Bold

served when "Alpha" rays passed through thin metallic foils. According to this view of atomic structure, the atom had a central nucleus of positive electricity of exceedingly small dimensions, round which a number of electrons, equal to the nuclear charge, revolved in planetary orbits of various radii. The ordinary physical and chemical properties of the atom depend directly on the number and arrangement of the outer electrons, whereas the mass and weight of the atom, its radio-activity, and its X-ray spectrum were determined by the number and arrangement of the inner electrons, or of the nucleus itself.

Rutherford also shows that the nucleus probably contained just as many positive electrons, or rather an excess of positive over negative electrons, as its atomic number in the periodic table, a view which was confirmed by the latter work of Moseley on the X-ray spectra of the elements. Thus a hydrogen atom consisted of a single positive electron, or proton, with a single electron revolving round it, whereas a helium atom consisted of a doubly charged nucleus with two planetary electrons; the largest nucleur charge being possessed by the uranium atom with a nucleur charge of 92, with 92 electron satellites.

In the following year, 1912, Sieds Bohr, a Danish physicist working in Rutherford's laboratory, by combining the views of Rutherford with Planck's theory of energy quanta, succeeded in obtaining a complete explanation of the spectrum of hydrogen, though in doing so he had to introduce new conceptions of the nature of radiant energy which could not be reconciled with Maxwell's theory of light. Subsequent work by Bohr and many others had shown the extraordinary fruitfulness of Bohr's theory in explaining atomic structure, and the character of the spectrum of atoms.

The next and last lecture which will be delivered on August 14, will give a summary of the present state of knowledge of the structure of atoms and their nuclei, and the explanation which it offers of chemical combination and of radio-activity.

Advertiser 8.8.23.

AUSTRALIAN DENTAL CONGRESS.

A PERMANENT RECORD.

The report of the proceedings of th Fourth Australian Dental Congress, whic just been published, and it is a most in teresting and comprehensive document It is contained in a profusely illustrate royal 8vo., volume of 336 pages, and was held in Adelaide in August, 1921, ha reflects the utmost credit on Mr. Alexander Swan, of Rockville House, North-terrace, who compiled it, and on the Government Printer, who has published it. Mr. Swan states that two years of his spare time were occupied in completing the report, and when its comprehensive character is seen this will not be a source of wonder. He expresses his thanks to the Government Printer and his staff "for their kindly consideration and their courteous assistance."

The congress, which was opened by Sir Archibald Weigall in the School of Mines Building on August 22, 1921, was continued for five days, and an immense amount of valuable business was done. The patrons included the Governor-General, the State Governors, and other prominent men, including Sir George Murray, Sir Henry Barwell, Sir Langdon Bonython, Sir Joseph Verco, and Sir Frank Moulden. The president was Dr. E. J. Counter. There are portraits of the leading officials, and group pictures of the Adelaide executive, and the Government House reception, with photographs of the School of Mines and of numerous other buildings and beauty spots in or near Adelaide. Scientific illustrations, illustrative of the various articles are also plentiful. There are full lists of the officials, with programmes of the work done. The long list of the contents is a silent testimony to the thoroughness and the excellence of Mr. Swan's work, which, in extent and efficiency, is worthy of the highest praise. He opens with a history of the congress, and incidentally expresses thanks to the president of the School of Mines for granting the use of "a magnificent building, replete with every convenience for a scientific gathering," to Sir Joseph Verco, and to the president of the Dental Board (Mr. Wallace Bruce).

A full report of the proceedings of the congress is included as well as the names of the members, who numbered 200, from all parts of Australia, and a host of manufac-

turers' exhibits. The volume will be invaluable to all members of the dental profession, as well as to others, and will form an adequate souvenir of an historic occasion. Mr. Swan has proved himself to be a most capable and conscientious editor, and he has spared neither time nor trouble to make the record worthy of its subject. Everyone is interested in the preservation of his or her teeth, and no one can fail to obtain useful information from this cyclopaedic report.

Register 8.8.23.

ATOMIC THEORIES.

Professor Kerr Grant on "Matter."

The series of extension lectures arranged by the Adelaide University was continued on Tuesday night, when Professor Kerr Grant delivered his second lecture on "Matter, ether, and electricity." A large audience listened to the lecture, which was given in the Prince of Wales Theatre. Professor Grant illustrated his remarks by highly interesting experiments and lantern slides.

The lecturer said he assumed that his audience knew the following fundamental facts concerning electricity:—1. That there are only two kinds of electricity, positive and negative. 2. That by whatever means electricity may be generated, these are always produced in exactly equal amounts. 3. That positive and negative electricity may be reasonably conceived to exist together in all non-electrified matter, i.e., in every atom, in exactly equal amounts. 4. That stationary electric charges exert mutual forces of repulsion or attraction according as they are of the same or of opposite kind; that moving electric charges exert mutual magnetic force.

The Electron.

The atomic theory of electricity, Professor Grant remarked, was first clearly stated in 1881 by Helmholtz, who based it upon the fact that in electrolysis each atom of matter liberated carried a definite positive or negative charge, which was invariably a multiple of a definite unit quantity. Later investigations in the domain of electrical discharge through gases, of optics, and of radio-activity had completely confirmed the atomic hypothesis, and had further led to the discovery of the electron (an atom of negative electricity which can exist entirely apart from matter, although present in all material atoms). At the end of the nineteenth century theories of an electrically constituted atom built up of electrons and positive electricity had been advanced by J. J. Thomson and others. In 1911 Rutherford had announced his theory of a nuclear or planetary atom, which had successfully explained the scattering observed when X-rays passed through thin metallic foils. According to that view of atomic structure the atom had a central nucleus of positive electricity of exceedingly small dimensions, around which a number of electrons equal to the nuclear charge revolved in planetary orbits of various radii. The ordinary physical and chemical properties of the atom depended directly upon the number and arrangement of the outer electrons, the mass and weight of the atom, its radio-activity, and its X-ray spectrum were determined by the number and arrangement of the inner electrons or of the nucleus itself.

Moseley and Bohr.

Rutherford had also showed that the nucleus probably contained just as many positive electrons, or, rather, excess of positive over negative, as its atomic number in the periodic table, a view which had been confirmed by the later work of Moseley on the X-ray spectra of the elements (the lecturer proceeded). Thus a hydrogen atom consisted of a single positive electron, or proton, with a single electron revolving around it, a helium atom of a doubly charged nucleus and two planetary electrons, the largest nuclear charge being possessed by the uranium atom with a nuclear charge of 92 and 92 electron satellites. In the following year (1912). Niels Bohr, a Danish physicist, working in Rutherford's laboratory, by combining the views of Rutherford with Planck's theory of energy quanta, had succeeded in obtaining a complete explanation of the spectrum of hyrdogen (Professor Grant added), although in doing so he had been compelled to introduce new conceptions as to the nature of radiant energy which could not be reconciled with Maxwell's theory of light. Subsequent work by Bohr and many others had shown the extraordinary fruitlessness of Bohr's theory in explaining atomic structure and the character of the spectrum of atoms.

The next and last lecture, which will be delivered on August 14, will give a summary of the present state of knowledge of the structure of atoms and their nuclei and the explanation which it offers of chemical combination and of radio-activity.

Herald. 9.8.23 Advertiser 10.8.23

THE MIGHTY ATOM

"MATTER, ETHER AND ELECTRICITY"

PROFESSOR GRANT'S LECTURE.

The second extension lecture by Professor Kerr Grant on "Matter, Ether and Electricity," was delivered in the Prince of Wales lecture room at the University on Tuesday night last before a large attendance. Professor Grant said that the atomic theory of Electricity was first clearly stated by Helmholtz in 1881, who based it on the fact that in electrolysis each atom of matter liberated carries a definite positive or negative charge, which is invariably a multiple of a definite unit quantity.

Later investigations in the domain of electrical discharge through gases, of optics, and of radio-activity have completely confirmed the atomic hypothesis and have further led to the discovery of the electron—an atom of negative electricity which can exist entirely apart from matter, though present in all material atoms. In the last years of the 19th century, theories of an electrically constituted atom built up of electrons and positive electricity were advanced by J. J. Thompson and others. In 1911 Rutherford put forward his theory of a nuclear or planetary atom which successfully explained the scattering observed when rays passed through thin metallic foils. According to this view of atomic structure the atom has a central nucleus of positive electricity of exceedingly small dimensions around which a number of electrons equal to the nuclear charge revolve in planetary orbits of various radii. The ordinary physical and chemical properties of the atom depend directly on the number and arrangement of the outer electrons, otherwise the mass and weight of the atom, its radio-activity, and its X-ray spectrum are determined by the number and arrangement of the inner electrons, or by the nucleus itself.

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Thus a hydrogen atom consists of a single positive electron, or proton, with a single electron revolving around it, a helium atom of a doubly charged nucleus and two planetary electrons, the largest nuclear being possessed by the uranium atom, with a nuclear charge of 92 electron satellites.

In the following year, 1912, Niels Bohr, a Danish physicist, working in Rutherford's laboratory, by combining the views of Rutherford with Planck's theory of energy quanta, succeeded in obtaining a complete explanation of the spectrum of hydrogen, though in doing so he had to introduce new conceptions as to the nature of radiant energy, which cannot be reconciled with Maxwell's theory of light.

Subsequent work by Bohr and many others has shown the extraordinary fruitfulness of Bohr's theory in explaining atomic structure and the character of the spectrum of atoms.

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Mr. Wesley H. James, B.Sc., B.E., of Fourth-avenue, Joslin, leaves by the steamer Jervis Bay on Saturday for London, to pursue further studies in civil engineering.

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MR. WYLDE'S LUNCH HOUR RECITALS.

The recitals given at the Elder Hall each Thursday by Mr. Harold Wylde, F.R.C.O. during the lunch hour, are increasing in popularity. There was again a large audience yesterday, which demonstrated its appreciation of an attractive programme, which included "Fantasia in F minor" (Mozart), "Pavane" (Bernard Johnson), "Rhapsody No. 1" (Herbert Howells), "Berceuse" (Jarnefelt), "Marche heroique" (Lemare).

THE PROBLEM OF MAN'S ANTIQUITY.

Mr. G. L. Wood, M.A., of St. Peter's College, lectured on "The Problem of Man's Antiquity" in St. Mary's Hall yesterday evening. He began by drawing attention to the unthinkable time necessary for man's evolution. Scientists had come to believe that man ceased to live in trees and came to the ground by reason of immense climatic changes. Intense cold destroyed the forests of Central Asia. Man survived when other high species perished because he did not over-specialise. The lecturer said in recent years the excessive claims of adherents of the Darwinian theory had been destroyed. Haeckel, for example, held the theory of end-on evolution—a ladder of types going back to a single primitive form of life. His research aimed at fitting in missing links. The ape was one stage of a series of which man was the last term. This theory was no longer tenable. Man had always been man as far as they could trace him. His type was now considered immeasurably older than was thought in Darwinian days. In many ways man was a more primitive type than the apes. He could not be descended from a type in some respects more highly developed than himself. Far from being his ancestor, the ape was descended from some offshoot of the main line of evolution which had carried man forward to his destiny. Man could never have gone on all fours. The formation of his forearm precluded this.

The lecturer discussed the importance of the discovery of the Talgai man in 1884 in a bed of fossil remains among strata which proved that he must have been contemporary with huge pouched animals —kangaroos—perhaps 20 ft. high. With him were found the bones of his dog. The find proved that man at least 200,000 years ago must have been able to travel by boat, bringing freights of food and water, wife and family. As early as they found traces of him he was seen to be differentiated by his qualities of mind. The lecturer showed a number of excellent slides depicting the chief historical skulls, and the reconstruction based on them, and some of them illustrating in a fascinating way the connection between geology and palaeonlotogy. He concluded by expressing his belief that reason could not have been the product of unreason.

In the discussion which followed a member of the audience pointed out that three principles seemed to emerge from modern research—(1) the importance of co-operation in the story of human evolution; (2) man's progress from humble origin gave him immense hope for the future; (3) the primary importance of psychology as most fruitful in helping to the understanding of the method of past and future development.

Register 10.8.23

ADELAIDE UNIVERSITY LAW STUDENTS' SOCIETY.

A meeting of the Adelaide University Law Students' Society was held at the University on Tuesday evening. Mr. A. L. Pinch presided. The question for debate was:—A testator by his will gave his residuary estate "in trust for my children living at my death who shall attain the age of 21 years, in equal shares, provided that if any of my children shall die in my lifetime leaving a child or children who shall survive me and attain the age of 21 years, then, and in any such case, such lastmentioned child or children shall take (and, if more than one, equally between them), by way of substitution, the share with his, her, or their parent would have taken in my residuary estate, if such parent had survived me and attained the age of 21 years." The testator had a son, A, who was dead at the date of the will, a fact which was known to the testator at that date. B, a son of A, survived the testator and attained 21 years. The testator had one other child, C, who survived him and attained 21 years. On a summons for advise and directions. Counsel were:—For A, Mr. J. C. McCarthy, with him Mr. Buttrose; for C, Mr. Morris, with him Mr. Kernich. A number of cases were cited. Messrs. Tucker, B. Harford, C. C. Crump, P. Cotlack, M. Bednall, and P. McCarthy took part in the general discussion. Mr. Pinch, in delivering judgment, referred to the difficulty of the problem, and complimented counsel on their handling of it. He distinguished the case of Loring v. Thomas from Christoferson v. Nesion. In his opinion the rules laid down in Loring v. Thomas applied here. Mr. Pinch referred to the judgment of Gordon, J., in the case of In re Umpherstone, a South Australian case. He found that plaintiff C was entitled to judgment. C would take his deceased father's share, the estate to pay costs.