

Registered 1.8.23

MATTER, ETHER AND ELECTRICITY.

PROFESSOR KERR GRANT'S LECTURE.

In the Prince of Wales Theatre, University of Adelaide, on Tuesday night, Professor Kerr Grant delivered the first of a series of three lectures on "Matter, ether and electricity," which formed a part of the University extension course. There was a large attendance. The lecturer dealt in an interesting manner with the problems connected with the atomic nature of matter. Several interesting experiments were performed in relation to the subject. "The problem on which physicists are mainly concerning their attack, both by theory and experiment, is that of the electrical constitution of matter—in what manner the different kinds of material atoms which exist are built up of positive and negative units of electricity," said Professor Grant. The existence of atoms was no longer a hypothesis (he declared), it was a fact more securely established than was the existence of the stars. Over 80 different elements of atomic species were known to chemists. Several more were known (on the basis of radioactive evidence) to exist in extremely minute quantities—a total of 87. It would be shown that between hydrogen the smallest atom known, and uranium, the heaviest, there were 80 other chemical species, making a total of 92. Of these 92, therefore, five remained to be discovered. Until recently the classification of the atoms was based mainly upon their relative weights, determined by chemical analysis. John Dalton (1803) was the first to show that the laws of chemical combination could be simply explained on the assumption that all elementary atoms of the same species were identical in all their properties, including weight. The hypothesis put forward by Prout a few years later, that all atoms were built up of hydrogen, was not confirmed by more exact determinations of the relative atomic weights, and was abandoned, only to be revived recently on other grounds.

"Periodic" Classification.

The Russian chemist Mendeleef, in 1869, advanced the "periodic" classification of the elements, the most important generalization of modern chemistry. The main features of this system were discussed by the lecturer, stress being laid on the properties of chemical valency, relative abundance of the elements, magnetic character and radioactivity. The discovery of the latter property of atoms. Professor Grant declared, opened up new and unsuspected fields of theoretical and experimental investigation. The dogma of the eternal existence of the atom was completely shattered. The discovery also of "isotopic" species, which had different atomic weights but identical chemical properties, was very disturbing to chemists, and led to enquiry after a new basis of classification. Such a basis was found in the concept of "atomic number," i.e., the ordinal number of an element when all were arranged according to their properties. Later an independent method of determining this number was found in the nature of its X-ray spectrum, which led to its identification with the positive electric charge carried by the nucleus. This conception found strong support also in the laws of radioactive changes.

"Positive Ray" Analysis.

The method of determining atomic weights by "positive ray" analysis inaugurated by Sir Joseph Thomson and perfected recently by his pupil, Aston, the lecturer went on, had led to the discovery of numerous isotopic species among the commoner elements of lower atomic number. Thus chlorine had two isotopic forms of atomic weights 35 and 37 exactly. The mixture of these gave an average atomic weight of 35.47, the value found by chemical analysis. Aston had investigated by this method the atomic weights of about 30 elements, and found that in every case, except for hydrogen and possibly tin, the atomic weight was an exact integer of oxygen (16) was taken as the standard. Thus Prout's hypothesis had at last found vindication.

On August 7 Professor Kerr Grant will deal with the problem of the structure of atoms from positive and negative electrons.

THE FORM OF MATTER.

LECTURE BY PROFESSOR KERR GRANT.

The first of a series of three extension lectures on the subject of "Matter, Electricity, and Ether," was delivered by Professor Kerr Grant, at the Prince of Wales Theatre, Adelaide University, on Tuesday night, before a large and interested audience. The lecture, which was illustrated by experiments and lantern views, dealt with "The Form of Matter," and traced the growth of the atomic theory of matter from the assumptions of Dalton, in 1803, to the conclusions arrived at by Sir Joseph Thomson and Dr. Aston, within comparatively recent times.

The lecturer pointed out that the problem on which physicists were at present mainly concentrating their attack, both by theory and experiment, was that of the electrical constitution of matter—in what manner the different kinds of material atoms which existed were built up of positive and negative units of electricity. The existence of atoms was no longer a hypothesis, but a fact more securely established by various lines of evidence than the existence of the stars. Over 80 different elements or atomic species were known to chemists. Several more were known on the basis of radioactive evidence, to exist in extremely minute quantities, there being a total, in all, of 87. It would be shown that between hydrogen, the smallest atom known, and uranium, the heaviest, there were 80 other chemical species, making a total of 92. Of these 92, therefore, 5 remained yet to be discovered.

Until recently the classification of the atoms was based mainly upon their relative weights determined by chemical analysis. John Dalton (1803) was the first to show that the laws of chemical combination could be simply explained on the assumption that all elementary atoms of the same species were identical in all their properties, including weight. The hypothesis put forward by Prout a few years later, that all atoms were built up of hydrogen, was not confirmed by more exact determinations of the relative atomic weights, and abandoned only to be revived recently on other grounds. The Russian chemist Mendeleef, in 1869, put forward the "Periodic" classification of the elements, the most important generalization of modern chemistry. The main features of this system were discussed by the lecturer, stress being laid on the properties of chemical valency, relative abundance of the elements, magnetic character and radioactivity. The discovery of the last-named property of atoms had opened up entirely new and unsuspected fields of theoretical and experimental investigations.

The dogma of the eternal existence of the atom was completely shattered. The discovery also of "isotopic" species, which had different atomic weights, but identical chemical properties, was very disturbing to chemists, and had led to enquiry after a new basis of classification. Such a basis was found in the concept of "atomic number," that was, the ordinal number of an element when all were arranged in order according to their properties. Later an independent method of determining this number was found in the nature of its X-ray spectrum, which led to its identification with the positive electric charge carried by the nucleus. This conception found strong support also in the laws of radio-active change. The method of determining atomic weights by "Positive-ray" analysis, inaugurated by Sir Joseph Thomson, and perfected recently by his pupil Aston, had led to the discovery of a number of isotopic species among the commoner elements of lower atomic number. Thus chlorine had two isotopic forms of atomic weights, 35 and 37 exactly. The mixture of these gave an average atomic weight 35.47, the value found by chemical analysis. Aston had investigated by this method the atomic weights of about 30 elements, and found that in every case, except for hydrogen, and possibly tin, the atomic weight was an exact integer, oxygen, 16, being taken as the standard. Thus Prout's hypothesis had at last found vindication.

The second lecture, which will be delivered next Tuesday evening, will deal with the problem of the structure of atoms from positive and negative electrons.

MUSIC EXAMINATIONS AND SCHOLARSHIPS.

Teachers of music and intending candidates are notified that August 9 is the last day of entry for the public examinations in music conducted by the Australian Music Examinations Board. Two free scholarships, tenable for three years, are awarded in connection with these examinations. Syllabus forms of entry and full information may be had from secretaries of local centres or the University.

BRITISH SCIENCE GUILD.

South Australian Branch.

The annual general meeting of the South Australian branch of the British Science Guild was held at the Royal Society's rooms, North terrace, on Tuesday. The report for the year 1922-1923 stated:—

Australian Natural History Handbooks.—Satisfactory progress had been made with the preparation and publication of the handbooks under the direction of a subcommittee, which had allocated the duties to the Chairman (Professor F. Wood Jones), treasurer (Dr. R. H. Pullett), editor (Mr. Edgar R. Waite), and secretary (Professor J. B. Cleland). Many of the contributors were steadily at work. "The Flora of South Australia," Part II, by Mr. J. M. Black (orchidaceae by Dr. R. S. Rogers), was in the press, and would be issued during the present year. "The Mammals of South Australia," part 2, by Professor Wood Jones, D.Sc., was well in hand. Two indexes were furnished, one of common names, the other of genera and species. Of the other books of the series Professor W. Howchin was preparing an introductory volume dealing with the evolution of life in the State from the geological aspect; Dr. R. H. Pullett was dealing with the spiders, Professor T. G. Osborn with the ecology of the flora, Professor J. B. Cleland with the larger fungi, and Mr. A. M. Lea with the beetles. The remaining volumes by other contributors will appear in due course.

Anthropology.—Action was taken during the year to promote interest in the important subject of anthropology. The recently acquired responsibility for the mandated territories, inhabited by a medley of widely differing races, render a knowledge of anthropology on the part of the administrators an absolute necessity. Again, Australians were within their own territories guardians of the remnants of a unique race in whose institutions and habits might be read the origins from which our own civilization had emerged. Much knowledge, physical and psychological, which might be gleaned from the study of those people would soon be lost for ever unless a greater number of trained investigators became available to complete the information before the pure-blooded aborigines became extinct. The introduction of anthropology as an intermediate study, common to both curricula, would place history, literature, and language upon a more scientific basis. The committee desires to draw the attention of members of the guild and all citizens to the importance of establishing a Chair of Anthropology at the University.

Hypsometric Survey.—The question of topographic data being made available for general reference in the form of contour maps continued to receive attention.

Inventions Board.—The desirability of giving greater encouragement to inventors by providing facilities for examination of inventions and securing publicity for those which were adjudged practical and scientifically sound was brought under the notice of the guild by Mr. G. Taylor, Sydney, who had recently interested the parent guild, London, in this matter. A subcommittee was appointed to consider the question of establishing a "board to encourage inventions" on similar lines to one which had been formed in New South Wales. A draft constitution, setting out the objects, rules, &c. of the proposed board had been prepared, and was now under consideration by the executive committee.

Vocational Training.—Attention was directed by Mr. W. A. Magarey to two Acts of Parliament, dealing with vocational training and guidance, in force in South Africa, and they were reported upon, at the request of the guild, by Dr. C. Fenner, Superintendent of Technical

Education. One was an Act to regulate apprenticeship and to provide for the training of apprentices and other matters incidental to contracts of apprenticeship. The subject matter of this Act was closely in line with legislative efforts that were being made in several Australian States, and was, to some extent similar to the Apprentice Act in operation in South Australia. It went much further, however, in demanding compulsory apprenticeship and the proper regulation by boards of indentures, transfers and cancellations of apprenticeship. This matter was at present receiving the special consideration of the Apprentices' Advisory Board, and the Act was officially forwarded to that board by the guild for consideration. The other Act dealt with the employment, training, welfare, and supervision of those under 18 years of age. The underlying object was to provide proper vocational guidance, to direct young people towards their most fitting work, and also towards that type of further education that would be most useful to them. This Act was referred to the subcommittee dealing with vocational guidance during adolescence for consideration.

Customs Duties on Educational Materials.—Consideration was given to the question of customs duties on scientific apparatus, chemicals and other materials used in teaching, and the matter would be brought under the notice of the Federal Government.

The report was adopted.

Officers elected:—Patron, the Governor (Sir Tom Bridges); President, Professor T. H. Johnston; Hon. Secretaries, Messrs. F. W. Reid and H. R. Marston; Hon. Treasurer, Dr. R. H. Pullett; Executive Committee, Professors Cleland, Kerr Grant, Wood Jones, and T. Braithwaite Robertson; Drs. Charles Fenner, Gertrud Halley, and R. H. Pullett, and Messrs. A. G. Edquist, R. N. Finlayson, W. A. Magarey, F. W. Reid, E. R. Waite, Gil Williams, and L. K. Ward.

Registered 3.8.23

Sir Joseph Verco, who is visiting England with Lady Verco, was 72 years of age on Wednesday. Sir Joseph was born at Fullarton, and is a son of Mr. James Crabbe Verco, who was a member of the House of Assembly in the early days of the State. Sir Joseph Verco obtained his early education at Mr. Young's school and St. Peter's College. In January, 1870, he went to England and matriculated at the University of London. He entered St. Bartholomew's Hospital, where he had a distinguished career. In 1874 he became an M.R.C.S. (Eng.), and in the following year took the degree of M.B. Lond., winning a scholarship and the gold medal in medicine. In the same year he became an L.R.C.P. (Lond.), and in 1876 took the degree of M.D. Lond., securing the gold medal for the greatest proficiency in all subjects. He became a Fellow of the



Sir Joseph Verco.

Royal College of Surgeons Eng., and took the degree of B.S. (Lond.), gaining a scholarship and gold medal in surgery. In 1878 he returned to Adelaide as surgeon on the Clyde, one of the last of the emigrant ships. After a distinguished medical career, during which doctors from every part of the Commonwealth sought his services in consultation, he retired from practice some years ago. Four years ago he received acknowledgment for contributions to medical science. He acted as lecturer on the Principles and Practice of Medicine for 29 years at the Adelaide University. Sir Joseph has always taken a deep interest in philanthropic work. Prior to his departure for England he was tendered a reception at Government House by the Red Cross Society, at whose disposal he had placed his services during the war.

ORGAN RECITAL.

A small but appreciative audience assembled at the Elder Hall, Adelaide Conservatorium of Music, during the luncheon hour on Thursday, when Mr. Harold Wylde, F.R.C.O., gave another of the weekly series of organ recitals. A delightful programme was presented. It was opened with Mendelssohn's "Second Sonata" in (a) grave, (b) allegro maestoso e vivace, and (c) allegro moderato, which was followed by Wolstenholme's "Rodino" and Guilmant's "Lamentation." The concluding items were:—"Danse Orientale" (Rebikow) and "Tocata" (Cesar Franck). The selections, which were comprehensive, and were excellently interpreted, evoked unstinted applause.

Registered 3.8.23

Mr. Eric S. West, M.Sc. (Agric.), left on Thursday by the Melbourne express for Leeton, Murrumbidgee irrigation area, to take up the duties of research officer with the Water Conservation and Irrigation Commission of New South Wales. This is a newly created position—the first of its kind in Australia. Mr. West, after having graduated at the University of Adelaide, spent some time in America and Europe in the pursuance of his studies, and returned to Australia early this year.

also Register Herald