

Register 15.8.23

Advertiser 16

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### ELDER CONSERVATORIUM.

### HYDROGEN AND HELIUM.

#### LADIES' PART-SINGING CLASS CONCERT.

#### PROFESSOR KERR GRANT'S OBSERVATIONS.

The concert given by the Ladies' Part-Singing Class under the conduct of Mr. H. Winsloe Hall at the Elder Conservatorium, on Monday evening, was a decided success. There was a good and appreciative audience. The various numbers were well received, applause being more and more enthusiastic as the programme was proceeded with, and several encores had to be given. Lady Bridges was present, and was accompanied by Miss Judge. The concert began with the National Anthem. There followed two characteristic compositions by Walford Davies—his setting of Shelley's poem "The Cloud," and a kindred and perhaps even more charming writing, "Clouds." In both of these the members of the part-singing class acquitted themselves admirably, the crisp attack of the fresh young voices being specially pleasing. In the duet, "If I pray, there is none to hear" (from Gounod's "Faust"), Mr. John McDermot, as Faust, and Mr. Richard Watson as Mephistopheles, gave a distinctly spirited rendering. Mr. Watson (the Elder Scholar) has a particularly fine bass voice, and he threw himself into his part with considerable expression and dramatic feeling. Mr. McDermot's voice told well both in the duet and in a trio, "O heaven, she hears me not" ("Faust"—Finale), in which Miss Enid Besanko most successfully took the part of Marguerite. Another number that was also enthusiastically applauded and had to be given twice was the duet, "La ci darem" (from Mozart's "Don Giovanni"), in which Miss Valda Harvey sang the part of Zerlina, while Mr. Harry Green put real dramatic feeling into his Don Giovanni. Miss Elsie Woolley was encored for her singing of two songs by Strauss, "To-morrow" and "Devotion." Miss Evelyn Russell, the only other soloist, gave a pleasing rendering of "An Island" (Rachmaninoff), and "The Sun's Bright Beams" (Lassen). In that beautiful part-song, "Ave Maria" by Huss, the soprano solo was taken by Miss Stella Sobels, who has a delightfully clear, high voice, while the contralto solo was sung by Miss Elsie Woolley. The whole effect was distinctly good. Cowan's Cantata, "Christmas Scenes," concluded the programme. The care with which the class had been trained and their responsiveness to the direction of their conductor, were very noticeable. Mr. Winsloe Hall had to respond to repeated bursts of applause, and he must have been happy in the success achieved. The cantata opens with a chorus, "Father Christmas," which is followed by "The Carolers." In the trio in this the contralto part was taken by Miss Alma Cook at very short notice, Miss Edna Lawrence, who was to have sung it, being absent through family bereavement. The soprano solo in the chorus, "Santa Clause," was effectively rendered by Miss Valda Harvey. "Christmas Bells" and "In Church" were both attractive, while the contralto solo, "Charity," was expressively given. The final chorus and dance, "Christmas Festivities," went with spirit. The quaint dance music was given artistically by organ and piano. Miss Doris Coonan was the other soloist. Mr. Harold Wyld, F.R.C.O. was at the organ, and Mr. Herbert Edwards, A.M.U.A., and Miss Muriel Prince (Brookman Scholar) acted as accompanists.

The final lectures of Professor Kerr Grant's series of three on "Matter, electricity, and ether," in connection with the Adelaide University, was delivered on Tuesday night. The Vice-Chancellor (Professor Mitchell) presided over a large audience in the Prince of Wales Theatre. The lecturer gave numerous illustrations by chart and lantern slide, and was warmly applauded at the conclusion of his discourse. He gave details of discoveries made by Rutherford and Bohr into the nature of the atom. What he designated the Rutherford Bohr type of nuclear atom, i.e., a nucleus of small dimensions, but a correspondingly large mass, positively charged with a number of negative electrons, equal to the number of uncompensated positive electrons in the nucleus, explained all the properties of the hydrogen-atom. With equal success it had been applied to the explanation of the spectrum and other properties of helium, whether of the neutral or the ionized atom. The mathematical difficulties became very great in the case of heavier atoms with more complicated systems, especially if the explanation of the visible spectrum was in question. X-rays, however, originated in the innermost rings or shells of electrons near the nucleus, and the X-ray spectrum was, accordingly, of a relatively simple character; in fact, like that of hydrogen. The X-ray spectrum varied continuously, not periodically, with atomic number, and hence permitted of an independent and certain determination of that fundamental constant. Applying Bohr's theory to the law connecting frequency of X-rays with atomic number, discovered by Moseley, the result was that the atomic number of an element was equal to the excess in the number of positive over negative electrons in the nucleus. Since various numbers might be chosen to give the same difference, the possibility of isotopes was made clear. The ordinary physical and chemical properties of atoms depended directly upon the electrons in the outermost ring or shell, only indirectly on the nuclear charge. After a narration of the Lewis-Langmuir theories of electro-valency and co-valency, and Bohr's departure from the "ring" and "shell" theories, the lecturer observed that the latter was probably nearer the truth, but was the more difficult to work out in detail. The problem of most interest for the future, continued Professor Grant, was, perhaps, that of the structure of the nucleus itself. The phenomena of radio-activity indicated that both helium nuclei (alpha rays) and electrons were component parts of its structure, and the very high velocity with which those rays were usually ejected was evidence of an enormous store of internal energy. Rutherford had also shown that when high-speed alpha rays hit the nucleus of nitrogen, aluminium, and certain other atoms, those nuclei were shattered, and hydrogen nuclei were ejected with energy, in certain cases much greater than that of the alpha itself. The interesting possibility was thus opened up of effecting, by artificial means, a real transmutation of the elements with conceivably a gain of energy enormously greater than was furnished by any chemical action. If they could liberate the one-eighth of helium, which a pint of water contained, they would have enough power to drive a steamship across the Atlantic. No one yet had discovered a method of transmitting hydrogen into helium, but there were certain lines of investigation being pursued which, he thought, would eventually yield satisfactory results.

Dr. A. A. Lendon, who has been president of the District Trained Nursing Society for a quarter of a century, was once more unanimously elected to that position at the annual meeting of the society on Wednesday. It is largely due to Dr. Lendon's advice and guidance that the financial affairs of the society have been placed on such a sound basis. He has enjoyed throughout his long tenure of office the whole-hearted esteem of the staff. It is highly probable that but for the firm stand taken by the president the society would some years ago have been absorbed in Lady Dudley's Federal Bush Nursing Scheme. He was convinced, however, that the District Trained Nursing Society had been established on the lines most suited to the needs of the State, and resolutely set his face against absorption by the new body. Events have justified his confidence in the society, which has done magnificent work, not only in Adelaide, but the remote country districts. Dr. Lendon, who contemplates visiting the old world in the near future, completed his final course of lectures on Tuesday at the University, after an association with the Medical School which has extended over 30 years. For 20 years he has been a member of the Medical Board, and has been president for the greater part of that time. Born at Maidstone, Kent, he was educated at the Maidstone Grammar School and at King's College School and University College School, London. He arrived in Australia in 1883. Since then he has given his services freely to the community, both at the Adelaide Hospital and the Adelaide Children's Hospital (of which he is vice-president) as honorary physician and consulting surgeon, and at the Queen's Home as consulting obstetrician. Dr. Lendon was president of the South Australian branch of the British Medical Association from 1895-1906. He took a leading part in the Inter-colonial Medical Congress, held in Dunedin in 1896, when he was president of the section of medicine. Always deeply interested in anything which would strengthen the bonds of Empire, Dr. Lendon was for two years president of the Commonwealth Club. He is a fluent and polished speaker, and his speeches have the added charm of humor and ready wit.

The number in the outer ring may increase up to a certain limit, eight in fact; any attempt to increase this number makes the ring unstable so that the addition of one more electron results in an internal ring, corresponding to the character of an alkali metal, two electrons in an outer ring to an alkaline earth and so on. The Lewis Langmuir theory of atomic structure postulates shells in the place of rings, of stability of the structure being greatest when eight electrons in the outer shell occupy the corners of a cube.

Electro-valency is explained equally well by either ring or shell structure, but the idea of combination of atoms by sharing of electrons in the complete octet-co-valency—introduced by Langmuir is a one of great value.

Bohr's latest views depart widely from the "ring" and "shell" theories. Electrons being classed rather according to their orbit. This theory is probably nearer the truth of the matter but also more difficult to work out in detail.

The problem of most interest for the future, is perhaps that of the structure of the nucleus itself. The phenomena of radio-activity indicate that both helium nuclei (X-rays) and electrons are component parts of its structure, and the very high velocity with which these rays are usually ejected is evidence of an enormous store of internal energy. Rutherford has also shown that when high-speed X-rays hit the nucleus of nitrogen, aluminium and certain other atoms these nuclei are shattered and hydrogen nuclei are ejected with energy in certain cases much greater than that of the X-ray itself.

The interesting possibility is thus opened up of effecting by artificial means a real transmutation of the elements with, conceivably a gain of energy enormously greater than is furnished by any chemical action.

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Mr. Robert Hall Chapman, who has been appointed as Assistant Engineer for Bridges to the South Australian Railways, has had a most interesting scholastic career. He is the son of Professor R. W. Chapman, of the University of Adelaide, and is himself a graduate of that University, holding the degree of Master of Engineering. Since graduating he has been doing practical work for about 12 years. After having left the University, he went to Queensland, where he was engaged on the mine fields at Einsleigh. After 12 months' practical work he joined the New South Wales Government Railways Department, on bridge design work, under the direction of Mr. J. J. Bradfield, the celebrated designer of the North Shore bridge. Later he took up construction work on the north coast railway, which, at that time, was being laid. The undertaking involved much heavy work on the lines, and a considerable amount of large bridge construction. In 1915 Mr. Chapman enlisted for active service. He served with the Royal Engineers, and was responsible for important experimental work, which resulted in the adoption of the system of calibration of field guns, by which the necessity for trial shots was obviated. He organized calibration ranges on the coast of Belgium, where all the field guns were sent in batches, calibrated, and sent on into action. When it is realized that before this discovery the trial shots greatly diminished the effectiveness of batteries, its importance, as a factor in warfare, may be recognized. Mr. Chapman's treatise on the subject of the calibration of field guns has been since published by the British War Office. On his return to Australia he resumed his work in the New South Wales Railways Department, but early last year was appointed as a lecturer at the Sydney University. He has now decided to resume his practical work in preference to any academical life.

Herald 16 AUG 1923

### THE MIGHTY ATOM

#### EXTENSION LECTURES CONCLUDED

Professor Kerr Grant delivered his third lecture on "Matter Electricity and Ether" to a big attendance in the Prince of Wales lecture room at the University, on Tuesday. This lecture completed the series of extension lectures on the subject. The lecturer said that the Rutherford Bohr type of nuclear atom, i.e., a nucleus of small dimensions but correspondingly large mass positively charged with a number of negative electrons equal to the number of uncompensated positive electrons in the last lecture all the properties of the hydrogen-atom. With equal success it has been applied to the explanation of the spectrum and other properties of helium whether the neutral or the ionised atom. The mathematical difficulties became very great in the case of heavier atoms with more complicated systems, especially if the explanation of the visible spectrum was in question. X-rays, however, originate in the innermost rings or shells of electrons near the nucleus and the X-ray spectrum is accordingly of the relatively simple character like that of hydrogen in fact. The X-ray spectrum varies continuously, not periodically—with atomic number and hence permits of an independent and uncertain determination of this fundamental constant. Applying Bohr's theory to the law connecting frequency of X-rays with atomic number discovered by Moseley, the result follows:—The atomic number of an element is equal to the excess in the number of positive over negative electrons in the nucleus. Since various numbers may be chosen to give the same difference the possibility of isotopes is made clear.

The ordinary physical and chemical properties of atoms depend directly upon the electrons in the outermost ring or shell, only indirectly on the nuclear charge.

#### UNIVERSITY EXAMINATIONS.

From G. G. NEWMAN.—As a grandfather scarcely daring to call myself "educated," I should like to express the opposite view to that of your correspondent, "Educated Grandfather." I consider the new Professor of English Literature at the Adelaide University has introduced an innovation likely to be provocative of remarkable results. By the substitution of a good English story in the place of analysis and parsing, which have been cut out, young students will have time to study critically the masterpieces of literature, and thereby cultivate a mode of writing and speech which will be a credit to themselves and their teachers. The modern methods of education are a very distinct advance on those practised in the early days of this State. Bad dreams were more likely to follow some of the pioneer methods among teachers and parents. A gentleman told me recently that his mother had on the wall a picture of Hell-fire with Satan in the midst. Because he had swallowed some harmless chalk powder, he was gripped by the ear and made to contemplate the terrible place to which he was doomed. For some time he sweated metaphorically "drops of blood," but when he found that he neither died nor was likely to go to that warm spot, he ever afterwards put little faith in any terrifying threats. "The Tale of Two Cities," in the short and carefully abbreviated form presented to intermediate students this year, is a model of excellence, and among young people it is generally regarded as one of the best of Dickens' famous stories. As a tutor of nearly fifty years' experience I am heartily in favor of this introduction of classic stories into the University curriculum.

#### UNIVERSITY TEST OF BAQUIE PNEUMATIC WHEEL.

#### AN AUSTRALIAN INVENTION.

H. C. Baquie, of Melbourne, has obtained a certificate concerning tests of his wheel, signed by Professor R. W. Grant, of the University of Adelaide. A photo of the test, and other particulars of the wheel will be found in the advertisement columns. Mr. Baquie will give a demonstration at the Chamber Manufacturers' rooms, off Pirie street, 2.30 p.m. on Thursday. Engineers and investors are invited to attend. The Adelaide brokers (Messrs. Hillman & Co.) report that a firm in London has called accepting an offer for the English rights of the patent, and the company holds the patent rights throughout the world.

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