my appeal to the prophecy of 2 Pet. iii, is not so well justified. It is not necessary that *diamenô* should suggest the idea of development *apart from the context*. It is the *context* which makes it imply development, since "Continuity" is postulated from the very beginning of Creation itself, thus ruling out literal creation. The Greek word *diamenô* (always either rendered "continue"* in the New Testament, or else "remain"† in the sense of continuance) is not only the exact equivalent of our English word "continue," but is here used by Peter's scoffers in the exact way that geologists and biologists quote the dogma of Continuity to-day, in order to *deny Creation* and preach *Evolution*. Compare the first two quotations at the head of my paper, and also my remarks (text and footnote) on p. 205, etc.‡ I know what I am talking about when discussing the theoretical foundation of modern geological§ speculation. Nor

* Luke xxii, 28; Gal. ii, 5.

† Luke i, 22; Heb. i, 11.

‡ I try to show that the supposed "continuance" is of the laws and processes of nature, which are regarded as being inviolable by Divine Interventions. The idea is, that the changing face of nature evolves under the influence of unchanging law, without a break in the uniform operations of the latter. Hence the dogma of UNIFORMITY (or Continuity) "*postulates Evolution*," as Huxley said, although Uniformity is not itself Evolution.

§ According to a first-rate authority, K. A. Zittel, the dogma of Uniformity (or Continuity) is the "basis of all modern geological investigation" (*History of Geology and Palæontology*, p. 197). Even Le Roy, as a philosopher, traces the modern belief in Evolution to the modern bias in favour of CONTINUITY (*op. cit.*, pp. 202-3).

can one dissociate religious Modernists from scientific ones.* No consistent believer in the dogma of Continuity can possibly advocate belief in the Second Advent. And deniers of that Advent, as Dr. Major shows, found their denials upon the supposed truth of evolution. Everything goes back to the dogma of CONTINUITY.

Colonel Skinner declares that Modernists often combine Christian beliefs with Modernist unbeliefs. The inconsistency of many Modernists is repeatedly stressed by me. I also make a particular study of the "fruits" of Modernism, tracing everything back to the fundamental dogma at the roots of the whole; and showing that the rise of this dogma into its present perfected form, together with certain of its characteristic "fruits," was expressly foretold in Scripture as the peculiar mark of scoffers in the "last days." I could far more reasonably apply the term "Christian" to a consistent Mohammedan than to a consistent Modernist.† No one desires the conversion of Modernists more fervently than I do; but Colonel Skinner will agree that conversion will not be forwarded by people who have no clear view of the dire *need* of the Modernist to be converted.

Mr. Percy Ruoff suggests that my remarks about Darwin were "flogging a dead horse" in view of Dr. Rendle Short's recent references to L. S. Berg's *Nomogenesis*. But how can anything, that Berg or anyone else has said, affect the unquestionable fact, which I point out in this paper, that Darwin applied the principle of Hume to organic studies, and thereby set the fashion to all successors, whether they all accept Darwin's "Selection" ideas or not?

Mr. Ruoff also suggests that Le Roy taught that the "attitude," "frame of mind," and "method" of a philosopher are continually

* Note that the scoffers are not *only* denying the Second Coming. They expressly carry their denials back to the very "beginning of the Creation"; and Peter shows that they are thereby *denying the Flood*, just as Uniformitarians are denying it to-day.

† Thus the Mohammedan admits many most important things which the Modernist flatly denies, *e.g.* that the Bible, as first received, was literally Inspired; that our Lord was born of a Virgin, physically rose from the Grave, ascended into Heaven, and will return again to destroy the *Dhajaal* (Antichrist). For a finished Modernist clergyman to officiate at the Communion is a more shocking blasphemy even than it would be for a Mohammedan Mullah to officiate at it.

changing. He had better get Le Roy's book and read it. Meanwhile, I would point out that although I never seriously supposed that anyone could imagine such an absurdity, I regarded Le Roy's wording as defective, and deliberately made my own definition "fool-proof" by talking of a "BASIS" instead of an "initial stage" (p. 192 and footnote).

Mr. Ruoff doubts "if the doctrine of Atonement is ever presented in Scripture" so as to "involve the idea of debtor and creditor." I would invite him to look up Matt. vi, 12; xviii, 23-35; xx, 28; Mark x, 45; Luke vii, 41-48; Acts xx, 28; 1 Cor. vi, 20; vii, 23; Eph. i, 7, 14; 1 Tim. ii, 6; 1 Pet. i, 18-19; 2 Pet. ii, 1; Rev. v, 9—as samples of passages which show him to be wrong.

I was not unfair to Canon Storr. I charged him only with doing what he himself openly avowed. To argue that he believes in "predictive prophecy" only emphasizes his inconsistency. I do not, as Mr. Ruoff asserts, indulge in "a pure abuse of language" by suggesting that Peter did not accept our Lord's rebuke. I never even discuss how he took that rebuke. I talk of Peter's action *before* that rebuke, as anyone can see from my words on p. 197. And since our Lord called Peter "Satan" for doing the very thing for which I call him "still very largely a Modernist," how does Mr. Ruoff propose to characterize our Lord's language, if he waxes so indignant over mine?

723RD ORDINARY GENERAL MEETING,
HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, APRIL 22ND, 1929,
AT 4.30 P.M.

DR. JAMES W. THIRTLE, M.R.A.S., IN THE CHAIR.

The CHAIRMAN began the proceedings by announcing the tidings just received, that the author of the paper about to be read, Dr. A. T. Schofield, so long an Associate Member and a Vice-President of the Society, had passed away. Those present stood in their places as a sign of respect to the departed. Later, a Motion already passed at the previous Council Meeting, expressing condolence with the family of the late Dr. Schofield, was read to the Meeting by the Chairman, and adopted unanimously by those present.

Resolution :—

“That this Meeting of the Council of the Victoria Institute learns with profound sorrow of the death, which took place on Saturday, April 20th, of Dr. Alfred Taylor Schofield, Vice-President of the Institute, and for the period of thirty-eight years an Associate Member. In the course of the years, Dr. Schofield served the interests of the Institute in many ways, reading papers which were accorded hearty appreciation by the Membership as a body. In these circumstances the Council expresses heartfelt sympathy with the family and friends of the lamented Vice-President.”

The Minutes of the previous Meeting were then read, confirmed, and signed, and the HON. SECRETARY announced the Election of the following :—As a Member: Dudley B. Toye, Esq., O.B.E., LL.D.; and as Associates: Howard Wilkins Wright, Esq., and Eliot Cecil Curwen, Esq., M.A., M.B., M.R.C.S., L.R.C.P.

Lieut.-Col. HOPE BIDDULPH, D.S.O., read the paper on “Humanity.”

HUMANITY.

By ALFRED T. SCHOFIELD, Esq., M.D.

AS a humble member of the largest hospital in the country—the London Hospital—I cannot but begin this paper with our venerable motto, so well known over the whole world—

“HOMO SUM : HUMANI NIHIL A ME ALIENUM PUTO.”

I am fully alive to the immensity and importance of my subject, and its enormous scope daunts me. To write comprehensively of Humanity would require a book, very large, fat, and in small print, to do it even scant justice. I have therefore determined to confine myself in the pages at my disposal, very rigorously to considering my subject under the three heads

enumerated by the great Apostle in 1 Thess. v, 23, as *τὸ πνεῦμα, καὶ ἡ ψυχὴ, καὶ τὸ σῶμα*.

To keep within the scope of the pages allotted me, I may only consider each of these under one single head. (1) With regard to the *spirit*, I will consider it as relative and not absolute; (2) with regard to the *soul* (or mind), I will view it as homologous, and not heterologous; (3) as to the *body*, I will show it as created, and not evolved in the sense used by Darwin, and revived to-day. These three selections are by no means arbitrary; but to me, at any rate, they are vital, essential, and fundamental. I trust that, as I proceed, I shall succeed in proving this to some at least of my audience. I will therefore commence with—

(1) THE SPIRIT: RELATIVE AND NOT ABSOLUTE.

I may remark that in using the word "relative" I do not forget the delightful paper on "Relativity and Reality" we had nearly a year ago from our President, Professor Fleming.* My present remarks in no way touch upon that paper. As a fact, the subject of Relativity is sufficiently large to form the topic of many papers.

I must remember whom I am addressing at the present time. I presume that an overwhelming number of my audience belong to the Institute as Members or Associates, and therefore I am not speaking to an ordinary audience. In the objects of the Institute, to which the majority of my hearers have subscribed, I read that we combine "in humble faith in one Eternal God, to combat the unbelief now prevalent." I think I am right in saying that such an object is not generally found in literary societies: it defines at once the relative position of this Institute to the Eternal God; in other words, that of Humanity to Divinity, or the Relative to the Absolute.

I think we should be unwise to dismiss these views as unimportant or irrelevant, and especially in this year of 1929. During the last fifty years or less Relativity has risen to an extraordinary importance, owing to the wonderful discoveries of Albert Einstein. These, as we know, are in the physical sphere, but we cannot deny that they increase in every sphere

* Now "Sir Ambrose," in recognition of his remarkable discoveries. We are all glad that public acknowledgment should have been made of his distinguished work in wireless electricity; although it may be a question to some of us if the old title of Professor is not the better one to use. At any rate, with the President's permission, it is the one which I shall continue to employ in this paper.

the importance of insisting on the Relative. It is true that the Victoria Institute is concerned with its spiritual relations only ; but, nevertheless, I consider it is a remarkable feature that it insists on every Member and Associate being up to date as to the relation of the Relative to the Absolute.

May I point out also that my subject, "Humanity," is undergoing a most searching and critical examination, on the physical and mental sides by Professor Sir Arthur Keith and his colleagues, and on the spiritual side by our theological teachers at Oxford and Cambridge, and other Modernist centres of learning. Is it not true, and rather remarkable, that while mentally and physically Sir Arthur Keith and his friends are seeking to lower, and even extinguish, *Homo sapiens* as of a "human" stock, in distinction to one merely "animal"; on the other hand, Modernist teaching, which incidentally dates from Nicodemus, tends to destroy the Relative, and in effect seeks to raise Humanity in the direction of the Absolute ?

A well-known clergyman lately begged me to study a book he lent me, of which the opening sentence was "The first man was not Adam, but God." But does not this, while lowering Divinity to Humanity, at the same time elevate Humanity to Divinity, and raise the Relative to the Absolute ? We cannot but note, in passing, this two-fold movement in Modernism : the denial of, or at least professed uncertainty as to, the Deity of Christ, and even as to a Deity at all, and the asserted certainty that man is not merely captain of his own soul, but that he needs no other captain.

Having emphasized enough, if not more than enough, the remarkably up-to-date position that the Victoria Institute holds with regard to the true relativity of Humanity to Divinity, I would remark that from another point of view the question is one that cannot be avoided. Freethinkers as a body were much to the fore fifty years ago, with their demand of an "open mind" on everything. Now, in their fullest meaning, neither one nor the other is possible to a relative Humanity ; only in asylums can such a belief be found. Where reason understands its seat, Humanity is aware that the Relative implies a certain loss of freedom, and that it is clear that the mind cannot be "open" on that which is already settled.

My own feeling is that the cause of the trend toward ignoring all spiritual relativity is this very desire to place Humanity in a more Absolute position, and thus to free it from the fetters

that have so long curtailed its full liberty. From such fetters the Victoria Institute shows no desire to be free.

Turning from the spiritual to the mental, from the spirit to the soul, we reach the second division of our subject.

(2) THE SOUL : HOMOLOGOUS AND NOT HETEROLOGOUS.

I must pause here to apologize for these awkward words of four and five syllables. I have no desire to be pedantic, but I really think it impossible to find simpler and more comprehensive words with which to express my meaning. These words represent a soul-truth so fundamental and important that it will be well worth endeavouring to secure a clear idea of their force and meaning. Quite possibly in the Discussion someone may be able to suggest more acceptable words for the truth I am about to expound. For the present, *homo* brings the meaning of likeness, and *hetero*, on the contrary, signifies unlikeness, or difference—Greek words, both of them.

Before dwelling on this, I must turn aside to the question of mind itself. I have been much surprised to find that, in spite of stout scientific opposition, Sir Arthur Keith is once again reviving the old idea of the 'sixties so persistently enforced by Haeckel—of Monism. In early days at Harley Street I had to fight the idea of Monists, that thought was neither more nor less than a secretion of the brain, just as bile is of the liver. Haeckel was the authority at that time. My warmest supporter was Sir James Crichton Browne, and I think we both thought that the mind was as the player to the piano, and in no sense was it the instrument itself, or any derivation of it.

I would insist on this, not merely on behalf of Humanity, but of the whole of the animal creation ; for I think none would deny that all animals have the elements of a soul or mind, as well as of a body ; and I think that, until Sir Arthur Keith's recent attempts, it was pretty generally agreed that this mind was in no sense physical, nor any derivation therefrom.

For our present purposes we may regard the soul as non-physical ; though the question is not directly before us. The question of the homologous and the heterologous is another one altogether, and is at once, as regards soul, the true distinction between the merely animal and the human. My audience will not object to my referring as proof of this to Gen. ii, 7 : " And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life ; and man became a living

soul." Surely we have here absolute proof of the Divine origin of the human soul, thus distinguishing it by an impassable gulf from that of all other animals. This "inbreathing" into the soul of Humanity suffices to make it homologous, or capable of understanding (in part) the Divine, of which no heterologous soul can have any perception. Here indeed we see the fundamental importance of these two words. We must observe that this is no question of Christianity or New-Testament teaching, but is as old as the Bible itself, and constitutes the essential validity of the doctrine that Humanity is a new order, entirely distinct from a merely animal life.

This distinction, be it noted, is not due to the formation of the body, but rather to the Divine inbreathing in the creation of man and of man alone. Two effects follow:—All, so inbreathed, have a soul that exists for ever, as is abundantly shown throughout Holy Scripture, although Scripture never refers eternal life to the soul distinctively, but solely to the spirit when born again (John iii, 36). The other effect is that every soul so inbreathed has a capacity possessed by no animal, however gifted, of understanding a good deal about God and His Word, sufficient, indeed, to accept or reject the message of salvation. This, I repeat, is entirely due to the soul of humanity being homologous with the Divine, that is, capable of understanding (in part) that which is above it.

(3) THE BODY: CREATED NOT EVOLVED.

We now reach our third and last division of Humanity—the body. Of this we have stated that it is created, and not evolved in the sense used by Darwin and revived to-day by Sir Arthur Keith and others. In corroboration of this I find, in a remarkably able paper by Dr. Rendle Short on "Some Recent Literature Concerning the Origin of Species," these words in the "Conclusion" (*supra*, p. 156):—

"Now, finally, how may the tentative conclusions of the biologists whose names we have mentioned lessen the difficulty of reconciling science and the Bible? First, and mostly, by showing that, instead of crying with Darwin 'All's Chance,' we must recognize that 'All's Law.' And Law demands a Law-giver. Since the marvellous adaptations found in Nature cannot be due to Chance, they must be due to Purpose. The theoretical systems will not work without a Creator."

In other words, the body is created by Purpose, not evolved by Chance. Before going further into the matter, let me point out that, whereas a true mind and a true spirit belong to Humanity alone, man shares his body with all creation : all animals have bodies, and the resemblances of the vast number of varieties is quite as well marked as are the differences. That man is descended directly from any animal, especially the ape, is entirely unproven, as Sir Arthur Keith himself shows. There can be no doubt that the body contains numberless resemblances to those of many animals, and at the same time it has unique points which are not shared by any. Perhaps I have said enough to make clear that, considering man's body as distinct from his mind and spirit, we are on totally different ground with regard to Humanity from any hitherto reached.

We must, however, keep to our point—that is, this body was created, not evolved. We shall find it necessary, however, to define what we mean by evolution. Darwin's Evolution is well defined, but the word "evolution" as generally used is exceedingly vague. My experience is that hardly any two people employ the word in exactly the same sense. The crucial point is : Do we consider evolution as a force, or merely as a method ? If the former, as Darwin believed and taught, we deny teleology, and hold that the world was, and is, being made by blind chance (without purpose) ; if the latter, we imply a Maker, a Creator ; and this latter view, in opposition to Sir Arthur Keith, Sir Oliver Lodge now holds.

That the world as it is should be automatically evolved by laws of pure chance seems so fundamentally unreasonable, that one cannot be surprised that the idea has been so widely rejected scientifically as a baseless and incredible theory. Its utter unreasonableness will be seen later on when we come to consider some special creations.

I will not now attempt to adduce theological evidence against it, for many who hold it most strongly do not believe in God at all. I will confine my remarks to scientific objections from scientists themselves. Haeckel, indeed, says : "Evolution is, and must ever remain, a fabric of hypotheses." A few years ago the President of the British Association said : "It is seventy-five years since Darwin wrote his *Origin of Species*, but with all our knowledge to-day we see as yet no origin of species, and for the first time we are in a position to discuss these things on a basis of fact, so that Evolution is more a faith than a knowledge."

Since then Professor Keith has made what is probably a last attempt to revive it here in the face of Professor Fleishmann, of Erlangen, who has devoted his life to the subject, and who declares: "Darwinism is certainly not the product of scientific investigation, but purely the product of imagination." The French Academy of Scientists officially announces: "The reason the doors of this Academy are shut to Darwin is this—that the man who indulged in so much supposition without proof is unworthy of the name of scientist." Can it be other than a hopeless task for Sir Arthur Keith to keep open the British door?

All the "lines of evidence" in support of Evolution have been in turn rejected by evolutionists themselves. The testimony of Rudiments was rejected by Huxley, in common with that of Embryology, rejected by Sedgwick, Morgan, Ballantyne, and Karl Vogt, who called it "absolutely and radically false." Depéret, himself a foremost authority, calls the famous ancestries of the horse "deceitful delusions."

Another insuperable difficulty is, to apply Evolution to the origin of man. Ontogeny used to be considered a sheet-anchor of proof in the history of the development of the embryo, but even Professor Keith now declares the arguments based on embryological resemblances to be invalid, while Bergson totally rejects the parallel, as also does Sedgwick in the *Encyclopædia Britannica*. Further, Professor Keith himself informs us that the missing-link theory is now generally given up! For man to have descended from the ape would require millions of years and a hundred links, and of such there is no reliable trace whatever.

That man cannot in any sense be the product of chance was shown with remarkable power by Professor Fleming in his paper on "Number in Nature," read before the Institute in December, 1927. From which I venture to make a brief quotation, premising that while all developing natal cells are at first alike in structure and nucleus:—

"The nucleus contains a material called chromatin . . . and this chromatin is arranged, at a certain stage of growth, in rod-like bodies called chromosomes. The remarkable thing is that the number of these chromosomes determines, or is determined by, the nature of the individual. There is one number, 48, characteristic of the cells of a human being; another number, 38, of an ox; another, 12, of a house-fly; and another, 24, of a lily. Thus an ox-cell can never produce a man or a fly-cell a lily." (*Transactions*, vol. lx, p. 21.)

That this can be a chance product, surpasses the bounds of reason to conceive. On the other hand, there is, I fear, little possibility to doubt that Darwin's Chance Laws were indirectly responsible for the horrors of the late War. Dr. Benjamin Kidd (*Science of Power*) most gravely charges that Darwin's bestial law of "survival of the fittest," developed into "might is right," was largely the cause of the War's atrocities. This law, indeed, had become the new gospel in Germany, while Christianity was declared to be the greatest enemy to progress Germany had ever had. Another great difficulty is the sudden appearance of fossils of myriads of new species, not preceded by the greatly desired intermediate types of which the strata are shamelessly deficient. All these new species seem perfect in every way, and show no traces of evolution; the species of insects alone number three-quarters of a million!

Consider for a moment Evolution as applied to insect-life, which seems, indeed, expressly designed to strike despair into a Darwinist's heart. It is certainly a terrible problem to discover how the "survival of the fittest" can cause a caterpillar, with numerous legs and complicated structure, suddenly to dissolve into a creamy mass of cells, all alike, and enclose itself into a horny chrysalis for weeks. Then, miracle of miracles! the grey slime has been transformed into the gauzy wings, gorgeous body, and long horny legs of a dragon-fly, or into the painted glories of a butterfly, or the polished scarabæus of a beetle. Reason absolutely refuses to grapple with such a problem. The instinct of these insects in the lines of evolution is just as insoluble as that of their formation.

Referring to this, *The Times* (June 9th, 1915) observed: "Battling for Evolution, scientists have torn it to pieces—nothing is left. Nothing on their own showing, save a few fragments strewn about the arena."

The word "Humanity" conjures up before us a magnificent vista, surpassed only by Divinity. In one way, I regret that I have confined myself to the three great points of which I have spoken; but, in another, as I realize that these are absolutely fundamental and are everywhere denied, I cannot but believe that it was my duty to bring before this select audience the best answers I could give to the scepticism of the day.

I trust that the noble subject of my paper may some day be taken up by a worthier pen. Meantime, my consolation is my sincere hope that I have succeeded in carrying my audience with me in the points of which I have spoken.

DISCUSSION.

Dr. THIRTLE, speaking from the Chair, said : In the progress of the lecture, as we have heard it read by Colonel Hope Biddulph, we cannot but have felt sincere regret for the absence of Dr. Schofield, through death, as notified at the opening of the meeting. From time to time our minds have gone back upon past years, and recalled occasions on which our absent friend has discoursed upon subjects of deep interest, once and again coming within close range of the very attractive theme that has engaged him to-day. Man in his origin and constitution, especially as regards his mental faculties and moral equipment, is a subject that for long years has occupied the mind of Dr. Schofield ; and when, in versatile fashion, he has dealt with the phenomena of mind, especially in relation to human well-being, he has uniformly commanded attention as the exponent of wholesome principles, expressive of forms of thought such as make for health of body and much beside.

Our lecture to-day has been unusually short ; but for all that, the subject is a large and important one. Moreover, it is a subject open to debate from various points of view, a fact which makes it all the more to be regretted that the lecturer himself is not present, possibly to answer questions on points of detail. Were Dr. Schofield here to-day, I should have indicated, assuredly with profound respect, what I have personally deemed to be a weakness in his deliverance, namely, the failure to commend to his audience a psychological theory at once true to human experience and consistent with the language of Holy Scripture, which he has sought throughout to employ in a popular sense.

I need not recall the scheme of the lecture, beyond saying that, in his pages of definition, Dr. Schofield quoted Gen. ii, 7, where we read that, by the Divine inbreathing, the man whom the Lord God had formed of the dust of the ground, " became a living soul." Here we have, in outline, a course of procedure at once simple and capable of rational vindication ; but in course of his argument Dr. Schofield seems to have felt himself compelled, without any sort of apology, to reverse the procedure ; he has spoken of *the soul* as being inbreathed—" every soul so inbreathed has a capacity possessed by no animal, however gifted " (p. 227). Now, Holy

Scripture affirms this inbreathing to have affected the body, and makes it clear that it was after receiving the "breath of life" that man, the creature of dust, "became a living soul." If I admit that the subject, as a whole, has its difficulties, I do not thereby shut my eyes to the fact that we can hardly reach a safe explanation of this and such-like passages of Scripture if we consent to a confusion of their terms. As we all know, there are in the Old Testament passages in which the word *nepshesh*, generally rendered "soul," is used of animals as well as men; and again, the word *ruach*, generally rendered "spirit," has likewise a wide application, and in one place, as we recall, there is a question in regard to "the spirit of man that goeth upward, and the spirit of the beast that goeth downward to the earth." All the same, I conclude that, to occupy safe ground, we must seek a formula at once true to Scripture and sound in its psychological theory. Such a formula, as I judge, has not been supplied this afternoon.

When Dr. Schofield comes to the discussion of the body, he occupies ground which is more sure and strong. Here we may meet evolution theorists with safety, while in regard to definitions of soul and spirit there may seem to be little to choose in point of vagueness between their statements and those the lecturer has employed. I would suggest that the vital facts do not depend upon speculations in regard to "soul" or "spirit," words which, owing to variety of definition, yield uncertain ground for conclusive argument. If in Holy Scripture there is a doctrine of human probation, it is of man as man—a tripartite creature—spirit and soul and body; if there is a doctrine of sin, it is the same, affecting the entire man; if a doctrine of salvation, it is the same, affecting the whole man. We do not well to associate sin with the soul and not with the body; to find salvation in the spirit as distinguished from the body and the soul. The same holds good of Christian life, in standing and service, also of the redemptive work of Christ in its provision and efficacy: we contemplate man as a whole, all-inclusive in his powers and faculties: and the issue, full and triumphant, will, in turn, yield victory to man as a whole, in the immortal life to which faith clings as destined to supersede the present constitution of spirit, soul, and body. I suggest that we are not able to contemplate, in the present state of existence, a separate soul-entity, a separate spirit-entity, and a separate body-entity—

certainly not for purposes of philosophical discussion. The three parts of man make one whole, and our concern is with man as a whole.

Were Dr. Schofield present, he would doubtless justify in some degree the definitions given in his lecture, and might propose further definitions, but still, for my own part, I would declare that danger lies in the way of endeavours to particularize upon the various aspects and parts of the human constitution. Finally, and most sincerely, do I thank him for his suggestive paper, and in particular would I recognize the cogency of the section in which he makes reply to Darwinism in its most recent development.

Mr. WILLIAM C. EDWARDS said : The circumstances under which we meet to-day seem to preclude criticism of the paper, this last contribution from our well-known, honoured and beloved Member. I would only make a comment on the text quoted (Gen. ii, 7). The language of these "Creation Chapters" is at once simple and stately—indeed sublime. Remembering that the verse may be translated "God breathed into man the breath of *lives*," *your* lives and *my* life, I feel constrained to testify that this verse has been to me a source of great help. It has seemed to open up to me a wonderful "revelation-vista." May I give an instance in which I used this verse in India? I would premise by reminding you that in the East the basis of most of the religions is that masterpiece of Satanic ingenuity—transmigration. Discussing this subject with a Hindu lawyer, I found this verse just what I needed. Transmigration teaches the benighted heathens that men and creatures may rise or fall, *e.g.* a bad man may become in his next life an animal; and a bad animal become a lower-animal; and a bad lower-animal may become an insect or less. Again, vice versa, a good insect may also rise. I said to the Hindu lawyer: "If such be the case, then the sum total of all 'transmigratable creatures' must from the beginning have been constant." There can be no simultaneous increase of living vegetation with the increase of fishes, animals, insects, birds, and men; the maxima must have been created and started at one time. Strangely enough, there are people in Syria that have this idea about their tribe. They say that there are always 100,000 of them, no more and no less. They may be born in Lebanon, or London, or elsewhere,

but the number is constant. One dies and another is at once incarnated somewhere.

Continuing my argument with the lawyer, I said: "Suppose that the world's population to-day numbers 1,800,000,000; I can speedily show that during the past 200 years populations have greatly increased. Not to be too long, let me take India as an example of all 'transmigratable' lives. Let us draw a line three inches long to represent Indian population to-day—say 300 million. I am sure that you will agree that in the time of Warren Hastings it was probably only 150 million—we draw another line, one and a-half inches long; and in 1500 possibly 100 million only—and we draw yet another line, one inch long; and before the invasions of immigrations from the west still less—and our line shortens almost to a point. One village in India, numbering about 400, recently produced a sheet of calico giving the genealogy of the village, and proving that they were all the descendants of two people who settled there about the year 1600. Now, if that is so, transmigration is obviously an impossible theory." The lawyer professed to be convinced by my argument. Then I said: "Let us now read the revelation of God's Holy Word"; and I read to him Gen. ii, 7. Josephus says of the Holy Scriptures that they "gave the earliest account of things as *they learned them of God Himself* by inspiration" (*Against Apion*, I, 7), and so I believe it to be. The blessed Creator tells us that He made all, that He made man out of the dust of the ground, and breathed into man the breath of *lives*, i.e. the power for one man to beget many, who in turn have the same powers to pass on to their descendants, also powers of procreation. This blessed book tells of one man of whom (or from whom—not as with animals) from a part of his body God formed his helpmate—woman. I am glad that we have such a revelation on this important subject, that satisfies my intellect, that rests my inquiring mind, and bears the impress of truth that is ever the stamp of Divine Revelation.

Mr. PERCY O. RUOFF referred to Dr. Schofield's gracious personality and wholesome Bible expositions, and continued: It appears to be open to objection to designate honest, open-minded seeking souls with the title "Modernist." To give Nicodemus the unenviable distinction of founding the teaching is assuredly not justified. What combination of his utterances can fairly be

construed so as to class him as a Modernist? Here are his words: "Rabbi, we know that Thou art a Teacher come from God: for no man can do these miracles that Thou doest except God be with him." Here Nicodemus, the ruler of the Jews, recognizes a Teacher from God, miracles, and God's presence. Again, "How can a man be born when he is old? Can he enter the second time into his mother's womb, and be born?" This question expresses a perfectly honest difficulty. Another question: "How can these things be?" Once more, "Doth our law judge any man before it hear him, and know what he doeth?" This was said by Nicodemus in answer to the unjust sneers of the Pharisees.

On p. 229 there appears a singular statement: "The French Academy of Scientists officially announces 'The reason the doors of this Academy are shut to Darwin is this, that the man who indulged in so much supposition without proof is unworthy of the name of scientist.'" It would be interesting to know the source of this statement, and the year in which it was announced. There are probably very few Englishmen, whatever view they take of Darwinism, who would deny to Darwin the name of a great scientist. On p. 227, referring to the effects following the Divine inbreathing in the Creation of man, the lecturer makes an important distinction, that "every soul so inbreathed has a capacity possessed by no animal, however gifted, of understanding a good deal about God and His Word, sufficient indeed to accept or reject the message of salvation." This is fundamental, and clearly establishes a gulf between man and all created animals.

Mr. W. HOSTE said: The verse from Thessalonians, quoted on p. 223, seems determinant as to the tripartite nature of man. Some teach that the spirit and body together make the soul, and that when their partnership is dissolved by death there is no survival of the latter. This idea is supported by a wealth of illustration: the barrel and the stock make the gun, they say (have then their guns no locks?); divide them and the gun ceases to exist. The case and the works make the watch: separate them, and where is the watch? One would think existing still in its separated parts. Who has not seen the works of a watch going merrily on a jeweller's bench under a glass? If I took a parcel to a gunsmith and urged him to keep the stock, the gun, and the

barrel safe, he would be surprised to find only two articles, and put me down as a queer customer if I explained that I only meant two.

So, when Paul said, "Your whole spirit, and soul, and body," he surely meant three parts, not only two. *The spirit* is the higher side of the spiritual nature of man, that knows, and is in touch with God (1 Cor. ii, 11; John iv, 24); *the soul* is in touch with the bodily senses, and loves, hates, fears, etc. The two are never separated, though the supreme proof of the penetrating character of the Word of God is its power to "divide asunder" soul and spirit, in the sense, I submit, of "discriminating" between their movements. The verb is *di-ikneomai*, to penetrate, pierce, "even to the division," which Grimm believes means "that most hidden spot of the dividing line between spirit and soul" (Heb. iv, 12). It seems important to insist, as the Chairman has done, on the unity of man; he is regarded as a whole. God did not say, "In the day that thou eatest thereof, thy soul shall die," but "*thou shalt die.*" This affects the question of man's immortality.

That man was created with a capacity for endless existence, is, I believe, conveyed in the manner of his creation at the direct hand of God and by the word for "breath," *n'shah-mah*, which God breathed into him, and which can be shown to apply only to God and man in the Scriptures. But it is equally clear he was not born immortal—that is, with immunity from death, for otherwise God would not have warned him he would surely die in case of disobedience. When he fell, the man was not affected externally; physically he was unchanged; certainly he did not cease to exist. But a marked and mysterious change took place in him. He became afraid of God, and hid from Him. A great gulf had yawned between him and his Creator: this was moral death. Death is not cessation of existence, but separation of existence. Man's physical death had to be provided for by his exclusion from the tree of life, but he should continue to exist for ever in a sin-infected body. The gift of eternal life, though not to be compared with immortality and vastly transcends it, does nevertheless include it. The immortality of the body is conferred separately and later. Those who refuse to partake of the gift of eternal life will certainly never regain immortality, but will none the less exist for ever.

Mr. L. BIDDULPH, a visitor, said : It should be borne in mind that the ancient philosophers were not ignorant of the science of psychology, but, on the contrary, had a clear and accurate knowledge of the constitution of the man, regarded as distinct from the body. This is specially true of the ancient Egyptians, from whom the most learned of the Greek philosophers received instruction, viz., Pythagoras and Plato. St. Paul was brought up at the feet of Gamaliel, and was a man of learning in all senses of the word. He had learned to distinguish between the spirit and the soul, and therefore mentions them with the body as being the three main divisions in man's constitution.

These divisions may be defined briefly as follows :—A.—*Spirit*, the real man, the immortal self, or ego. B.—*Soul*, the part which goes to make up the personality of men, the emotional and sentient part of man, without which he could have no feeling or interest in the world : not immortal in origin, but only conditionally immortal. C.—*The physical body*, which is the garment of matter (mistaken by children and some others for the real self), which forms the instrument through which the spirit has contact with the material world, and is enabled to experience conditions of matter, and learn in the school of life such lessons as can only be acquired in a physical embodiment. D.—St. Paul probably includes in "soul" *the mind* or intelligence, though this is really a separate part, and is the link between the spirit and its lower vehicles, like the lense between the magic-lantern slide and the reflection on the sheet. It is the focussing point between the spirit and its vehicles.

In the nature of things there was no reply on the discussion. In closing the Meeting, however, the CHAIRMAN made two remarks : (1) If Dr. Schofield were present, he would doubtless have declared that the proceedings went to show that psychological theory has never exhibited anything in the nature of unity of judgment. Here, as elsewhere, it is a case of "so many men, so many minds." (2) As to the statement that, in Gen. ii, 7, the inspired writer speaks of "the breath of *lives*" (in the plural), there is this to say : that in various forms of Semitic speech, "life" is classed among plural ideas. The word *chayyim* is of frequent use in the Old Testament ; and whether emphatic in its relation to physical life,

or appearing in expressive combinations—such as tree of life, way of life, book of life, years of life, or the fountain of life—it is given in plural form in regular Hebrew usage. In the circumstances, therefore, it would hardly seem to be justified to find a mystical meaning in the word as encountered in the Genesis records of the Creation.

724TH ORDINARY GENERAL MEETING,

HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, MAY 6TH, 1929,
AT 4.30 P.M.

LIEUT.-COL. F. A. MOLONY, O.B.E., IN THE CHAIR.

The Minutes of the last Meeting were read, confirmed, and signed, and the HON. SECRETARY announced the Election of George Brewer, Esq., as an Associate.

The CHAIRMAN then introduced the Rev. Canon A. Lukyn Williams, D.D., to read his paper on "Early Anti-Judaica: the Books of Testimonies."

*EARLY ANTI-JUDAICA: THE BOOKS OF
TESTIMONIES.*

By THE REV. CANON A. LUKYN WILLIAMS, D.D.

HOW are Jews to be won for Christ? That, for Christian people, is always a pressing question, never more pressing than at this time, but answered by each generation of Christians in its own way.

At the very first, indeed, the one argument was Christ Himself, Christ in His supreme moral glory and the wonderful

attractiveness of His Personality, together with the success of His Life, His Resurrection, and His work in the world. But almost at once, to some degree even before His death, the question arose: In what relation did Christ stand to the Old Testament, and the hopes and promises contained in it?

Our object to-day is to see how this question was answered by the very early Christians. I shall try to state the facts as they present themselves to me, in as positive fashion as I can, and to explain them as it seems to me they ought to be explained. But it will, alas! also be necessary to criticize what appear to be mistaken opinions. I shall close with calling your attention to the light which our subject throws upon the faith of those early Christians.

Now it is true that sometimes our Lord had occasion to refer to the Old Testament as corroborating Himself and His work, even during His ministry. He said, for example, that Isaiah's words described the attitude of the Traditionalists towards Him: "This people honoureth Me with their lips, but their heart is far from Me."* He also quoted Genesis as confirming His attitude to the question of divorce.† Then, again, He quotes Ps. cxviii to illustrate the treatment that He was already receiving, and was about to receive, from the Jews, with the assurance of the ultimate triumph that the Psalm foretold of Him: "The Stone which the builders rejected," etc.‡ Further, He appeals to Ps. cx, as a witness that He held, after all, a higher relation towards David than might be gathered from His earthly descent from him: "The LORD said unto my Lord, sit Thou on My right hand."§ You will have noticed that I have purposely limited myself to references in the Gospel according to St. Mark, because that is almost certainly the earliest of the four, and the least likely, therefore, to contain references to Old Testament passages which were adduced by Apostolic or Evangelistic preachers, and though placed in our Lord's mouth, were not really spoken by Him. That question, however, though of extreme importance and interest, is not before us.

But those genuine references by our Lord to the Old Testament were, after all, only sporadic, and such as were called out by the needs of the moment. The real starting-point for us lies in the

* Mark vii, 6. (See Isa. xxix, 13.) † Mark x, 7. (See Gen. ii, 24.)
 ‡ Mark xii, 10. (See Ps. cxviii, 22 sq.) § Mark xii, 36.

last chapter of St. Luke. We are told there that on the walk to Emmaus,* and again shortly afterwards,† our Lord showed to His Disciples “from Moses and from all the Prophets,” and again “from the Law of Moses, and the Prophets, and the Psalms,” “the things concerning Himself.” He gave the testimony of “the Scriptures” to His sufferings, His rising from the dead on the third day, and the preaching of repentance and remission of sins to the Gentiles as well as to the Jews.‡ From this passage it would appear that although our Lord had occasionally referred to the Old Testament in confirmation of His actions or teaching, and had indeed also, as we learn from other Gospels than St. Mark’s, especially indicated to His Disciples some confirmation from the Old Testament to the fact that He should die and rise again, yet He had never put the whole case so fully and systematically before them as in that walk to Emmaus and at His subsequent appearance to the eleven. It was, for example, no part of the equipment of the twelve, or the seventy, when they were sent out through Galilee.

It is, however, more important still for our purpose to notice, as Dr. Rendel Harris does, in a book to which I shall refer a good deal, that “It is not possible to reduce this statement to a lower meaning than that the early Church believed that they had supreme authority for their method in dealing with the Old Testament, and that this authority thus given to the method must have covered, in part, the matter and the arrangement.”§

Would not this teaching of the Master, the Master risen in His glory, have burnt into the hearts and memories of those who listened? Would it not have had for its immediate outcome the repetition of the lessons so often learned during those forty days in which they could still question Him and be answered audibly by Him? And would not those passages be so stored up in their minds, and the method be so brought home to them by Divine influence after Pentecost, that they would hand it on to others, who, in their turn, were coming into contact with other Jews, and be required to bring before them the evidence of the Old Testament Scriptures?

You see at once that the matter is one of extreme importance.

* Luke xxiv, 27. † Luke xxiv, 44. ‡ Luke xxiv, 46.

§ Rendel Harris, *Testimonies*, ii, p. 97; cf. also pp. 70, 95.

There are two points for us to consider: First, the lists of such passages; and, secondly, the method of interpretation that was employed.

I.

First, the Lists of Texts.—Now, when I say “Lists,” I do not mean that at the beginning these were very long or very formidable. I should suppose that at first the passages were not written down at all, for they were but few, and these easily remembered. But as time went on and the multitude of the believers increased, and their unconverted friends asked them the reason of the Faith that was in them, many would begin to make written memoranda of the chief texts for their own use. It is not probable that such notes would always be alike. To one evangelist certain texts would appeal, to other evangelists others. There would thus be many little Books of Testimonies, as we may call them.* But in process of time there would arise someone who felt called upon to produce, perhaps for the purpose of teaching the teachers, something more elaborate and more complete. He would, one may be sure, never get anything quite complete, but he would do his best. One such writer would enlarge, but another, perhaps, would trim away such texts as he did not himself find relevant. But there would inevitably be a large measure of matter that was common to all such books. And, in fact, several of such lists have survived to our own time.

Do not mistake me. I do not mean that any lists of actually Apostolic, or even sub-Apostolic, days have survived. They have not. How devoutly we wish they had! We have nothing really definite even of the second century, though the little tract called *Jason and Papiscus*, written not later than the middle of that century, was criticized severely by Celsus about A.D. 178, and not very favourably by Origen about A.D. 248. But with the exception of its general character, and of one or two quotations from it, it is completely unknown to us. But

* So, we are told, “Among the Waldensians [in the twelfth century] the minister or teacher carried his little book in his hand, containing various portions of the Bible, sometimes the whole of the New Testament, with chosen selections from the Old.” (L. Isr. Newman, *Jewish Influence on Christian Reform*, 1925, p. 226.)

Tertullian at the end of the second century gives us such a list in his treatise *Against the Jews*, and so especially does Cyprian in the first two Books of his *Testimonies*. And soon after that they begin to increase in number, the more noticeable being Pseudo-Gregory of Nyssa's *Selections* of such Testimonies in the latter part of the fourth century. Isidore of Seville's treatise *Against the Jews* in the very end of the sixth century, the *Teaching of Jacob (James)* in the seventh century, the five-chaptered treatise of Matthew the Monk, on which Dr. Rendel Harris provides us with many speculations (though, as it stands, it cannot be earlier than the fourteenth century), and so on, until Dionysius bar Salibi's treatise *Against the Jews* in the twelfth century. But similar lists, as we all know, have never ceased to be drawn up, and hardly a year passes that some devout and worthy soul does not compile such a collection of proof-passages for Jewish readers, under the naïve assumption that it has never been done so well before.

But here an interesting question comes up. I have mentioned some lists that occur in the second and later Christian centuries : but are there traces of the existence and use of such lists in the writings of the New Testament itself ? Have we any evidence that the Evangelists, for example, used such compilations ?

You ask, How can we know ? What tests can we apply to finding out whether the New Testament writers used such *Books of Testimonies* ? There is, I think, at least one test. Suppose that such lists existed, would not the selected passages be arranged under subjects, or, at least, would not some passages be set under others, without much consideration of the books from which the individual passages were taken ? For example : Isaiah is a big book and its name is more easily remembered than that of most books, and passages from it would be so numerous, and often so important, that texts from other lesser books might well be found under a list containing passages taken chiefly from it. A text from Malachi, for instance, might easily be put in a list made up chiefly of passages from Isaiah. If so, it would surely be very easy for a man to attribute a passage to Isaiah which really occurs only in Malachi. This seems to be a reasonable explanation of what has happened in Mark i, 2. The Evangelist says : " Even as it is written in Isaiah the Prophet," and promptly quotes, not Isaiah, but Malachi, adding a passage from Isaiah immediately afterwards. He may well have been using a *Book of Testimonies* in which Malachi is

quoted under the general heading of Isaiah. It is worth noticing that Justin, in the middle of the second century, makes the same kind of mistake when he affirms that Isaiah says: "A Star shall arise out of Jacob" (Num. xxiv, 17), and only afterwards adds, "and a Flower shall come up from the root of Jesse" (Isa. xi, 1).*

Closely akin to this, though not quite identical, is the case when a single text, one alone and not connected with a second as in our last examples, is wrongly attributed to a certain author. For some reason or other, with which we are not for the moment concerned, such wrongly attributed texts are often found in the name of Jeremiah. In the New Testament the famous example is Matt. xxvii, 9: "Then was fulfilled that which was spoken by Jeremiah the prophet," but the words given are those of Zech. xi, 13, with perhaps some reminiscences of the language of Jer. xviii, 2, and xix, 1, 2. It may perhaps be noticed here that one of our very best MSS., the Sinaitic, together with other authorities of less importance, reads in Matt. xiii, 35: "That there may be fulfilled that which was spoken by the prophet Isaiah, saying, I will open My mouth in parables; I will utter things hidden from the foundation of the world," though the words really come in Ps. lxxviii.

Justin, it may be added, does the same sort of thing when he says that those Christians who are of Gentile origin are greater in number and truer than those who are of Jewish and Samaritan origin, and (a little further on) proves this by saying: "We will report what has been said by Isaiah the prophet. For he said thus: 'Israel is uncircumcised in heart, but the Gentiles in the uncircumcision (of their flesh),' " a saying which is to be found only in Jer. ix, 26.†

The combination of two or more passages of the Old Testament recurring in two or more authors, without any error of nomenclature such as we have already seen, also suggests the use of a *Book of Testimonies*. For example, parts of Ps. cx, either "Sit Thou on My right hand" or "Until I put Thy enemies under Thy feet," are combined with Ps. viii, 6, "Thou hast put all things under His feet," by St. Paul, both in 1 Cor. xv, 25, 26, and in Eph. i, 20, 22, and also by the writer of the Epistle to the Hebrews in chaps. i, 13; ii, 6-8.‡ It is possible, of course,

* I *Apol.*, xxxii, 12. Justin's reference in *Trypho*, cvi, 4, is accurate.

† I *Apol.*, liii, 3, 10, 11. (See Rendel Harris, *Testimonies*, i, p. 17.)

‡ Rendel Harris, *Testimonies*, ii, p. 38.

that the writer to the Hebrews knew St. Paul's Epistles, but it is quite a rational theory that both he and St. Paul were using a common source, part of such a Book as those we have in mind.

There is, again, a passage in the Acts to which an even more striking interpretation has been given. The Greek is difficult, but the R.V. represents it fairly when it reads: "I stand this day, testifying both to small and great, saying nothing but what the prophets and Moses did say should come; how that the Christ must suffer, and how that He first by the resurrection of the dead should proclaim light both to the people and to the Gentiles." The wording from the first "how" onwards so closely resembles that of the titles to chapters in Cyprian's collection of *Testimonies* and elsewhere, that the suggestion has been made that we have here in fact the actual titles, or two titles, of sections in the *Book of Testimonies* which lay before St. Luke when he compiled the Acts, one showing that Christ was to suffer, and the other that He was to rise again. It is not impossible.*

We can, I think, hardly be wrong in considering that the writers of the New Testament had at their disposal collections of what we call proof-texts from the Old Testament.

Before leaving, however, the subject of the lists of proof-texts, it may be asked whether one should not rather speak of one such list *par excellence*. And this question must be definitely faced, because Dr. Rendel Harris, to whom we owe so much for bringing the subject before us, has adopted this opinion very decidedly, and has been followed by many writers who have given a general assent without going deeply into the question for themselves. His chief disciple, moreover, Dr. Vacher Burch, has staked everything upon it. Dr. Rendel Harris has written a great deal about the subject of the proof-texts, especially in the *Expositor*, and has republished his essays without alteration, or modification, or adjustment, in two slim volumes called *Testimonies* (1916 and 1920). Some of the essays in those volumes are contributed by Dr. Vacher Burch. Unfortunately neither

* Rendel Harris, *Testimonies*, i, pp. 19 sq., 59. Zwaan, in Foakes Jackson and Lake's *Beginnings of Christianity*, ii, p. 49 sq., says that "headlines" from the *Book of Testimonies* are "quoted," and adds that "the interruption of Festus shows that Paul had been pouring out a stream of such 'proof-texts' (xxvi, 24, τὰ πολλὰ . . . γράμματα), referring to Gospel history (xxvi, 26, οὐ γὰρ ἔστιν ἐν γωνίᾳ πεπραγμένον τοῦτο) as their fulfilment."

of the two authors has the gift of lucidity of thought and expression, and it is often hard to grasp their meaning. But so far as I understand them their theory is this: A collection of proof-texts was drawn up in very early times, before the composition of our present four Gospels, and was known as *The Book of Testimonies*. It was written probably by St. Matthew himself. It was a *vade-mecum* for teachers, and, indeed, for all who wished to answer objections made by Jews. It took on a different form after A.D. 70 (the Fall of Jerusalem) from that which it had before, being sometimes enlarged, sometimes modified. But it was still the one and the same book, and it continued in existence throughout the first, second, third, and, indeed, many centuries, at least as late as the twelfth.

It was, further, Dr. Harris assures us, a work of extraordinary importance. "The work in question" (to quote his actual words) "is the first known treatise on Christian theology,"* "the first handbook on Palestinian theology."† Or, as Gwatkin says with reference to Rendel Harris' theory: "If these early writers are all borrowing from some very early manual of proof-texts which must be at least earlier than the first Gospel, we may safely say that few books have so deeply influenced Christian thought."‡

I have already given some of the evidence to which Rendel Harris and others refer, but I should like to make some remarks about what he is pleased to call the direct evidence for the existence of this one Book. He says "Nyssen" (by this term he means the Pseudo-Gregory of the end of the fourth century) "is working, as he himself affirms, from a *Book of Testimonies*." And, again, "he is ostensibly quoting *Testimonies*."§ But the nuance is mistaken. The *Testimonies* to which "Nyssen" refers are simply and solely texts of the Bible, taken chiefly, though not entirely, from the Old Testament, and "Nyssen" does not even hint that he has used any collection of excerpts, much less that he used any one famous Book.

Again, Rendel Harris says of Bar Salibi in the twelfth century that, after quoting in his *Treatise Against the Jews*|| several

* Rendel Harris, *Testimonies*, i, Introduction.

† Rendel Harris, *Testimonies*, ii, p. 52.

‡ *Early Church History* (1909), i, p. 199.

§ Rendel Harris, *Testimonies*, i, p. 35.

|| Edition Zwaan, Leiden, 1906.

texts about the Trinity, he "comes at last to the conclusion that 'all these things we have made clear from the testimonies,' " the implication being that Bar Salibi is making use of a book of excerpts. But the fact is quite otherwise. He says in sec. 10 : "But they say, 'Teach us here, where did the prophets speak of His rule?' And we say readily, 'David wrote.'" And then follow twenty-seven or twenty-eight quotations until the end of sec. 16, and in sec. 17 he says : "All these testimonies give information about the Three Persons," etc. Then in sec. 18 he adds, "For after we have shown from the Scriptures," etc.* The Syrian Father is referring to the Scriptures only, and uses an ordinary word for their "testimonies" in its ordinary sense.†

There is, indeed, so far as I know, not a single direct allusion in any patristic writer to "the *Book of Testimonies*." True that *Selections* (Ἐκλογαί) is the title of the Pseudo-Gregory of Nyssa's treatise, as also of a treatise composed by Melito,‡ which has not come down to us. But there is no reference to such a book as *The Selections* (αἱ Ἐκλογαί) *par excellence*, or, as it happens, even to any work at all with that exact title.

II.

There is no reason to think that there was only one *Book of Testimonies*, or even one which attained pre-eminence. There were many. Whether, however, such collections of texts were actually written down (at least in very early days) is not so sure. Probably they were, but there is something more important than that. In the long run it is not the lists of Old Testament passages that matter, but the method by which those lists were compiled, the principle of interpretation of the Old Testament which caused the early Christians to use certain texts in the Old Testament as proofs for their belief that the life and teaching of the Lord Jesus were in full accord with the hopes of the revelation given by God through Moses, the Prophets, and the Holy Writings, the promise of the Messiah and all that He was to accomplish.

* Rendel Harris, *Testimonies*, i, p. 58.

† Ἐκλογαί.

‡ See Rendel Harris, *Testimonies*, ii, p. 57.

The witness of the Old Testament was everything to the Jews. Jews as such, and Jews as Christians, were agreed about the full inspiration of the Old Testament Scriptures—so full that “although the word of a mere man has only one true meaning,” says the Talmud, “God spoke one thing, but two things did I hear” (Ps. lxii, 11); “for this power belongeth to God; one utterance issues in many meanings.” So we read in Jeremiah: “And as a hammer when it smiteth the rock”—“As this hammer divides itself into many sparks (or, perhaps, into many shivers), so one utterance issues in many meanings.”*

Besides, Jews were wont to learn by the experience of new facts to learn to see ever fresh meanings in Scripture, as Klausner has shown.† This principle was taken over gladly by such Jews as became Christians, who allowed the new facts about the Christ as seen in Jesus of Nazareth to throw light on the sense of the Scriptures. Toy was quite right when he said in 1884: “The New Testament writers handle the Old according to a Talmudic manner, *plus* their Messianic hope.”‡ They would naturally see first the Christian interpretation of a few great passages such as Isa. liii (the Passion), and Isa. xxviii, 16, Dan. ii, 34, and Ps. cxviii, 22 (the Stone), and the method would be continued from year to year and from decade to decade, with ever enlarging scope of Christian exegesis. In this way there gradually arose a *corpus* of traditional explanation of the Old Testament.§ Whether this was ever written down as fully as any one person could write it, or whether only certain parts of it were written down, was more or less accidental. It depended on whether the need arose.

We know that sometimes the need did arise. Cyprian’s “*filius*,” Quirinus, *i.e.* probably a layman in his diocese, asked his “father” Cyprian, and Isidore’s sister Florentina asked her

* T. B. *Sanhed*, 34a; cf. *Mechilta* on Exod. xv, 11 (Horowitz edit., p. 143, J. 4).

† *Die Messianische Vorstellungen des jüdischen Volkes im Zeitalter der Tannaim* (1904), p. 88. See also his *The Messianic Idea in Israel* (Hebrew) (1927), p. 314. Cf. my *Hebrew-Christian Messiah* (1916), p. 12.

‡ *Quotations in the New Testament*, p. 21. See Vacher Burch in *Testimonies*, ii, p. 34.

§ For an example of development in such a use of the Old Testament see Cyprian’s *Testimonia*, ii, p. 16 (the Stone), p. 19 (the Bridgroom), p. 20 (the Cross).

brother, for such a summary of Old Testament texts which they could use for the furtherance of their own faith, or for direct controversy with Jews. At other times a writer, unasked so far as we know, wished to gather up into a short and convenient treatise the passages which he himself had found, or had heard from the experience of others, to be useful in dealing with Jews, or, as with the *Teaching of Jacob* in the seventh century, in instructing Jews who had been baptized by force. There was no authoritative standard book to draw upon, at least there is no mention of the existence of such a book. There was only the traditional teaching which Christian teachers had received. It was the *method* which continued, not the Book.

If it be replied that in some cases the similarity of words and of the order of quotation, and the like, suggests, as indeed it does, a Book rather than merely oral tradition, much less only similarity of method, the answer is that the use of books is not excluded. Naturally, certain texts would be apt to be set in a certain order, both in arrangement of subjects and in individual sequence, and writers would, no doubt, often strengthen their memory by referring to any written collection they might happen to possess, but to say that this implies—as Dr. Rendel Harris assumes throughout—the existence of one Book throughout the ages, or of several Books historically connected with each other, is to go beyond the evidence.

It will be seen that my form of the explanation of the facts is that so long as the same method of curious verbal interpretation of Scripture lasted so long would common matter be likely to continue. In other words we cannot be surprised that the use of common matter continued as late as Bar Salibi in the twelfth century, for the method of interpretation lasted until then.

One rather asks, whether we have any reason to think that it ceased at that date.

True, that in one particular there has been a change, and it is so great as to veil the continuance of the one method. It is this. The current Greek Version of the time and district was in early days the standard used for quotations from the Old Testament. Jerome's work, at the end of the fourth century, in some degree, and the renaissance of Hebrew scholarship in the sixteenth century, in a greater degree, changed that standard from the Greek to the Hebrew. But the method remained unchanged. A whole series of tracts for the Jews

has been written since the Reformation, in which the old arguments of early collections of *Testimonies*, notably Cyprian's and Isidore's, have appeared without any consciousness of borrowing on the part of their compilers. Historical criticism, and scholarship as we understand the term, were non-existent. The words of the Old Testament—the Hebrew words now—were seen to fit in with the life and teaching of Christ. Let us take them, said the authors of our tracts, disregarding the context, for they are all God's words, and use them as Testimonies, that we may show to ourselves and to all who accept the Scriptures, notably the Jews, that the Old Testament does bear witness to the truth of the Gospel.

You will not misunderstand me. I am not arguing that we *ought* to use this method, and write our tracts and controversial literature accordingly. No such thing. For us to do so would be to fly in the very face of the Holy Spirit who has led us to truer knowledge of Scripture. But I do say this, that to argue for the existence of one special *Book of Testimonies* lasting essentially until now, or until the twelfth, or even only as late as the second century, because of such usage and arrangement of Old Testament passages, is to forget the all-important fact that wherever the method of interpretation is unchanged, there the same results are bound to follow. To talk of *The Book of Testimonies* is inaccurate. *Books of Testimony*—Yes. There are dozens, but one Book, small and growing and altered, with its various forms in vital connection with each other—No.

To sum up, *The Book of Testimonies* is, in fact, a myth; but the proper meaning of "myth," we are told, is the pictorial representation of a spiritual truth. In this case the truth is the permanence of a certain method which produced catena after catena of texts from the Old Testament which were regarded as *Testimonies* to Christ and Christianity. Words were everything; grammatical meaning and historical reference were of little account.

III.

A final word on the mentality of those who pursued this method in the first few centuries.

Originally they were but simple folk, Galilean fishermen, and afterwards Gentile converts, who were, for the most part, of

humble training. If any of the early believers had had Rabbinic teaching like St. Paul, he would use the same method.

But when philosophers began to accept Christ there came a slight reaction. Possibly even the fourth Gospel represents the better side of that reaction, as Vacher Burch suggests.* Similarly Justin Martyr's *Dialogue with Trypho* is, I believe, the attempt of a Christian philosopher to put the arguments for Christ in a way which would appeal to Jews of education more than the common method. But it almost perished, its text now resting in reality on only one manuscript, and it had little, if any, influence on writers after the time of Irenæus and Tertullian. It is not by accident, on the other hand, that though the simple tract *Jason and Papiscus* was ridiculed by Celsus and not defended in its form by Origen, it had an enormous number of imitators. For as we all know, the simpler the method the more easily is it grasped and followed, especially in ages when learning tends to diminish rather than to increase. For, indeed, philosophical attempts to grapple with the Old Testament as such did not come to their own much before our own time, and, until they did, so long was the Old Testament treated as little more than an arsenal of weapons for Christian warfare.

It will not, I think, be out of place to notice here that in the *Books of Testimonies* there is very little reference to the Holy Communion. Of course, Mal. i, 11 is adduced in evidence that it was foretold (quite wrongly, I believe), but I do not remember any other passage being brought forward. It looks as though for those earliest Christians the Holy Communion did not take that position of extreme importance in men's thoughts that some would insist upon to-day.

But what Rendel Harris and Vacher Burch do teach us (and it is a great lesson to have been allowed to teach) is the antiquity and priority of the orthodox idea of Christ, which some writers have asserted to be a comparatively late development. The lesson, from which there is no escape, is that the early, and simple, and non-"philosophic" opinion about Jesus existed and prevailed from the very first, and that this was held by the writers of the New Testament records. In other words, the more the facts about the *Books of Testimonies* are studied the earlier and the more definite does the orthodox belief in Christ appear. The

* In Rendel Harris, *Testimonies*, ii, p. 71.

compilers of the Testimony Books, even in the earliest forms which preceded the Gospels, know of no such stage of belief in Christ as that He was only Man. On the contrary, they regarded Jesus from the first as having been born of a Virgin, and, indeed as Very God who had come down from Heaven.*

And it was these simple-minded Christians, with their crude and naïve use of the Old Testament, who conquered the world, because they were filled with zeal for Jesus the Christ, Son of God, Son of Man, Redeemer, and Saviour, and Judge.

DISCUSSION.

The CHAIRMAN (Lieut.-Col. F. A. Molony) said : It takes a little thinking before we can realize the importance of the subject which Dr. Lukyn Williams has brought before us to-day. What were these Testimonies ? May I enlarge on a specimen of one, to which the learned Doctor has already referred ?

Ps. cxviii was well known to all Jews, because it was part of the Hallel sung at every Passover. It contains the passage : "The stone which the builders rejected is become the head of the corner."

Christ quoted this in His famous argument with the Scribes and Pharisees in Passion Week, immediately *after* His parable of the wicked husbandmen who killed the only and well-loved son of the owner of the vineyard. He implied that the corner-stone of Jewish history must be the long-expected Messiah, and thus predicted that He would be rejected and killed, and yet afterwards reign gloriously.

Soon after the prediction had been fulfilled by Christ's death and resurrection, St. Peter publicly quoted the passage from the psalm again. What a powerful testimony this was ! The two great arguments for Christianity—that drawn from the prophecies and that drawn from the Resurrection—were combined in it.

Again, St. Paul, preaching at Antioch in Pisidia, and alluding to such predictions of Christ's sufferings as are contained in Ps. xxii and Isa. liii, pointed out that they were all fulfilled in Christ, and he was careful to bring out the strong point of the argument, namely, that they were fulfilled not *by* Christ but by His enemies ; who would have been very careful not to fulfil them had they remembered the

* Cf. Rendel Harris, *Testimonies*, ii, p. 52.

predictions, because they thereby proved that Jesus *was* the Messiah, and their object at the time was to prove that He was not. Now the believing Jews naturally thought that, if they could only bring forward enough of such Testimonies, either drawn from, or based on, the Old Testament, they must convert their brethren. But herein arose a difficulty; very few had copies of any books of the Old Testament, and most probably none had complete Scriptures. How they solved this problem by collecting Testimonies the learned Doctor has described to us, and he has spoken on a still more important point, namely, the method of interpretation that was employed.

The Chairman then proposed a vote of thanks to Dr. Lukyn Williams, which was passed by acclamation.

Dr. THIRTLE said: I speak for all present, I am sure, when I say that we welcome very heartily the highly illuminating paper to which we have listened this afternoon. Alike in substance and in presentation, it is what we should expect from Canon Lukyn Williams. During a long course of years Dr. Williams has been before the world as a scholar of profound erudition, and at the same time his interest in the witness of the Church to the people of the Synagogue has been an important factor in his career as a Christian minister.

To some, maybe, the paper will come as a revelation—something new in critical thought; to others, however, more or less familiar with the literature of what are known as the “Testimonies,” it comes as a rectifying statement of great value. Every now and then one meets with references to the subject, on the part of scholars disposed to accept, offhand, all that comes from the pen of Dr. Rendel Harris and Dr. Vacher Burch, and one is truly thankful that the labours of those investigators should command the attention of scholars, both in the Church and without. But here, this afternoon, we have had the privilege of a lecture in which the entire subject has been discussed with candour and with stabilizing results. We have, in fact, been shown wherein the theory is strong and wherein it is weak; and it seems to me that we shall generally agree in the judgment that, while there is no evidence of a general “Book of Testimonies,” singular and inclusive, there is little doubt that

from age to age in the history of the Church, pursuing a certain simple method, men have prepared catena after catena of Old Testament passages such as were regarded as testimonies to Christ and Christianity, and calculated to prove of service in placing the Gospel before the Jewish people. Good men did this in the early days of the Church, and they do it to-day. Taking the words of Scripture, they gather and arrange—in particular has this been done to impress unbelieving Jews—the while leaving to others the obligation of justifying a procedure which, though more or less mechanical, has proved helpful and conclusive to many minds.

If the appeal to Holy Scripture is vital in the presentation of revealed truth, most certainly the appeal to the Old Testament is final in the approach to such Jews as in some measure are acquainted with the writings of Moses and the Prophets. As the lecturer has intimated, such appeal in ordered fashion has been made a thousand times, and we may well conclude that it will continue to be made. Students of a past generation will recall how, in two substantial volumes, Dr. John Pye Smith dealt with what were regarded as the Messianic passages of the Old Testament. With great care he formulated a list of passages, and proceeded to adduce comments, critical and expository. Gentiles as well as Jews were helped by his treatment of a great subject, and as we to-day go to the Jews with the Gospel we go in the light of the same Scriptural facts and arguments. Are our quotations loose, as in the case of the early Fathers? Nevertheless, being from the Old Testament, they cannot but attract attention, and to many they may prove conclusive.

Do we find a certain freedom in such "Books of Testimonies"? Assuredly, and in that case we may consider them as belonging to a large class, some such lists being made up, as we have heard, of Scripture passages, and others, in corresponding fashion, of sayings gathered from early Christian tradition. Of the latter class we have an example in what have been styled the "Unwritten Sayings of Jesus," the *Logia*, given to the world some thirty years ago by Grenfell and Hunt, edited from papyri found near the ruined city of Oxyrhynchus. These sentences, in series, beginning with the formula "*Jesus saith*," were apparently intended to summarize familiar utterances, some of them admittedly foreign to the Gospel

story; and I venture to suggest that certain of the "Sayings" were collected and handed on with the definite intention of meeting Jewish prejudice or unbelief. In particular, I have in mind the second series of seven or more "Sayings."

Here is one of the "Sayings": "*Jesus saith*: Wheresoever there be two, they are not without God; and where there is one alone, I say I am with him. Raise the stone and there thou shalt find Me; cleave the wood and there I am." My remarks by way of explanation will be brief. First, as we well know, the Rabbis demanded a certain quorum for worship (called *minyan*); but the Lord spoke a word of emancipation when He promised His presence where "two or three" might gather in His Name. The first part of the Saying recalls the Lord's utterance in this regard. The intention of the remaining words was, as I suggest, to show, in particular to Jews, that ancient things, quite familiar in Israel, were typical of Christ and His work. "Raise the stone"—that is, build an altar; "cleave the wood"—that is, offer sacrifice. What then?—"Thou shalt find Me: there I am." The terms employed bring to mind scenes on Mount Moriah, with Abram as the actor, and on Mount Carmel in presence of the prophet Elijah. The claim of Christ's presence as expressed in the Saying supplies an argument in parable, and the issue is clear—Christ is both altar and sacrifice; both institutions looked forward to Him. Here was a lesson in typology, an element in Christian apologetic—an important aspect of truth to be impressed upon the Jewish mind. Does not the Saying indicate that there were those who approached the Jews along lines that diverged from the practice of merely giving excerpts from Holy Scripture? Hence we have in the Saying an illustration of the subject introduced by Dr. Lukyn Williams.

We do well, I think, to cherish the memory of men who, in the early Church or since, have shown a passion for presenting Gospel truth to the Jewish people. In history this proceeding is represented as *against the Jews* (p. 243), that is, as *anti-Judaica*; but in some cases, most certainly, the "anti" found expression in a deep spiritual sympathy, which completely veiled any spirit of opposition from the Christian side of the controversy.

Reverting to the subject so ably brought before us, we should, I think, be profoundly thankful that all down the ages Christian

men have set in order the great facts of the Gospel, for Jews on the basis of the Old Testament, and for all and sundry in the light of Old and New Testaments together. They made, as we have seen, lists of "Testimonies," even as we make them to-day. And may I not add, that we should also be thankful that, while placing the entire theory of "Books of Testimonies" in the light of ascertained facts and legitimate inferences, Dr. Lukyn Williams has enabled us to see that a wholesome proportion was observed in such work. First, in the early days, Eucharistic doctrine was not given the commanding place which has been claimed for it in more recent times; and, second, the outstanding facts of the Gospel were given a place in such presentations of testimony—Christ was beyond question the Son of God, and came to earth as the Saviour of men, as Evangelical believers maintain.

Lieut.-Col. SKINNER said: Since reading the advance copy of Canon Lukyn Williams' interesting and most helpful paper, I have been wondering if the "Testimonies" could be invoked to explain the palpable discrepancy between the passage in Isa. liii, 7, and the same passage as read by the Eunuch of Queen Candace in the hearing of Philip the Evangelist (Acts viii, 32), the two versions being as follow:—

Isaiah.—"He is brought as a lamb to the slaughter, and as a sheep before her shearers is dumb, so He openeth not His mouth."

Acts.—"He was led as a sheep to the slaughter; and like a lamb dumb before his shearer, so opened He not His mouth."

The version in Acts is clearly inaccurate, on two counts. Sheep are shorn, not lambs; while lambs, not sheep, were offered in sacrifice. Indeed, it is scarce too much to say that the latter inversion well-nigh destroys the beauty and significance of the original text, since clearly the allusion of Isaiah is to the substitutionary sacrifice of a lamb without blemish, prophetic of the Lamb of God that taketh away the sin of the world, and not merely to the killing of a sheep for food.

Perhaps the Lecturer can kindly help us to understand how such a mistake can have been made, and equally how it can have escaped revision to this day.

Mr. W. C. EDWARDS said : Our lecturer believes that there were, once upon a time, a number of "text"-books—"Books of Testimonies"—and he suggests that these very books were used in the production of the Gospels ; he thinks that the writer of the Epistle to the Hebrews, and even the Apostle Paul himself, used such ! I must quote his words : "We can, I think, hardly be wrong in considering that the writers of the New Testament had at their disposal collections of what we call proof-texts from the Old Testament." "It is possible, of course, that the writer to the Hebrews knew St. Paul's Epistles, but it is quite a *rational* theory that both he and St. Paul *were using* a common source, part of such a book as those we have in mind."

This I doubt. Though it may be *rationalistic*, in my humble opinion it is not *rational*. I suggest that the early disciples used for their arguments verses taken from the Old Testament, as taught by the Holy Spirit, and followed the examples of the Apostles, notably as we may read in Acts iii ; vii ; ix, 20-22 ; xiii ; xxviii, 23 ; etc. ; but that the great Apostle depended upon these primers, or such hypothetical lists, seems to me very unlikely. Upon what real foundations is this literary hypothesis built ? I say it has no foundation at all.

How did the Holy Gospels possibly and probably come into being ? I suggest that in those early days—the days of the Church's first love—a great number of the hearers and followers of Christ used to repeat that they had heard from His own lips, using such a phrase as the Apostle did at Miletus. "Remember the words of the Lord Jesus, how He said, 'It is more blessed to give than to receive'" (Acts xx, 35).

To these early disciples special grace was given—the Holy Spirit, according to promise, brought all things to their remembrance (John xiv, 26). As the years rolled on, and one by one "fell on sleep," these "Testimonies," repeated at first almost verbatim, became second-hand and third-hand, etc., and became rather mixed. People copied and treasured these "Sayings" to which Dr. Thirtle has referred (read John xxi, 25).

I should like to refer to 2 Pet. i, 14-21. I believe that we have in that Epistle the substance of some addresses of the Apostle, and that the Apostle did cause to be written at his dictation the Gospel known

as "Mark's." It is obviously the account of an earwitness as well as an eyewitness. Then came the Evangelist and Apostle Matthew, and the Evangelist Luke, whose account is definitely stated to be a compilation and the composition of a man who was a scholar and historian, who could arrange all the facts in "proper order." He claims (Luke i, 2) to have received what followed from eyewitnesses and ministers of the Word: to have a "perfect understanding of all things from the *very* first," and wrote that his friend Theophilus and all lovers of the God incarnate might know the certainty of all these things which the Gospel called by his name records. Possibly he was one of our Lord's first Gentile disciples, and almost certainly the beloved companion of the great Apostle Paul.

Lastly, there came the inspired testimony of the Evangelist and Apostle John, who wrote as his signature, "This is that disciple that testifieth these things, and we know that his testimony is true" (xxi, 24). "There are many other things (xxi, 25) which are not written in this book; but these are written that ye might believe that Jesus is the Christ—the Son of God, and that believing ye might have life through His Name" (xx, 30–1). With all my soul I accept the inspired records of the life of the Incarnate Son of God.

Mr. W. HOSTE said: One realizes, as one listens to this paper, that it is from one in love with his whole subject, and that he has given us the very best that can be said for it. One cannot help feeling, however, that some of the grounds of the argument are rather precarious, if not *admittedly* tentative. He himself speaks of the "many speculations" (p. 243) of the high priest of the cult, Dr. Rendel Harris; so apparently the speculative element must be expected in this enquiry. It seems that the proofs resting on the comparative ease with which the name "Isaiah" could be remembered, can hardly be called convincing. One can certainly go a long way if one admits such suppositions as proofs. May not the facts admit of quite a different explanation? In both the cases cited, where two quotations of different origin are ascribed to the same Prophet, it is the concluding quotation which tallies with the alleged Old Testament writer. May not this be simply to avoid the awkwardness of the double citation of authority? The human author is

not of the first importance, where "men spake from God." In the case of Matt. xxvii, 9, instead of too easily ascribing a mistake to one who, according even to Renan, wrote the most wonderful book in the world, might it not be permissible to seek a solution of the difficulty on more prosaic lines, *e.g.*, from the fact that Jeremiah, being the longest of the Prophets, not infrequently gave his name to the whole prophetic volume, just as the Psalms are sometimes referred to under the generic name of David (Heb. iv, 1). Sometimes, too, the Prophets repeat the same message verbatim. For instance, Mic. iv, 1-3, tallies exactly with Isa. ii, 2-4. How easy it would be to convict of mistake a New Testament writer quoting Mic. v, 1-3, as by Isaiah the Prophet, if one happened not to be familiar with Isa. ii. Jeremiah who, as the lecturer points out, does refer to the potter's field, may also have spoken in the sense of Zech. xi, 13. I suppose the "anti" in "anti-Judaica" would have the sense of sitting down *opposite* Jews in a friendly spirit rather than in antagonism.

725TH ORDINARY GENERAL MEETING,

HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, MAY 27TH, 1929,

AT 4.30 P.M.

SIR AMBROSE FLEMING, D.Sc., F.R.S. (*President*), IN THE CHAIR.

The Minutes of the previous Meeting were read, confirmed, and signed, and the PRESIDENT then called on Sir Flinders Petrie, F.R.S., to read his paper on "The Materialization of Old Testament History."

*THE MATERIALIZATION OF OLD TESTAMENT
HISTORY.*

By SIR FLINDERS PETRIE, F.R.S., F.B.A.

IT is natural to man to feel a need of a material association to consolidate his verbal knowledge of past events. Personal mementoes are eagerly treasured, and every religion has its sites and objects which are sacred by reason of the history with which they are connected. Whether it be Buddhism or Islam or Christianity, either Catholic or Protestant, all have veneration for the things which are linked with the history of the faith.

So soon as the Church had a civic organization, the respect for holy places led to pilgrimages, and soon after to the veneration of objects. Both of these naturally pious interests produced an enormous growth of fable, in an ignorant age: yet the instinct was natural and true in its proper sense. The estrangement of East and West in mediæval times led to the substitution of western types for eastern realities, and hence a materialization which was absurd and misleading, especially in pictures.

In the last century or two, this estrangement has taken the form of reading eastern writings in a western frame of mind, and taking the statements or meaning of events as if they were the precise relations of a man in entirely different surroundings and modes of thought of modern times. We know, ourselves, how the statements of a Chinese or a Negro, *verbatim*, will seem quite out of joint with our sense of things, and how we must discard our frame of mind if we are to enter into their sense of things. Thus, in order to understand any document of a different country, or remote age, we must try to read it from the point of view of the writer, and with the mentality of those to whom it was written. It is only by thus reclothing ourselves in a different frame of mind, that we can begin to realise the true aspect of writings which did not start from our present position. A wholesome practice in this is to soak the mind in tales of very different civilisations—Eskimo, Tibetan, Chinese—and so learn a flexibility of thought. For half a century I have worked with Orientals, and latterly in the heart of Bedawy life, where the patriarchal tales seem to be naturally materialised as one with the life around. As Dr. Schechter said of Rumania, "In my country there is no difficulty about miracles; they happen every day."

Now we can bring our modern development of life and thought into touch with ancient times, not by pilgrimages and relics, but by unearthing the actual works of past lives, by realising the places, the conditions, the habits of people, and so living in the past as closely as we may. This is the only way in which we can get a true valuation of the records which remain to us. We must see events in the same aspect as those who wrote about them, however much we may translate them into the terms which we—or any other peoples—might employ. If I remember aright, the "Lamb" has to be rendered the "little seal" to the Eskimo.

The record of patriarchal times deals with a nomad people, and we must first realise their conditions. They were nomads

not as inferiors, but as living in a fluctuating climate, so that they had their pastures in various places, up at Hebron or north of that in a dry season, down in the Negeb in a rainy season, just as nowadays strings of camels and donkeys and sheep, as far as the eye can see, pass up from drought to green pastures. Such were the shepherd kings, known as the Hyksos, who conquered Egypt, and Abraham was an example of these people, a Bedawy chieftain, who drifted to and fro in accord with the rains. For defence these people had fixed camps surrounded by great earth banks, as in Central Asia at present. In such places they had pottery, and very fine pottery, which it would be impossible to carry about in a nomad life. They also, no doubt, had embroidered garments, like the modern Bedawy, as such are shown in the Bedawy procession at Beni Hasan. Weaving also in coloured patterns is still usual, as it was in the days of Joseph. Their weapons were good and effective, and the lyre was not despised. At present we find the Bedawy very adaptable; in a short time they will pick up delicate and minute ways of work, which seem entirely outside of their natural kind of life. Similarly the Hyksos in Egypt took up much of the old civilisation; they restored Egyptian temples with pillars and bronze gates, and the first mathematical treatise was compiled in their time. At Beth-pelet we have recovered much of the Hyksos occupation, their immense fortification by steep slopes, their noble pottery, numerous scarabs in finger-rings, daggers, and dress-fasteners. Those who remained nomadic, as Abraham, could not have pottery, and in the hill country south of Judah the named sites of well-known places have not a single potsherd; evidently only wooden and skin vessels were in use. But much else of the civilisation would be common to all the chieftains of this age.

The duration of the Hyksos rule is indicated by our finding that, late in that period, the same vizier was over both Egypt and Palestine, and scarabs of his were made in different styles according to the country. There was, therefore, a lengthy period,—probably two or three centuries or more—of united Hyksos rule.

Regarding the geography of the Exodus, there have been various theories, which are superfluous in view of the close agreement of the record with the traditional road. There is no water-supply on any other way, whereas fresh water can always be had near the seashore by digging down to the water-table. The distances

to Marah, to Elim, and to Sinai agree with the route. From Sinai the next stage was to Paran or Pharan, which is obviously the Wady Feiran, the most fertile region of the peninsula. This way led out to the east, which was, therefore, called the wilderness of Paran. It was south of Mount Seir (Gen. xiv, 6), but far to the south, as it was in ready communication with Egypt (Gen. xxi, 21; 1 Kings xi, 18), and was limited by Hazeroth just east of Wady Feiran (Num. xii, 16). The name applied to all the wilderness up to Kadesh Barnea (Num. xiii, 26; Deut. i, 1), and that mount may be the holy place Mount Paran, named in later times (Deut. xxxiii, 2; Hab. iii, 3). It is needful to point out these connections, as there have been various sites of Paran named, while they may well be all reduced to the Wady Feiran, and the wilderness which the Israelites approached through that valley, and named after it. This is like the transfer of the name of the little tribe of Græci to the whole of Greece, because the Romans knew that tribe first.

The entry into Palestine has been much confused by the treatment of the site of Jericho; that has been cut to pieces without any reliable dating of the various walls, and is now at last to be scientifically examined. The questions raised by the great stele of Merneptah, which describes that in his reign "the people of Israel are laid waste—their crops are not," seem to have been satisfactorily answered by Mr. Wiener. He refers this defeat of the Israelites to their rout and destruction when they attempted first to enter Canaan (Num. xiv, 45). As the land was under the dominion of Egypt at the time, a defeat of would-be invaders was reckoned as a triumph of Egypt. It is stated after naming all the cities, and is a defeat of a people without a city, only followed by a general statement of all Palestine being in subjection.

We must turn back somewhat now to the Philistines. It is at present generally accepted that a class of pottery in Palestine which is obviously degraded from Cretan and Mykenæan types was introduced by the Philistines, as they are the only people in Palestine who appear likely to have come from the west. This agrees with the relation of the Philistines to Capthor or Keft, a region of South Anatolia or Crete. A main objection to this view is that the Philistines spoke Semitic, and had they come in as a whole people at the fall of Crete under the "Dorian" migration, they would have kept their own language. They first appear in Egyptian records as one of the western peoples of

Crete and Sicily (?) allied with the North Syrians, in 1194 B.C., and this may well have been the time of the principal migration; but most migrations are prepared by an infiltration long before. The Palestine coast was known to the Cretans for two thousand years before this period, as Cretan pottery came into Egypt with oil and ruddle in the first dynasty. The coast round from Crete to Egypt must have been familiar.

Let us now look at the references to the Philistines, disregarding conjectural emendations which are the refuge of ignorance. At the time of Abraham and Isaac there was a king of the Philistines in Gerar, with a Syrian, Phichol (Pa-khal Egn.) as his captain of the guard. The dominion of the Philistines extended to Beersheba, where they stopped the wells of Abraham. This does not imply any large body of men, but rather a control exercised through a native police force under a Syrian. It would be much the same as the British control at the present time with native police. The reason of the Philistines occupying this coast was not only for securing the ports of Gaza and Ashkelon, but for holding the Shephelah by residents at Ekron, Ashdod, Gath, and Gerar. The purpose of such a control seems probably the obtaining of supplies from this fertile corn land to feed Crete, and perhaps South Anatolia. The rich population of Crete, in a rocky island, would need to import corn, and the placing of Philistine lords in the corn lands, and the two ports, seems naturally explained by the economic necessities. Such residents would soon speak the Aramaic of the country, like Turkish officials now. Then when trouble fell upon Crete, by the northern migration which swamped the older civilisation there, the Philistines naturally pushed over into a land already well known to them, and from which their food had come. At the Exodus there appear the familiar phrases of "the land of the Philistines" for the coast road, and the "sea of the Philistines" for the Mediterranean. This region was not extended by the time of Joshua, who carefully left the Philistines alone in their five cities. But soon after they desired the other great corn plain of Esdraelon, and by 1030 B.C. they held the key position of Beth-shan at the head of that plain, which controlled the access from the south. The Philistines continued in possession of their southern pentapolis all through the age of the prophets, and Nehemiah was greatly troubled by the intermarriages of Babylonian Jews with the Philistines of Ashdod. No doubt the Jewish peasantry who were left in the land had freely mixed

with the Philistines before that time. This leads to considering the interesting paper by Dr. Redcliffe Salaman on the modern types of the Jews. He distinguishes the Hittite, the Semitic, and the fair Western type which he identifies with that of the Philistine. The profiles of the Philistines on the Egyptian monuments are strikingly the same as those of the Cretans, and appear to be continued in the fair, thin-featured, light-haired Jews of the present day.

Of the materials that were in use, we have learned much from recent excavations. We now know how Isaac reaped his hundredfold crops with sickles made of flints set with plaster into wooden handles. This was a form also used in Egypt, but the Palestine flints were much deeper and shorter. Bronze seems to have been too valuable for it to be in common use among reapers, and flint sickles continued in use until 1350 B.C., and gradually died out by 1100. Overlapping these, the iron sickles began about 1250, and are usual from 1000 B.C. onward. Iron knives first appear about 1300 or 1250 B.C., and heavy agricultural tools belong to 1150 B.C., found alongside of the iron furnaces. Thus iron was in full use during the period of the Judges, though apparently kept reserved to the Philistines; while at Beth-pelet, beyond the Philistine rule, flint was still in common use.

The extent of the Egyptian conquest of Palestine under Sety I in 1325 B.C., and their hold on it for a century after that, has been well exemplified by finding long inscriptions of Sety and of his son Rameses at Beth-shan, on the high road to the northern country in which most of their fighting took place.

The rise of David's power seems to have been largely due to the trained bodyguard of Cherethites and Pelethites. They were entirely under the rule of Benaiah, son of Jehoiada. The Cherethites are linked with the Philistines as late as Zephaniah and Ezekiel, and the general view is that they were Cretans settled about Gaza at the southern end of the Philistine land. The Pelethites were more closely connected with Benaiah. Their name shows them to have belonged to Beth-pelet, the strongest fortress of the south, and Benaiah's father Jehoiada was a valiant man of Kabzeel. That place was the chief sanctuary, the "assembly of El," which heads the whole list of cities of the Negeb. Benaiah, therefore, represents the influence of the south country in David's party, doubtless from the early days of the wild life at Ziklag. Joab, on the contrary, represented the

influence of the hill country of Bethlehem. Though Joab was David's sister's son he did not follow David's bequest of the kingdom to Solomon, but joined the party of Adonijah, son of Haggith, a Hebronite. The contest of the succession was between the hill party of Joab and the host, and that of the Negeb party of Benaiah and the bodyguard. The latter, being in possession of Jerusalem, carried the day for Solomon. This was rewarded by Solomon ordering his own cousin Joab to be slain by Benaiah, and the pretorian guard of Cherethites and Pelethites won the supremacy, with their leader as the ruler of the host, in place of Joab. The southern interest thus prevailed over the Bethlehemite. The site of Beth-pelet is one of the most important, from its strength under the Hyksos, and its being the centre of the bodyguard of the south country. The clearance of it would throw much light on the early history, and two seasons' work have hardly yet opened the subject. Unhappily England does not support such work effectively, and the contrast with the support of American work is pitiable. We are lamentably hindered unless the public will take the need of our researches more seriously into account.

The buildings of Solomon have lately come to light very notably in the great stables of Megiddo. Each block is for twenty-four horses and their chariots. There is a central avenue to hold the chariots, and on either side twelve great pillars with tether holes, and stone mangers placed between the pillars all the way. The horses were thus outside of the rows of pillars, and the grooms went up the chariot avenue to feed them. Many such great stables remain, and some others of lesser size. One of the small stables for half a dozen was unearthed long ago, and duly regarded as a sanctuary with sacred pillars. The great stables have completely cleared up this position, and it is only stones very different in form and arrangement that we can in future suppose to have been sacred. The whole of Megiddo may probably be cleared by about 1960 or 1970, and as Mr. Rockefeller has given a trust fund permanently for this work, it may be hoped that it will be completely carried out and published by Mr. Guy.

From our own work at Gerar it is evident that Palestine in the age of Solomon was far more wealthy and prosperous than either Egypt or Babylonia. The fine stone jewellery of this age is much more costly and beautiful than anything made then in Egypt; it rivals the best work before that in the XVIIIth

dynasty. Such wealth can only be explained by the mercantile activities of Solomon dealing in horses and linen, and above all, by his control of the whole trade between east and west. By holding Ezion-Geber as a port he cut out Egypt, as the Gulf of Suez is dangerous owing to coral reefs. By reaching the Euphrates he also controlled the northern trade route by Iraq. Thus astride of the lines of trade both south and north, he was able to levy toll on the whole of the Eastern commerce.

The parade through Palestine in the end of the reign of Shishak, and his looting of Jerusalem, is borne out by finding part of a very large stele of this king at Megiddo. The more permanent remains of his reign are the rebuilding of Gerar and the immense wall which still stands at Beth-pelet. These buildings are notable for the depth of their foundations, in which the large clay bricks are laid in clean sand. The great wall of Beth-pelet, twenty-two feet thick, has foundations eight feet deep, to ensure that it should not slip by subsidence of the hill. Such work must imply enormous activity in the last few years of his reign.

Of the monarchy, not much has been found that is distinctive. At Samaria the palace was finely built of large blocks, and there were many ink-written labels, which show how usual writing was. Yet there is a strange dearth of written record in all the sites of Palestine. If we could afford much wider clearance of sites we might hope to secure more documents, but for the present the material remains and their interpretation are all that we can obtain as aids to further understanding the Israelite history.

Jerusalem has been much examined, but with less result than would be expected elsewhere, owing to the restrictions of property, the high expenses of land and labour, and the need of avoiding work which might offend any of the religions there entrenched. The continuous occupation of the site, and the many destructions that have overtaken it, also make the interpretation of the remains difficult and often doubtful. The most decisive recent discovery is that of a great gateway on the west of the ridge of Zion, now Ophel. This is stated by Mr. Crowfoot to have been built in the Bronze Age or Early Iron Age, say the XIXth dynasty, about 1300 B.C., and to have been used, with various repairs, down to the time of Titus. This delimits the width of the ridge to only 400 feet, or less for the higher part; so it was much the same size as the other early hill forts, and not a fiftieth of the size of the fortified Jerusalem of late times. Such

was the Zion of David, and the threshing floor of Araunah was a quarter of a mile away to the north, much further up the ridge, out in the fields of those days. The ruin of Zion was the fatal cutting down of the hill by the Maccabees in order to prevent the temple courts being overlooked. This cleared away all the early town, and now it is only in the rubbish below the hill that anything early could be found.

Whenever excavation on a large scale could be supported, a most interesting place to search would be the Tyropoeon valley behind the temple site, north of Wilson's arch, where probably remains of the masonry of each temple would be found overthrown. Much has been done in tracing walls and rock scarps, but the absence of any means of dating these hinders their appreciation historically. A large portion of a wall of immense blocks has lately been uncovered near the Palestine Museum, far to the north, assigned to the fortification of Agrippa.

Not only in Palestine but also in Egypt may material remains be found of Jewish history. As early as before the Exodus there appears a large tablet of an Egyptian officer, engraved by a scribe called Yehu-naam, or "Yehu speaks," the converse of the familiar phrase, "Thus saith the Lord." This can hardly be other than a Jew of the bondage period, who became a highly skilled artist in Upper Egypt. Later, in Middle Egypt, there is an old tomb which was re-used by a family who wrote their memoirs in Aramaic on the walls, showing that they were in Egyptian politics from the time of Tirhaka, that is in the reign of Manasseh, a century before the destruction of the temple.

After the captivity there is the contact with the history of Jeremiah at Tahpanhes, where the arrangement of the fortress explains the narrative, which otherwise seemed hard to understand. This great camp of the Greeks was the familiar stage to every Jew who went down into Egypt during seventy years before the captivity. Any number of Greek objects and their names would pass thence into familiar Jewish use. It was the first step in the Hellenization of the Jewish race.

The settlements of the Jews in Egypt extended up to the southern frontier at Aswan. There the Diaspora was so strong that a temple was built, probably at the Persian conquest, as it was destroyed in 411 B.C. The well-known papyri from there show an absence of the fanaticisms of the Babylonian Judaism. The Jews intermarried with the Egyptians, who took Jewish names and gave them to their sons. The mixture was rather

an accession to Judaism than otherwise, like the cases of proselytes. This carries our review down to the end of the Canon, and the mass of later links of Judaism are beyond our scope.

We may now briefly see what are the means for bringing to light the material history. In the first place there is the necessity of working with an accurate dating; it is almost useless to find a wall or a tomb if the date of it remains in doubt, and if we cannot put the knowledge that we reap into its historic connection. In the past there has been a great lack of such needful attachment. It is only from the neighbourhood of Egypt, the importation of Egyptian objects, and the dating of Egyptian conquests, that any precise historical status can be given to the Palestinian antiquities. Sometimes large monuments are found, as at Beth-shan and Megiddo, with the names of conquerors, but such are only of rare occurrence. There are also many small objects which can be dated by their Egyptian relation, and these are naturally most frequent on the southern border. It is therefore by a preliminary knowledge of Egyptian antiquities, and by working on sites near Egypt, that we can lay the foundations of the history of Palestine. It is for this reason that the British School of Egyptian Archæology has entered on the entirely neglected field of the Negeb. Gerar proved an ideal place to begin with, as it had been rebuilt every two or three centuries, and being entirely of clay brick it wore down equably, forming about five feet of ruin between each rebuilding. There all the products of the civilisation from 1500 to 500 B.C. could be dated, to form a scale for future work. Beth-pelet is not quite so complete in its series, but every stage of it can be linked with Gerar, except that it provides the Hyksos remains and even pre-Hyksos, thus carrying the chain of civilisations back to the XIIth dynasty. Whenever the Megiddo work reaches back to the earlier ages we shall learn much more, but it will be some years yet before the period of the Judges is exposed.

What hope is there of doing more on the dozens of city mounds which await our search in Palestine? Only a small fraction of the whole will be done in a century, and for the sake of history the available working power will be best applied by complete work on selected portions, examining those parts of sites which will best give their history.

For such work the limit of convenient management is about 400 or 500 men and children, divided in small groups. The difficulty of drawing men from far, and the lack of discipline in

very large bodies with fluctuating attendance, makes larger numbers unsuitable. The camp, with trained archæologists to manage it, and the publication, will cost about £3,000 a year, without allowing for salaries, but only bare costs. If the superintendence were on a professional scale, £5,000 a year would be needful.

It seems absurd to say that England cannot afford £30,000 a year for half a dozen such expeditions, when we look at the immense waste going on in all classes of society. One *per cent.* on any of the great sources of waste would pay for all that is wanted. Yet actually there is great difficulty in raising even £1,500 a year, and we are heavily depleting the resources of our School of Egyptian Archæology, which will soon be exhausted. The opportunity is here before us to learn of the past, but few there be that will accept it.

DISCUSSION.

Sir AMBROSE FLEMING (President) said: I feel sure I shall be giving expression to the predominant sentiment of this audience in stating our great obligations to Sir Flinders Petrie for the address he has given us to-day. We are very much indebted to him for granting us a share of his valuable time and thought in the preparation and delivery of this interesting paper.

It would hardly be possible to name any subject for discussion more in accordance with the main objects of this Institute than that of the historical basis of our religious faith, and sacred Book. Literary criticism has been busy in the past, and is even in the present, in endeavouring to reduce much of the Old Testament narratives to mere folk-lore or legend. The subjects of its life-like biographies in the patriarchal period, at any rate not so long ago, were claimed to be merely the names of tribes or clans, and as having no individual existence. But the spade of the archæologist has many times over undermined the hasty conclusions of the literary critic, and may do still more yet in the same direction. Both persons and places mentioned in the Old Testament are continually becoming more and more real to us, and the history of the Book declared to be fact, and not fiction, in virtue of archæological exploration.

The discoveries made lately, and the objects exhibited in the British Museum, found at Ur of the Chaldees, for instance, have shown us the state of civilization, in art and building, at and before the date of Abraham. The city of Ur was, I believe, a place devoted to the worship of the Moon-God Sin, and its elaborate ritual.

Now it seems not at all improbable that Terah the father of Abraham, who, we are told, lived in Ur, had become impressed with the idea that these celestial bodies, the moon and planets which move about over the celestial vault, were not living creatures to be worshipped but the creations of one invisible living God, and hence he, becoming displeased and dissatisfied with this astronomical idolatry, determined to migrate with his family westwards, and find a fresh place for free worship of the single Supreme Deity; just as the Pilgrim Fathers went forth more than 300 years ago, from Europe to North America, to find religious freedom and worship there.

I am much interested in the statement (on p. 263) that the site of the Canaanite Jericho is to be scientifically examined. Last January, on a lovely day, I drove down from Jerusalem to Jericho, or rather to one of the Jerichos—because there are three sites. There is (1) the old Jericho, which is now merely great mounds of stones and dust, partly opened up, revealing the shells of a few houses; (2) the remains of Roman Jericho; and (3) modern Jericho, a collection of untidy houses, and a few third-rate hotels. The old Jericho, of which I took a photograph, lies about a couple of miles higher up the Jordan valley than modern Jericho. It would be extremely interesting if proper excavation could reveal whether this old Jericho was a walled town, and whether there is any evidence that these walls all fell down at some time simultaneously on all sides, in accordance with the Old Testament narrative in the Book of Joshua.

In view of the importance of such exploration, I am sure we can all heartily endorse the regret of Sir Flinders Petrie that it is so difficult here in Great Britain to secure funds for scientific work—when we remember what large amounts of money are expended annually on alcoholic liquors, tobacco, and amusements, and in preparation of films for moving pictures.

Another matter in which I am interested is the mention, on p. 265,

of the first use of iron. I should like to ask where the Philistine iron ore probably came from, and whether there is any evidence of the invention of bellows or chimneys for producing a forced draught, at the time of the first use of iron? The ordinary iron ores are—*magnetite*, which is a tetroxide of iron; *hæmatite*, which is most abundant and is a sesquioxide; and the *clay ironstone*, which is a carbonate of iron, and supplies two-thirds of the iron now produced in Great Britain. It is not difficult to reduce the pure oxides of iron to metallic iron by heating it with charcoal, provided fairly high temperature and a pure oxide is obtainable. If, however, there is much silica or clay mixed with the ore, then it is necessary to use limestone, or calcic carbonate, to form a fusible flux, and this requires a much higher temperature than the reduction of a pure oxide of iron. According to Xenophon, metallic iron was first prepared by the Chalubes, a people living near the Black Sea. Hence our word “chalybeate” for water containing iron. The first preparation of steel, which is an alloy of iron and carbide of iron, came much later.

In the Book of Genesis (iv, 22) we have a mention of Tubal Cain, “an instructor of every artificer in brass and iron.” In Deuteronomy (xxvii, 5) we are told that in building an altar “thou shalt not lift up any iron tool upon it”; and in Joshua (xvii, 18) we are told that the Israelites were to “drive out the Canaanites though they have iron chariots.” The date of the first use of iron in weapons of war is important, as it would give great advantage to the people possessing them. I should like to ask whether it is not possible that iron was in use before 1300 B.C.?

As there are, no doubt, many present who will like to speak or to ask questions, I shall not trespass at any greater length on your attention, but ask you to approve by your applause the formal vote of thanks to Sir Flinders Petrie, which I have now the pleasure of proposing, for the very interesting and valuable paper he has read to us to-day.

Mr. R. DUNCAN said he counted it a high privilege to have had the opportunity of listening to one whose fame as an archæologist must be world-wide. There were a couple of points in the paper on which he desired to touch:—

(1) Did the description of Abraham as “a Bedawy chieftain”

quite accord with the circumstances? Was he, for instance, any more a Bedawy chieftain than Colonel Lawrence, who, in the Great War, lived with the desert Arabs, and was their leader in raids, yet remained English to the core? Although called, comparatively late in life, to be a tent-dweller, was not Abraham, as a matter of fact, town-bred, hailing, as he did, from Ur of the Chaldees? When, with advancing years, his possessions multiplied, had he not, as his steward, a townsman, Eliezer of Damascus? and, if importance is to be attached to what the Epistle to the Hebrews says of Abraham's outlook, did he not continue, to the end, a townsman at heart, "for he looked for a city which hath foundations whose builder and maker is God"?

(2) The circumstance that the district now "Feiran" was called by the Israelites "Paran" suggests the query whether there was, in the speech of the ancient Hebrews, an inability to pronounce the "f" sound at the beginning of words, and a tendency to have recourse to the "p" sound instead. It is interesting to note in this connection that the lists of proper names in Cruden's Concordance contain no Hebrew ones under the letter "F."

Lieut.-Col. F. A. MOLONY said: The Victoria Institute is much indebted to Sir Flinders Petrie. The title of his paper might well have been "Confirmations of the Old Testament." As Sir Flinders has frequently mentioned dates, we should like to know whether he regards Archbishop Usher's chronology as fairly accurate back to Moses. According to the Archbishop, there was a gap of 235 years between the close of the Book of Judges and the opening of the First Book of Samuel, and of 388 years between the capture of Jericho and the slaying of Goliath, which, according to Matt. i, 5, 6, should only have been four generations. Hence it would seem probable that the Books of Samuel follow more closely on Judges than Archbishop Usher supposed.

Mr. W. N. DELEVINGNE said: The lecturer, in his extremely interesting paper, remarks (pp. 266, 267) that from the work of the British School of Archæology at Gerar it is evident that, in the age of Solomon, Palestine was far more wealthy and prosperous than either Egypt or Babylonia; and he goes on to state that its wealth can only be explained by the mercantile activities of Solomon

dealing in horses and linen, and, above all, by his control of the whole trade between east and west. By holding Ezion-Geber as a port, he says, Solomon cut out Egypt, and by reaching the Euphrates he also controlled the northern trade route by Iraq; and thus, being astride of the lines of trade both south and north, he was able to levy toll on the whole of the Eastern commerce.

As regards the growth of Solomon's wealth and power, it must be remembered that, not many years previously (about forty), the power of the Israelites had been broken when they were utterly defeated by the Philistines at the battle of Mount Gilboa, and their king, Saul, and his son were slain. It is remarkable, therefore, that not only should they have been able to make so rapid a recovery under David and Solomon, but that the latter should have succeeded in extending his kingdom to the port of Ezion-Geber (on the Red Sea) on the south and as far north as the River Euphrates. In the Biblical record we are told very little as to how the military power of the nation was restored and increased under David and Solomon, and it would be interesting to know how, in face of the Egyptian power on the south and the Assyrian power on the north, Solomon was able, not only to maintain his hold on the port of Ezion-Geber, but also to assert his authority as far north as the Euphrates with such success as to be in a position to levy toll on all the trade coming down from the north by the regular trade routes. Will the lecturer be good enough to throw further light on this point?

Mr. W. HOSTE said: The details (on p. 265) as to the use of stone, iron, and occasionally bronze sickles as far back as the time of Isaac are very interesting, as illustrating the fact that what are known as the stone, bronze and iron ages were not necessarily successive, but contemporaneous, or, at all events, overlapping. Would not this necessitate a revision of some calculations as to the extreme antiquity of certain objects and their makers? Then Isaac's long flint sickles, which the lecturer points out were of the Egyptian model, and not that usual in Palestine which, perhaps, were brought by Abraham from Egypt, *circa* 1900 B.C., and did not die out till 800 years later, were in use contemporaneously for at least 150 years with iron tools. No doubt in Africa or Asia to-day, all "the ages" can be found running contemporaneously in different parts of the

continents, according to the supplies available. For instance, one sees copper in common use among the natives of Katanga at the south extremity of the Congo Free State, and in the Zambesi Valley native ironsmiths working with their primitive bellows producing their native steel, and no doubt in regions not far distant you could have had your skull cracked with a stone hammer, if so disposed, not so many years back.

WRITTEN COMMUNICATIONS.

From Mr. W. R. ROWLATT JONES: I notice that Sir Flinders Petrie throws the weight of his authority on the "Bedawin chieftain" aspect of Abraham's life. This tends to obscure the possibility that he was of royal descent, and closely allied to the reigning houses of early Babylonia. It might be that his strong monotheistic views rendered him distasteful to his kingly and priestly relatives, and the Divine call fell on prepared ground. In thus leaving his royal surroundings, he would be a type of *the One* who, two thousand years later, did the same. Further, when he left Haran to go into Canaan, Abraham would be the forerunner of *the One* who left home, mother, and property in Nazareth, when about thirty years of age, to adopt a nomadic career. I suggest the view, doubtless strange (in spite of several texts supposed to prove the contrary) that Joseph and Mary and their son and heir were people of substance, with property both at Nazareth and Bethlehem.

From Dr. J. W. THIRTLE: Day by day, before our eyes so to speak, the materialization of Old Testament history proceeds, with incidents that in many cases are full of interest. I shall not, I think, be deemed an obscurantist if I indicate a typical aspect of the general subject. I call attention to something which for many generations was a shadowy allusion in literature, but which in our own time has materialized and makes its appeal as an object of profound importance.

First, the historical allusion. Who does not recall words, coming to us from the Pentateuch, in a passage wherein the Divine Law was eulogized before the children of Israel? The words were:

“What great nation is there that hath statutes and judgments so righteous as all this law, which I set before you this day?” The passage is familiar, but its implication is not so readily gathered. One thing is certain, however—we have here a definite allusion to the fact that before the days of Moses, and the law which he promulgated, surrounding nations had their codes of laws; and, further, we gather that great nations had such codes, although the statutes and judgments were not so righteous—so noble and equitable—as was the Law which, by Divine ordinance, had been given to the small nation of Israel. As to their character, the statutes and judgments of the great nations were comparable with those of the Chosen People, but as to their substantial nature they were manifestly inferior. This thought lies in the passage, Deut. iv, 8, R.V.

For thousands of years this allusion has had its place in the literature of Israel, but until recent times no material counterpart was at hand. Should we look to Egypt, the land which meant much in patriarchal days, then the institutions observed would be of a far different order: they would lack real correspondence with the familiar Hebrew reference. At length, however, in the Providence of God, the things indicated—like thousands of others within the scope of the lecture to which we have listened—have materialized. We go back to the beginning of the present century, and we find that, thousands of years after enactment, a code of laws was recovered from the dust of ages—a code which fills the bill in regard to the “statutes and judgments” by which great nations regulated their social life in days long gone by.

As to the materialization. It was in the year 1901, while excavating at Susa, that M. de Morgan discovered a huge block of black diorite, with a bas-relief representing King Hammurabi receiving a code of laws from the sun-god, Shamash, with laws inscribed on the front and back sides of the stele. Some part of the code had been erased, but there remained 248 enactments, relating in large measure to civil and criminal law; and, to use the words of the late Professor Driver, they were “remarkably similar to corresponding provisions of the Hebrew codes preserved in the Pentateuch.”

Going back to the third millennium B.C., this code, among others, may well have been in the mind of the Hebrew Lawgiver, when comparing to their virtual disparagement, the statutes and judgments of the great nations with those of the righteous law given by

God to the little nation of Israel. For many generations there had been no material counterpart of the Deuteronomic allusion, but now at length the code of the Elamite empire had proclaimed its affinity (though not otherwise related) with the Law of Moses. Found along with cuneiform letters and contract tablets, the code had slept for thousands of years, and the people whose lives were ordered thereby, along with their god Shamash, had long passed into oblivion.

My point is : The Hammurabi stele explains the Pentateuchal allusion ; in a word, it materializes it, and enables us, by contrast, to see the excellence of the Mosaic institutions, and to realize therein a system of law worthy of the God of heaven and earth. It does more : it serves as a symbol of the entire process of materialization, as this latter has interpreted to men and women of our own time the life and literature of ancient days.

THE LECTURER'S REPLY.

The source of iron was in the common nodules of hæmatite from the stream-bed ; these were apparently produced by hot springs leaching the sulphur from the pyritic nodules in the chalk and limestone. No reduced iron is known before 1350 B.C. ; but meteoric iron was occasionally worked even in prehistoric times.

The Bedawy are nomads, like Abraham, because they live in a half-arid region, and have to move according to rainfall ; but that is no reflection on their abilities or character.

The Hebrew "P" is always "F" among Arabs, as they have no labials beyond "B" and "F."

Chronology can only be dealt with on the basis of recent knowledge.

David and Solomon rose to power during an eclipse of Egypt under the decadent Ramessides, and of Babylonia crushed by an Assyrian invasion.

Flint implements continued in common use till 1100 B.C., and in some cases much later.

726TH ORDINARY GENERAL MEETING,
HELD IN COMMITTEE ROOM B, THE CENTRAL HALL,
WESTMINSTER, S.W.1, ON MONDAY, JUNE 3RD, 1929,
AT 4.30 P.M.

DR. JAMES W. THIRTLE, M.R.A.S., IN THE CHAIR.

The Minutes of the previous Meeting were read, confirmed, and signed, and the HON. SECRETARY announced the election of the following:—As Associates: Alfred Phibbs, Esq.; the Rev. F. E. Marsh, D.D.; W. B. Sommers, Esq., M.B., F.R.C.S.; the Rev. D. E. Hart-Davies, M.A., D.D.; Andrew Williamson, Esq.; Commander W. H. N. Yonge, R.N. (ret.).

The HON. SECRETARY also announced the name of the successful candidate in the Triennial Langhorne Orchard Prize Essay Competition. This was founded six years ago in memory of Prof. Langhorne Orchard—a Vice-President of the Society—by his daughter, Mrs. W. Langhorne Cooper. The subject proposed for the Competition was “The Bearing of Modern Discovery on the Historicity of the Noachian Deluge.” The name of the successful candidate was Lieut.-Col. L. M. Davies, R.A., F.G.S. Other valuable essays were sent in, but that of Col. Davies was awarded the prize of £20 and the commemorative medal. Unfortunately the Colonel’s military duties prevented his attendance, but he was hoping to be present in the course of the next session to read his essay.

The CHAIRMAN then called on the President, Sir Ambrose Fleming, D.Sc., F.R.S., to deliver the Annual Address on “Nature and the Supernatural.”

NATURE AND THE SUPERNATURAL.

By SIR AMBROSE FLEMING, M.A., D.Sc., F.R.S. (*President*).

THE trend of modern thought as exhibited in much scientific and popular literature, also to some extent in theological writings, is to deny the probability of any sudden discontinuities or interruptions in the order of events in Nature, perceptible by us, and to assume everywhere an unbroken interconnection of a kind possible of comprehension by us.

Thus we now endeavour to find as far as possible mechanical, physical, or chemical explanations of natural phenomena, and are not willing to admit the happening of any event which contradicts our normal experiences or cannot be explained by reference to phenomena or causes with which we are already to some extent familiar.

Even where there is some very obvious *hiatus*, as between living and dead matter, it is very common to assume that we

shall one day be able to discover the exact nature of this difference, trace out its stages, and explain it without reference to any supernatural agency.

This conviction of the continuity and unchangeableness of phenomena in the external world, and that there is nothing in it which is, or should be, beyond the power of the human intellect to explore and explain, is, however, a plant of rather recent growth.

For primitive man everything that presented itself to his mind was so novel, and mostly so inexplicable, that no departure from usual occurrences would have seemed strange or improbable. In the childhood of the world nothing that could happen would have been considered miraculous in our sense of this term.

Modern science, experimental, inductive and deductive, is almost entirely the achievement of the last 300 years. Its chief pioneers were Descartes (1596-1650), Galileo (1564-1642), Gilbert of Colchester (1540-1603), and, in a less degree, Francis Bacon, and it had as its great initiator Sir Isaac Newton (1642-1727), who was born in the year (1642) that Galileo died.

The result of three centuries of intellectual labour has been to establish firmly a belief in the general constancy of events and phenomena in the material world. If that constancy did not exist to a very great extent, there could be no scientific investigation, invention, or research. It would be useless for men to expend a lifetime of labour in determining and measuring effects or physical quantities, such as the velocity of light, the mechanical equivalent of heat, or weights of atoms, if these were liable to sudden or gradual change.

1.—THE MEANING OF THE PHRASE "LAWS OF NATURE."

As far as we have been able to explore the phenomena of the material world they appear to remain constant from age to age; they vary neither with time nor distance. An atom of hydrogen in a far distant star on the confines of the universe has the same radiative powers, as shown by its spectral lines, as an atom of hydrogen in our terrestrial laboratories when observed under the same conditions. All our scientific investigation to-day is based upon, and supports, the conclusion that the phenomena of the material world, as far as we have accurately ascertained them, exhibit no variability, but remain the same. We speak

of these observed uniformities as the "Laws of Nature," and we commonly say they are constant or invariable.

The word "law" as here used has somewhat different significance from the same word when used in legislative or moral statements. In the latter case the term "law" implies a regulation or restriction of some kind which must be obeyed. Penalties are often attached to breaches or neglect of it. We thus speak of the "Common Law of England" or of the "Divine laws."

There is then associated with the word "law," in this sense, the idea of compulsion or necessity, and of consequences which may be serious for non-attention to the law. Even in matters such as games there are so-called "laws" of cricket, or golf, or chess. Anyone who intentionally disregards them is shut out from participation in these pursuits by those who accept the rules as necessary.

In the scientific use of the word "law," in such phrases as "the law of gravitation" or "the laws of optics," the term "law" merely means an observed uniformity or effect which may often be expressed in numerical form.

Thus we state Newton's "law of gravitation" to be the observed fact, that masses of matter draw or attract one another with a force which is proportional to the numerical product of the masses, and inversely proportional to the square of their distance. The general truth of this statement is confirmed by the fact that we are able by means of it to predict astronomical events such as eclipses, the accuracy of which is proved by agreement with the results of observation. Einstein has, however, recently modified this law slightly, and given an expression for it which includes certain observations which Newton's law did not cover. In the same way there are innumerable other physical and chemical observations which by their uniform occurrence enable us to make a general statement or "law" which summarizes these experiences.

But now it should be noticed that, although we are in this way able to sum up the results of countless observations in a so-called "law of Nature," we are seldom if ever justified in saying that there can never be any deviations from it or them.

Suppose we release a stone from our hand, and notice that it falls towards the centre of the earth at a certain rate. Let us suppose the experiment conducted a million times with the same result. We have merely established an enormous prob-

ability that if it is tried once more a similar result will take place. We have not however established any necessity that it *must* take place. The idea of necessity or of compulsion does not enter into the question. All that our extended investigation of the physical world has done for us is to create an immense probability that the events in the material world will happen in the future as we have found them happen in the past. We are not entitled, however, to postulate that there never can be any variation in the happenings when they take place under the same conditions. The reason for this is that our knowledge of these so-called "laws of Nature" is indeed extremely limited.

As regards our experience of the phenomena in the physical world, we are in the position of a person who has seen a very small portion of a certain curve and determined its curvature, but he is not therefore justified in asserting that its curvature at all other unseen parts is the same. At certain places discontinuities or sudden changes of curvature may take place which are beyond the scope of his present vision.

The great achievements in scientific invention and research, especially in the last century, have, however, resulted in the production of a widespread conviction that the order of Nature, or what we call its "laws," are inevitably invariable. In other words, that there is not only an order as far as observed by us, but that the sequence of phenomena is necessary and is never changed.

This does not imply that entirely new phenomena or effects cannot be discovered, but it implies a conviction that when they are found we shall be able to trace a definite connection with other already known effects, or explain them consistently with already accepted interpretation of known phenomena, and find the new effects in course of time also to exhibit the same characteristic constancy.

Thus, in the closing years of last century, between 1895 and 1899, a series of discoveries were made by men of genius which totally changed the previously held ideas or theories of matter, and introduced us to new and very astonishing phenomena. Up to that time, although much knowledge had been accumulated by chemists concerning the combination of atoms, the structure of the atom itself had never been disclosed. Atoms were considered as infinitely hard unbreakable particles into the interior of which we could never penetrate.

In the same way our ideas of the nature of light were once limited to the radiations which affect the eye, and to a certain small range of non-visible rays at opposite ends of the spectrum having, respectively, heating and photographic power, called the dark heat and ultra-violet or actinic rays. The discovery in 1895 of the X-rays by Röntgen, and that of the Hertzian waves previously discovered, made known to us a vast extension of the spectrum beyond the violet and red light, and gave us the means of photographing the bones in the living hand or foot, or the coins inside a leather purse, and of conducting wireless telegraphy.

In 1896 the discovery by Becquerel of the power of Uranium ores, such as pitch-blende, to blacken a photographic plate, led to the great discovery of radium by M. and Mme. Curie, and all the surprising powers of the radioactive elements.

The epoch-making discoveries of Rutherford, Ramsay, Soddy, and many others, and that of Sir J. J. Thomson of the existence of the electron or atom of electricity as a constituent of all chemical atoms, led at last to a consistent theory of the atomic structure, which regards it as a miniature solar system in which electrons circulate round a nucleus built up of protons or atoms of positive electricity and of electrons or atoms of negative electricity. In all this mass of new knowledge we recognize, however, no discontinuity with the old knowledge, but only an extension of it, and a still unbroken reign of law. We are able to construct reasonable hypotheses which give us the power to visualize the atomic structure to some extent, but these are taken as merely guides for further experimental work and not assumed to be absolute representations of the actual structures.

It was in former times taken for granted extensively that a mechanical explanation of physical phenomena would hold good, and that such a reduction of observed effects to mechanism or motion was always possible. We are not so confident of it at the present time. The gap between living and non-living matter, for instance, has not been bridged. Although some biologists, such as Bastian, asserted that they had produced living organisms from non-living material, the results of more careful work seemed to be against this conclusion. The tendency of scientific thought has been then to regard the material universe as an entity existing in itself and by itself, and containing within itself all the resources necessary for its evolution or development.

In the latter half of the last century the term Evolution began to be used to describe the gradual progress of the universe of material things from one state to another more complicated, complete, or varied. The whole entirety of existing things and beings was spoken of as "Nature," but this term gradually acquired a certain degree of personality as if it were a causative agent apart from the things themselves, in such phrases as "Nature abhors a vacuum," or "Nature does this, that, or the other." In like manner the term Evolution came to be used as the name for a certain designing or controlling power, and not merely limited to its use as a general term describing the slow and gradual progress of the Universe from one state to another.

These ideas, viz., the assumed inviolability of the "laws of Nature," and the operation of an agency called Evolution, which is regarded as an automatic agency shaping or guiding the gradual changes in Nature, have exerted in the last half-century or more a very powerful influence on scientific and popular thought. One result has been to undermine belief almost entirely in the past occurrence of any interruptions or exceptions to what are called the laws of Nature, and to render belief in so-called miracles more difficult or impossible. According to Matthew Arnold, "miracles do not happen."

This does not mean that we invariably deny the actual occurrence or historical truth of exceptional events, but that an attempt would at once be made to explain them as the outcome or result of known and comprehensible antecedents. If that could not be done, the general tendency would be rather to doubt the accuracy or truth of the observations than the real interruption in any long-observed sequence of events. This, of course, is the essence of David Hume's argument against miracles, viz., that it is more likely the witnesses should be mistaken or deceived than that the event violating prolonged normal experience should have occurred.

We cannot however ignore the fact that there is a large body of evidence for the happening of many events which are outside all normal experience, and are not explicable as arising from known causes. It has, therefore, been usual to assume that all events coming within our cognizance may be divided into natural and supernatural.

2.—DEFINITIONS OF THE TERMS “MIRACLE” AND “SUPERNATURAL.”

At this stage, however, a little more careful statement must be made as to the events which ought to be included under the terms supernatural or miraculous. It is clear that not every wonderful or exceptional event can be included. As soon as we know, or can probably demonstrate, that the event in question depends upon powers or phenomena previously in any degree familiar to us, it ceases to be supernatural or miraculous.

In a pre-scientific age such exceptional events as a total solar eclipse, the appearance of a new and brilliant star, or a great meteoric shower or comet were regarded as supernatural or miraculous. But to us with our astronomical knowledge they are not so.

Even when the complete mechanism of some new happening is not known to us, analogy may lead us to see that the normal chain of cause and effect may not be broken by its occurrence. Thus, for instance, we all know that mental emotions, such as fear, anger, or joy, can disturb the bodily functions and secretions, and that an optimistic or hopeful temperament assists recovery from certain bodily complaints. Hence we are not indisposed to grant that a strong conviction of recovery will or can overcome functional disorders; in other words, that so-called faith cures are possible without passing outside of the natural order of events

A not unusual definition of a miracle is that it is a “breach of the laws of Nature.” This statement, however, takes for granted that we have a perfectly complete knowledge of these so-called laws or uniformities. All that we do know is, that over a certain period of time we have observed that certain events take place in a certain manner and sequence. Our evidence of this for the most part depends on human testimony and extends possibly over a very limited time. We have each of us, for instance, observed that the sun rises, or that day succeeds night for the span of our past lifetime. How do we know it took place before we were born? Only because we have been told by older persons that it did so happen. Our knowledge of the uniformities of Nature is then chiefly based on human testimony.

Very few persons have verified for themselves more than the

smallest fraction of the regular occurrences in Nature even in one branch of science, and then only over a limited space of time. The main facts are taken for granted on the evidence of experts deemed to be worthy of confidence. Hence to declare that a miracle is a breach of the laws of Nature is to assume a far more extensive knowledge of those uniformities or laws than we actually do possess. Both the existence of the uniformity and any departure from it, that is both the "law" and the supposed "breach" of it, are only established by the sufficient testimony of competent witnesses.

We have then to be very cautious in declaring that any particular event is a breach of the laws of Nature, because our so-called "law" may be only a limited part of a more complete phenomenon, including also the exception or breach in question, as well as the more usual uniformity.

This matter was very well expounded in a book entitled *The Ninth Bridgewater Treatise*, by an eminent mathematician and scientific man, Charles Babbage, published many years ago, in 1838. Babbage was the inventor of certain machines called calculating engines. The purpose of these appliances was to exhibit on dials or print down numbers following a certain assigned rule or law.

Thus, for instance, if we take the series of natural numbers 1, 2, 3, 4, etc., and multiply each by itself, we obtain a series 1, 4, 9, 16, etc., called the square numbers. Now, of course, any child can give these squares up, say, to 12 times 12, but if we were asked to give immediately the square, say, of 51492 it would take some time to work it out, and one might make a mistake. The object of these engines then was to give the absolutely correct answer.

Now, Babbage uses the following illustration to show how cautious we should be in asserting that we have sufficient knowledge to justify a general statement being made from a finite number of observations. He supposes an observer to operate one of these calculating engines, and, if he lived long enough, to observe that the machine had exhibited, say, 100 million terms of the series of square numbers without exception. Would not anyone then feel perfectly confident in asserting after this experience that the machine was set to produce these numbers and no others? But Babbage tells us the machine could be arranged so that at any assigned place it would interpolate one or more numbers which did not agree with the law of the

squares. Hence the true law of the machine was not simply to exhibit the series of square numbers, but that series with one single interpolation not agreeing with it. Babbage employs this fact as an illustration that a miracle, though an apparent exception to an observed uniformity, may yet be included in a larger and more complete order or harmony.

3.—THE BIBLICAL MIRACLES.

From these topics we are led naturally to consider the important matter of the Biblical miracles. In so doing we must approach the subject from a definite standpoint. If we consider the Universe to be a self-ordered entity, the origin of which we are unable to conjecture, but possibly infinite in past duration, then the utmost that can be said is that its various phenomena may be found to result from certain general or fixed principles, and though catastrophic events might occur, they would have no significance with regard to such intelligent beings as ourselves, the product of gradual evolution from lower organisms. From such a standpoint miracles such as the Biblical could have no meaning or importance.

On the other hand, if we take a different standpoint, and regard this Universe as the Creation of One Supreme God infinite in Wisdom, Power and Love, and the intelligent and spiritual occupants of it such as ourselves as His offspring, then two conditions seem necessary. In the first place, such Universe must exhibit generally an order and regularity in its phenomena, otherwise we should continually be put to mental confusion, and unable to draw any inferences from it as to the Wisdom and Power of which it is a witness. But, on the other hand, such order and regularity, if absolute and complete, has a tendency to deflect our attention from the Supreme Personal Intelligence which gives rise to it, and to engender the belief that this order and regularity is self-produced and self-maintained.

It seems necessary then that there should be certain interruptions or discontinuities of that order, and the occurrence of events, which will draw attention powerfully to the truth that the Universe is not self-ordered or self-maintained, but exists only from moment to moment by the ever-acting will and purposes

of Almighty God. These exceptional events having a moral or spiritual end in view constitute the miracles which are such a striking feature of the Biblical history and narrative.

The fundamental purpose of this Universe is the Glory of God ; making manifest to the intelligent, moral, and spiritual individuals in it the Wisdom, Power, Love, and Grace, and other Divine attributes, to the end that it may excite in them praise, adoration, and filial love, so that they may have communion with the Father of Spirits, and be co-workers with Him in the development of His great purposes throughout the series of eternity. For this purpose the created Universe of things must be a place of education and spiritual training.

One basic lesson to be learnt is, then, the constancy and unchangeableness of God—the same yesterday, to-day, and for ever, in whom is “no variableness neither shadow of turning.”

We have this set before us in the universal reign of natural law, in the large constancy of physical phenomena, and by our discovery that in the physical Universe everything and every act is regulated minutely by number, weight, and measure. But if that were the only lesson taught we might retain the conviction of the uniformity of events, but lose sight of the truth that it is intended to teach.

Hence a second condition seems to be essential, and that is the evidence of Divine power in apparent departures from this uniformity, but which may indeed be contained in a larger and more extensive uniformity.

When we take a broad outlook on the Biblical miracles, we see they do not occur indiscriminately, but in groups or periods closely connected with the beginning or end of great dispensations, and have definite aims. Thus there are special Theophanies or Appearances of God, and certain miracles described in connection with the creation of Man and the Adamic age which ended with the Flood. Then another group characterized the Patriarchal dispensation and the Call and Covenant with Abraham. A third group is associated with the Covenant with the Chosen Nation and their Exodus from Egypt ; a fourth with the Great prophetic period, especially that of Elijah and Elisha ; a fifth with the Captivity period, and the revelations to Daniel ; then a sixth manifestation, the greatest of all. “When the Word became flesh, and dwelt amongst us, and we beheld His glory as of the only begotten of the Father, full of grace and truth ” (John i, 14). Finally, these special manifestations

of Divine Power gradually ceased in the subsequent Apostolic age.

In all these we have a certain group of miracles which comprise the provision of food, the healing of diseases, and the raising of the dead to life: all of them meeting the most urgent of human needs for nourishment, health, and continuance of personal existence, in such manner as to teach that these great requirements come to us as gifts of God, and not as the mere outcome solely of human efforts or the spontaneous operation of the energies of Nature. Then there are a large number of instances in which the great forces and energies of Nature are directed and controlled so as to show that there is a supreme and controlling Power in and above Nature. Lightning, storms, earthquakes, floods and winds, the animal creation, and all the agencies in the physical world obey Him who brought them into existence, and they execute His Will. Ps. cxlviii is a great anthem describing the manner in which all the powers of Nature, "Fire and hail, snow and vapour, stormy wind fulfilling his word," praise the Name of the Lord.

If we admit that the physical Universe is not self-produced, the outcome of impersonal agencies, but is the handiwork of God; can we refuse to admit also that He can control the energies he has brought into existence? We ourselves possess this power to a very limited extent. We can divert the otherwise wasted power of a waterfall or river and make it drive our trains or light our towns. We can utilize to some extent the tidal energy, and we may one day be able to do the same with solar heat, or atmospheric electricity, or the heat stored in the earth.

Many of the miracles of the Bible, especially in the Old Testament, seem to have been, not any suspension or reversal of normal operations in Nature, but a control or guidance of them for Divine purposes. Thus at the Exodus, when the Israelites escaped from the pursuing Egyptians by crossing some water called a "sea," we read: "The Lord caused the sea to go back by a strong east wind all that night, and made the sea dry land" (Exod. xiv, 21). The passage of the Jordan by the hosts of Israel at the entrance into Palestine may have been achieved by a similar natural agency, suitably timed.

We cannot, however, presume to say that the Biblical miracles do not ever involve special acts of Divine will, suspending or reversing normal operations in Nature, or could be explained, if we knew enough, by the operation of agencies with which we

are already familiar. Nevertheless, it must not be assumed that the miracles of the Bible are arbitrary interferences altogether detached from the main stream of events. They may be the result of putting into action forces or agencies of which we are ignorant, as a rule latent and reserved for special Divine operations.

We ourselves, for instance, by special electromagnetic actions, can make a heavy metal ring float in the air, as was shown by the writer in lecture experiments many years ago. We thus oppose the normal action of gravitation by another supercontrolling action. Are we then entitled to say that the story of Elisha causing an iron axe-head to float on water was untrue, because we do not understand how it can have been done? (2 Kings vi, 6.)

4.—EVIDENCE FOR MIRACLES NOT ALL OF EQUAL VALUE.

It is however unquestionable that there are differences in the essential character of the various Biblical miracles as well as in the evidence for their historical actuality. Nevertheless, the strong evidence which can be produced for some of them communicates support to the veracity of statement concerning others.

Thus, the keystone of the arch of truth in connection with the Gospel miracles is the direct and indirect evidence which exists for the historic actuality of the Resurrection of Our Lord, as, and in literal accordance with, the statements of the Gospel authors. If this is true, as we believe it to be, it makes all the rest of the signs and mighty works He performed not only antecedently possible, but essentially necessary.

The usual method employed by rationalist opponents of Biblical truth, in discrediting accounts of miracles, is to select some of the Old Testament miracles for which the independent testimony is small, and meet it with ridicule or assertions of its impossibility or non-historical character, and then argue from this that disbelief is justified in the case of the New Testament miracles. Although this may be skilful as a controversial method, it is entirely unsound as an argument.

The unquestionable evidence which exists for the greatest of these supernatural events, viz., the Resurrection of our Lord, contributes to render possible and probable all others.

The Bible, moreover, has a remarkable power of establishing its historical accuracy. The spade of the explorer has many times over undermined the hasty conclusions of the literary critic, and may do still more yet.

It would be impossible to summarize here even the smallest fraction of the evidence for that supernatural event the Resurrection, which has been the subject of countless volumes. The attempt to explain it on a naturalistic basis, as in the so-called "swoon" or "hallucination" theories, has been found hopelessly insufficient to meet the facts.* Apart from the emphatic and uncontradicted evidence given by the disciples and witnesses themselves as recorded in the Gospel narratives, the earliest origin or sources of which critical opinion now dates within thirty or thirty-five years or so of this event, there is the indirect evidence of the establishment and rapid upgrowth of the Christian Church founded essentially on faith on its historic occurrence.

The principle of the "sufficient cause" applies not only to physical events, but also to the events of history.

There is no adequate explanation of the sudden rise and growth of the Christian Church apart from the supernatural events which preceded and accompanied it. Its early history does not agree at all with that of the man-made religions such as Mohammedanism, Buddhism, or Confucianism. Mohammedanism was propagated largely by the sword wielded for it; but Christianity, in spite of the sword wielded against it. The fact remains that before the Resurrection the disciples are always represented in the Gospel narratives as a band of rather self-seeking men, one of whom betrayed, another denied, and all forsook their Master in the critical hour. A few weeks after they are found to be with one exception a cohort of most courageous men, persistent in spite of threats or prosecution in giving emphatic testimony to the bodily Resurrection and Messiahship of their Lord.

We are told in the Acts of the Apostles that 3,000 persons were converted on the day of Pentecost to that faith, and very shortly after another 5,000. Is it conceivable these 8,000 persons

* This hypothesis has been critically discussed by many writers. A recent and very able article, by the Rev. Professor W. M. Alexander, in *The Evangelical Quarterly* for January, 1929, on "The Resurrection of Our Lord," deals with it briefly.

could have given their allegiance so suddenly and firmly to a faith based on deception or fraud.*

On the other hand, it is necessary to remember that these conversions were in themselves a miracle. They were not the outcome merely of an intellectual conviction or of an appeal to the reason alone, they were the miraculous result of the Pentecostal gift of the Spirit, when, with the sound of a mighty rushing wind, it came upon the assembled first disciples, giving them an utterance in foreign speech of the wonderful works of God and crowning each lowly head with cloven tongues of mysterious flame.

Several incidents which are mentioned, as it were casually, in the Acts of the Apostles show clearly that there were unusual events at the Resurrection which had a very great effect upon contemporary witnesses of them.

It is stated that soon after the day of Pentecost "a great company of the priests were obedient to the faith" (Acts vi, 7). This clearly means that amongst the Temple priests many were convinced of the fact of the Resurrection and of the Messiahship of Him whom the chief priests had caused to be put to death. These converted priests were in a position to know certain things which were probably not known immediately to the general public.

The three Synoptic gospels all tell us that at the moment our Lord expired on the Cross "the veil of the temple was rent in twain from the top to the bottom" (Matt. xxvii, 51). This veil was a very thick heavy curtain which separated the Holy Place in the Temple from the Holy of Holies. Into the Holy Place only the priests went daily to renew the shewbread, replenish the lamp with oil, and burn incense on the golden Altar. Into the Holy of Holies no one entered except the High Priest, and he only on the great day of Atonement. If, then, this curtain was suddenly torn from the top by invisible

* It does not, of course, follow that because a statement is accepted by numerous persons it is therefore necessarily true. The tenets and doctrines of Mohammedanism are thus widely accepted, but that does not prove their truth. In the case of the Christian Church there was objective proof of its supernatural character in the immediate production of an intensive charity, purity of life, and readiness to undergo the most appalling suffering rather than abandon its belief in the Resurrection and Deity of Christ which followed immediately on its establishment.

hands where no man could reach it, it would be known to the priests on duty only, and would cause them the greatest astonishment and perturbation. They would not be likely to publish this news at once. Then, again, certain inexplicable events must have taken place in the very early hours of the following Sunday when the Roman guard or watch set at the tomb came hurriedly back to the chief priests with the startling news of the stone rolled away by the Angel whose countenance was like lightning. This would at first be known only to the priests, and they attempted to suppress publication of these events by large bribes to the soldiers and promises to assist them to escape the penalties for deserting their post* (Matt. xxviii, 11-14).

These details surely could not have been pure fabrication nor legendary accretions on some simple narrative of a Roman execution, unless there had been essential truth at the back of them. People do not invent and circulate falsehoods that incriminate themselves.

The more the whole of the statements of the four Gospels as to the incidents of the Crucifixion are considered and compared, the more utterly improbable does it seem that they should have been the result of human imagination as regards their supernatural character.

5.—THE SUFFICIENCY OF HUMAN TESTIMONY TO THE SUPERNATURAL.

We have now seen that there is no *à priori* argument against the happening of miracles or so-called supernatural events which lie outside ordinary normal human experience. We cannot say

* It has been held that this guard did not consist of Roman soldiers, but was a civilian guard provided by the chief priests. Pilate's answer to the request to provide a guard, "Ye have a watch: go your way, make it as sure as ye can" (Matt. xxvii, 65), has been held to be a semi-contemptuous refusal of a military guard. If, however, the priests had provided their own watch, why does St. Matthew call them "soldiers," and why should the priests have attempted to bribe their own servants? If they were Roman soldiers no one would believe that they had deserted sentry duty without some very serious reason, because that was a military offence punishable by death. If they were not Romans, then the priests were self-condemned, because their own watch had failed to do the thing they were put there by them to do. In any case their excuse was a very bungling attempt to explain the empty tomb.

they are impossible. Their occurrence can, however, only be established by adequate testimony.

The argument of the Scotch philosopher, David Hume, was that these abnormal events are so improbable that no amount of human testimony can establish their actuality. Hume's statement is as follows.* He first assumes, in contradiction to that which has been above said, that a miracle is a violation of the laws of Nature, and he says that as unalterable experience has proved the latter to be invariable, no evidence is sufficient to establish the fact of the miracle. This, however, begs the whole question at issue. His exact words are: "The plain consequence is that no testimony is sufficient to establish a miracle, unless the testimony be of such a kind that its falsehood would be more miraculous than the fact it endeavours to establish."

Hume evidently here uses the word "miraculous" by mistake, in place of the proper word "improbable." Hume's argument, therefore, amounts to this, that the improbability of the falsehood of the testimony must be greater than the improbability of the occurrence of the thing testified.

In a chapter in the book above mentioned, Babbage endeavours to defeat Hume's assertion by a mathematical argument based on the Theory of Probabilities. This last is an important branch of mathematics which deals with the measurement of the chance or probability of certain events happening expressed numerically. Thus, if we put into a bag 1 black ball and 9 similar white ones, and ask a person to shut his eyes and draw one ball out of the bag at random, we may ask, what is the chance of his drawing the black ball? The answer is $1/10$ th, because there are 10 balls equally liable to be drawn but only 1 is black. In the same way the fraction $9/10$ th expresses the chance of drawing a white ball. Suppose then that two such bags are provided, and two independent persons blindfold both draw at random one ball each out of his bag. What is the chance that both will draw a black ball? The answer is $1/100$ th, because it can be shown that the probability of a double event is the product of the probabilities of the separate events. In the same way for three bags and three persons, the probability of all drawing black balls is $1/1000$ th.

Now Babbage applies this principle to the case of human testimony. He assumes there are independent witnesses to

* Hume's *Essays*, Edinburgh, 1817, No. ii, p. 117.

some abnormal event, each of whom may be supposed to be accurate or truthful in his statement, say, nine times out of ten and erroneous in one out of ten. Then he proves that if there are a very moderate number of such witnesses who independently agree in their testimony as to a very improbable fact, the improbability of being all wrong is greater than the improbability of the abnormal event.

Thus, if we take one witness alone, the chance of his being mistaken or untruthful, say, is $1/10$ th, or the improbability of his statement being wrong is represented by the reciprocal number 10. If there are two independent witnesses the probability of both being wrong is $1/100$ and the improbability is represented by 100. If there are 12 such independent witnesses, the probability of all being mistaken or untruthful is 1 divided by 10 multiplied 12 times by itself, or one-billionth, and the improbability of the total testimony being wrong is represented by the enormous number 1,000,000,000,000. If then the event to which they testify has an improbability represented by, say, a million million, it is clear that the united testimony of 12 or 13 independent witnesses is sufficient to establish it: in other words, to defeat Hume's argument against miracles.

The weak point in Babbage's argument seems to me to be that in the case of human beings we cannot divide their testimonies sharply into correct and incorrect, or true and false. All persons are more or less observant or unobservant, more or less careless, more or less biased, and hence all their statements as to events are more or less tinged with inaccuracy, forgetfulness, or want of truth. We cannot express this departure from perfection in testimony exactly by a numerical factor or fraction. Hence Babbage's method of test is hardly a valid or satisfactory one. The object of cross-examination in a Court of Law is, however, to test the weight to be attached to a witness's evidence, and we do arrive at an appreciation of it in a general way.

Broadly speaking, when a number of independent witnesses testify to the same abnormal event, we expect to find a certain difference as to detail in their testimony. If they agree too well, we at once suspect collusion. But, nevertheless, we expect a general agreement as to main facts. Also we expect that the occupation or state in life of each witness will to some extent determine the things to which they pay attention.

Again, if the witnesses were inventing a story rather than describing an actual experience, their past experience or education would colour their imaginative efforts. We have then to consider whether the statements made are such as the witnesses would be likely to concoct if not true, having regard to their station and life. The fact remains, however, that the independent but concordant evidence of a number of witnesses to an event gives an assurance of its occurrence which increases much faster than the number of witnesses. Thus, four such independent witnesses all agreeing give an assurance of truth much more than four times that given by a single witness.

In considering the actuality of historical events in a bygone age we cannot cross-examine the witnesses, and we have to rely solely on the recorded evidence or statements. These tests have been applied with the utmost care and skill to the records of the Synoptic Gospels and that of the fourth Gospel for the last hundred years or more. What concerns us, however, at the moment is the validity of the evidence as to supernatural events in them. It is almost universally granted by those whose opinion is worth anything at all, that the Gospel narratives are based broadly on historical facts. The tendency in many quarters is, however, to regard the supernatural events recorded as non-historical. Such critics would accept the ethical and religious teaching of Christ, such as that of regarding the brotherhood of man and the Fatherhood of God as of supreme importance, but would seek for naturalistic explanations of the miracles of healing and perhaps reject as mythical many of the others. Such process of separation, however, breaks down the consistency of the narrative as a whole, and leaves us without adequate cause or explanation of the accepted course of events.

Nothing is more certain than that the Christian Church was built up, not simply on an advocacy of Christ's ethical teaching, but on an unbreakable testimony of eye-witnesses to the supernatural event of the Resurrection. The first utterances of the Apostles were a reiteration of this fact at every opportunity. They charged the Sanhedrim with having "killed the Prince of Life whom God hath raised from the dead" (Acts iii, 15), and we are told "with great power gave the Apostles witness of the Resurrection of the Lord Jesus" (Acts iv, 33).

There was absolutely no contemporary evidence in opposition to this testimony. The Sanhedrim could have destroyed the faith of the nascent Church at once if they could have produced

the dead body of the Lord, or proved that it had been surreptitiously removed from the tomb. Why did they not do it? Simply because they could not.

We are left, therefore, with a very high degree of certainty by the internal evidence of the narratives themselves, that the supernatural events recorded are not the result of human imagination, nor of subsequent legend or myth embroidering an account of purely natural events. Either the record is literally true or else its creation and wide acceptance as true is almost as great a miracle as the events recorded.

6.—THE TRUE RELATION OF THE NATURAL AND SUPERNATURAL.

The distinction which we ordinarily draw between events called Natural and those called Supernatural depends (i) upon the frequency of their occurrence, or (ii) our power of reproducing them at will, or (iii) upon our ability to give an explanation of them in terms of familiar events.

An event of a kind which occurs frequently, or can be repeated at pleasure, or explained in known terms, we call Natural; but an event which is very rare or unique, cannot be repeated, or is inexplicable in terms of known phenomena, is called Supernatural. It is noteworthy, however, that no such distinction is drawn in Holy Scripture. Everything is there stated in a matter-of-fact way, and the events we call miraculous are related without any additional remarks to indicate them as supernormal or beyond expectation, but they are stated as done expressly and immediately by the Will of God. There is, however, a difficulty involved. We have present before us at all times the continual mystery of good and evil; of sin, sorrow, suffering, and death, no less than the pleasures and bounties of life.

How is this duality to be reconciled with the belief that all that happens is by the Will of an omnipotent and beneficent Creator whose tender mercies are over all His Works? This paradox has oppressed the minds of all serious thinkers from the dawn of history, and the pagan explanation of it was the assumption of two antagonistic Powers in the Universe, such as the Ormazd and Ahriman of Zoroaster, who respectively willed the good and the evil to man.

But we, who accept the Bible as an inspired communication

from the One Almighty Creator and Father of mankind, cannot for an instant entertain the idea that God permits or acquiesces in that which is not perfect good, even though it be in a form incomprehensible to us.

How then shall we reconcile this faith with facts ?

I humbly venture to suggest that the explanation is that the omnipotence of the All Holy Creator of the Universe is yet subject to the condition that even He cannot perform simultaneously operations which are the inverse of each other. He can create anything He pleases, but He cannot create and leave uncreated at the same instant. He can give or bestow what things or powers He chooses, but He cannot give and withdraw them at the same moment.

If then He has chosen to bestow on intelligent beings the power of free choice within limits, that choice may be exercised in opposition to or divergence from His Will or else there could be no bestowal of freedom. That free choice so exercised combined with a finite or very limited power to control the consequences of it lies at the root of all moral evil, and hence of suffering and sin. Critics will probably say that this plunges us at once into the metaphysical quagmire of the free-will controversy, but the common sense of mankind cuts the Gordian knot of determinism with the answer "*solvitur ambulando.*" We each of us here know at the back of our minds, that whatever may be the motives which induce us now to remain in this room, we *can* get up and walk out of it if we choose : that is, we can exercise free will.

The distinctions which then are fundamental, are those things or events which are in accordance with the Will of God and those things or events which are not. The former should be called natural, because they belong to the very essence of Creation or Nature. The latter are unnatural, because they are not in accord with that Holy Will. That there are things which may happen contrary to the Will of God is proved by many Scriptural statements, as in the petition "Thy Will be done on earth as it is in Heaven," for there is here an implication that it is not now done on earth as it is in Heaven.

The problem, then, if with deepest reverence we may use that term, before the Mind of God was to recover the Adamic race of mankind without compulsion of the Will, which would have destroyed personality, into a condition in which that human will is perfectly blended with the Divine. In other words,

in which the unnatural separation should be brought back into a natural union. As Tennyson says :—

“ Our wills are ours we know not how,
Our wills are ours to make them Thine.”

But it is clear that the Scriptural teaching involves much more than this, and that the separation, divergence, or opposition of the human will and the Divine was never intended to occur, was not at first manifested, and involved at its appearance not only a loss of a stupendous kind, but a debt or obligation which required remission.

I am well aware that Modernism in theology as well as Evolutionary theory repudiates entirely the doctrine of an Adamic “ Fall ” from perfection, and starts with the idea of a gradual ascent rather than a sudden descent. We have, however, to make our choice between building on the impregnable rock of Holy Scripture or on the shifting sands of the hypothesis of Evolution. The Scripture teaching as to the necessity of an Atonement is only consistent with its teaching as to a previous “ Fall.”

What was required to meet the case was not simply a gradual amelioration, but an entire reconstruction, a process which was, as it were, a second Creation over and above original Creation, and hence *Supernatural* in its essence and result. The whole scheme of redemption, therefore, as disclosed to us in the Old and New Covenants of the Bible, regarded as a Divine revelation, involves Divine operations which may truly be called *Supernatural* and outside of the normal course of Nature.

The forgiveness of sins, by a mediatorial sacrifice is supernatural, for there is no analogous process in the ordinary course of Nature. The recovery of human nature to its pristine condition of purity by the processes described by the New Testament terms justification and sanctification are supernatural, and do not take place naturally, and involve acts properly called miraculous. The Incarnation, the Vicarious Sacrifice, the Resurrection, Ascension, and the creation of the Christian Church are one and all *Supernatural* in this sense of the word, and are described in apostolic writings as mysteries. “ Great is the mystery of godliness : God was manifest in the flesh, justified in the Spirit, seen of angels, preached unto the Gentiles, believed on in the world, received up into glory ” (1 Tim. iii, 16).

On all sides there is a recognition that human nature has gone

extremely wrong, and that its wars, crimes, cruelties, inequalities, sufferings, and diseases are unnatural and call aloud for remedy. But the history of mankind is one long unending demonstration that no merely human effort is sufficient to remove and destroy these potent evils ; it can only be done by the special Supernatural agencies appointed by God.

The attempt, therefore, to eliminate or explain away the Supernatural elements in the written Word of God, or to ignore or deny the Supernatural attributes and powers of the Incarnate Word of God, deprives them of all life-giving power or potency to cure the death-producing ailments of human nature.

Anyone who will deal fairly with the history of the present and the past, can hardly fail to admit that humanity is not "slowly struggling upwards to the light" by the aid of its own intrinsic powers, but that apart from supernatural gifts and grace the future holds no assuring promise of a final conquest over the spiritual and material ills to which our flesh is heir.

On the call of the CHAIRMAN, a hearty vote of thanks was accorded to Sir Ambrose for his Address.