



SATURDAY, NOVEMBER 25, 1922.

CONTENTS.

	PAGE
Cambridge and the Royal Commission	689
The Study of Spectra	690
Animal Venoms. By A. A.	691
Crime and Remedial Punishment	692
Our Bookshelf	694
Letters to the Editor :—	
Speculation concerning the Positive Electron.—Sir Oliver Lodge, F.R.S.	696
The Measurement of Intervals.—Prof. A. S. Eddington, F.R.S.; E. Cunningham	697
The Time-Triangle and Time-Triad in Special Relativity.—R. A. P. Rogers	698
Space-Time Geodesics.—Prof. H. T. H. Piaggio	699
The Dictionary of Applied Physics.—Sir R. T. Glazebrook, K.C.B., F.R.S.	699
Action of Cutting Tools.—Prof. E. G. Coker, F.R.S.	700
A New Worship?—Prof. Henry E. Armstrong, F.R.S.	700
The Spectrum of Neutral Helium.—Prof. C. V. Raman	700
Water Snails and Liver Flukes.—Dr. Monica Taylor A Mutation of the Columbine. (Illustrated).—Prof. T. D. A. Cockerell and Dorothy Young	701
The Atoms of Matter; their Size, Number, and Construction. (Illustrated.) By Dr. F. W. Aston, F.R.S.	702
The Herring Fishery and its Fluctuations. By B. Storror	705
The Nebraska Tooth. By W. P. Pycraft	707
Obituary :—	
Mrs. A. D. Waller	708
Lady Herdman	708
Current Topics and Events	709
Our Astronomical Column	712
Research Items	713
The International Geological Congress of 1922. By J. W. E.	715
Education, Research, and Invention	715
The Life History of the Eel. By J. J.	716
The Harrison Memorial. (Illustrated). By C. R. Y.	717
Long Distance Telephony	718
Low Temperature Carbonisation. By Prof. John W. Cobb	718
Expedition to Chinese Tibet	719
University and Educational Intelligence	720
Calendar of Industrial Pioneers	721
Societies and Academies	721
Official Publications Received	724
Diary of Societies	724

Editorial and Publishing Offices :

MACMILLAN & CO., LTD.,

ST. MARTIN'S STREET, LONDON, W.C.2.

Advertisements and business letters should be
addressed to the Publishers.

Editorial communications to the Editor.

Telegraphic Address: PHUSIS, LONDON.

Telephone Number: GERRARD 8830.

NO. 2769, VOL. IIO]

Cambridge and the Royal Commission.

IN the current number of the *Quarterly Review*, Sir William Ridgeway publishes a critical account of the recent report of the Royal Commission. As is not unexpected, he differs fundamentally from the Commissioners on certain points. First of all he opposes the principle of accepting State grants with, as he suggests, "the uncomfortable corollary of State control." He fears that this will be of the nature of "continuous administrative control" and that Cambridge will lose that liberty of spirit and initiative which have built up her present strong position in the scientific and educational world. Many of those who do not share Sir William Ridgeway's fears will agree with him that much trouble to all concerned will be saved, and some freedom from Parliamentary pin-pricks from cranks or extremists will be secured, if the grant which the Commissioners recommend can be charged on the Consolidated Fund.

The second main criticism is that the Board of Studies and Research, the body charged with the control of the studies of the University, is placed too directly under the Council, the administrative body of the University. As the electorate which chooses both bodies is the same, any serious difficulties that may arise through differences of opinion between the administrative and teaching members of the University would always be capable of early adjustment. As the teachers are in the majority, the side that would presumably suffer in any such conflict as Sir William Ridgeway foreshadows would be the administrative side. On the ground which he has chosen it is doubtful whether the criticism can be maintained. On other grounds there is a great deal to be said against the majority of so important a body in the University as the Board of Studies being nominated by the Council.

The main attack of Sir William Ridgeway is, however, levelled against the proposals of the Commission to reduce the powers of the Senate, the non-resident graduates, and to give them no longer the final say in all serious matters of University policy. In his criticism of detail Sir William Ridgeway is not happy. When he says "The Cambridge Commissioners know perfectly well that it would not be easy to get fifty signatures to any appeal within a week," the obvious answer is that Sir William Ridgeway knows perfectly well that in any issue of importance where an appeal to the Senate is likely, fifty signatures could be collected in the Senate House from the defeated minority at the conclusion of the poll.

On the general question whether the ultimate control should lie with the Senate or with the House of Residents, there is naturally much divergence of

opinion. Sir William Ridgeway repeats an old challenge to the supporters of the House of Residents to cite a case where the Senate has outvoted the local body. There may be only one case, the recent compromise on the admission of women to the University. But the charge against the Senate's vote is that, as is perhaps only too natural with the older members of the University, the Senate's vote is consistently and steadily against change—or, if an alternative is presented, for the least possible change offered to its choice. Its control is capricious in so far as its intervention is made at the capricious decision of a body of resident conservatives who, through the Senate, wield a wholly disproportionate power on matters vitally affecting the well-being of the University.

The Study of Spectra.

The Physical Society of London. Report on Series in Line Spectra. By Prof. A. Fowler. Pp. vii + 183 + 5 plates. (London: The Fleetway Press, Ltd., 1922.) 12s. 6d.

A Treatise on the Analysis of Spectra: Based on an Essay to which the Adams Prize was awarded in 1921. By Prof. W. M. Hicks. Pp. viii + 326. (Cambridge: At the University Press, 1922.) 35s. net.

OF the two works now under notice, the first, by Prof. Fowler, is the third of the series of reports published by the Physical Society, its predecessors being those by Dr. Jeans on Radiation, and by Prof. Eddington on the Relativity theory. These set a very high standard, but the present work worthily maintains it, and we are glad, at the outset, to offer congratulations to the Physical Society on the continued service which it is rendering to science by their publication.

The choice of subjects for these reports has been singularly happy. The first two dealt with the matters which, at the time, were most prominently in course of development. This third report has at least an equal claim to attention on a somewhat different ground. The remaining problem which is most outstanding, both for the physicist and chemist, and indeed for every scientific man, is that of the structure of the atom. Clues towards its comprehension are provided on every hand by the practical and statistical workers; but they never become final in their importance. After Balmer formulated his well-known expression for the hydrogen spectrum as an orderly arrangement, at least eight model atoms, constructed on entirely different principles, have been used to deduce it theoretically. Its simplicity alone condemns it as a decisive factor in our knowledge, and

the practical worker, who shows us that, even artificially, elements can be broken up, takes us no further towards the formulation of the fundamental dynamical principles, all-embracing in their scope, which determine the behaviour and structure of an individual atom, once and for all, when we know the charge on its nucleus and the number of electrons pursuing their orbits.

The study of spectra must provide the final test of any atomic theory. Spectra can be measured with an accuracy far transcending that obtained in any other phenomena which bring us into touch with an individual atom, and spectra have never been measured systematically by any worker with the general accuracy obtained by the author of the present report. A remarkable part of the work described in this report is due to Prof. Fowler himself, not only in respect of the accuracy of measurement, but even more as regards the elucidation of the nature of the spectra and the conditions which regulate their appearance in the laboratory or in celestial bodies.

For many years spectroscopists have been at a great disadvantage. All the literature of their subject has been scattered, and a general compendium, written by one in the forefront of progress, has been perhaps the most urgent need of the physicist whose aim is the direct determination of the laws governing the motions in an atom of any element more complex than hydrogen. In the last resort, the test of a theory of any chemical atom is that its possible radiations can be determined, by pure mathematical analysis, as specific numbers with a degree of accuracy of at least one part in 10,000, which shall preclude any possible fortuitous coincidence. In certain cases this appears to have been done. Nicholson's investigation of the coronal spectrum, and Bohr's theory of the hydrogen and charged-helium spectrum, together with Wilson's and Sommerfeld's remarkable determination of the appropriate generalisation for elliptic paths of the electrons, appear, for example, to meet this necessity. But all such investigations are preliminary only, and nothing is certain till a more complex spectrum is so elucidated.

The material for such a generalised treatment of the quantum theory is presented in full detail by Prof. Fowler. The treatment is very lucid and this work will completely replace the more usual but out-of-date accounts, which the spectroscopist now has in his library. The present work may be expected to mark a definite epoch in the history of atomic theory as well as of spectra in their more limited scope.

The author, like Prof. Hicks in the other work under notice, is not concerned with particular theories. In a certain sense, however, Prof. Hicks is so concerned,