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THE NEW SCIENCE.

PROFESSOR BRAGG ON RADIO-ACTIVITY.

ADELAIDE UNIVERSITY EXPERIMENTS.

At the University on Monday night, Professor Bragg gave the first of two lectures on radio-activity, with special reference to recent discoveries.

Professor Bragg said the study of radio-activity was exciting immense interest in all parts of the world. This arose in part from the fact that the new science revealed wonders hitherto unsurpassed. Moreover, it dealt with a series of the phenomena never before touched by scientific discovery. It was of some importance to understand clearly this point. In the 19th century, discoveries of Dalton, and the work of all the great chemists and physicists who had followed him, had dealt in the main with the interactions of atoms and molecules on one another. The very word atom implied that the study of its properties was carried on in relation to the atom as a whole, and not to its parts. The new science was distinguished from the old in that it dealt with the processes occurring within the atom itself. One illustration of this would serve. In the laboratory of the chemist the thermometer was an all-important instrument; in fact all chemical processes were largely affected by the temperature at which they were carried on. Temperature implied the existence of heat, and heat consisted in the energy of the motion of the molecules and atoms amongst themselves. But in the new science of radio-activity temperature was of very small importance, for the motions and properties dealt with were those that occurred within the atoms themselves, and had no relation to their motions amongst other bodies, or to other atoms and molecules round about them. Whether as many great results would flow from the study of radio-activity as proceeded from the study of the atom and the molecule, as exemplified in chemistry and physics, remained to be seen, but there was no doubt that the study was enormously interesting, and gave every promise of leading to knowledge of service to man.

Professor Bragg proceeded to sketch the principal points in the theory of radio-activity, for the information of those who had not studied the subject, and he recapitulated the description of some discoveries made in the University of Adelaide, an outline of which he gave last year. He mentioned that when he gave his last lecture on the subject he was not in a position to say much about the impression the Adelaide discoveries had made in the scientific world, but in the year that had elapsed many discoveries in various parts of the world had verified his experiments, so that he might say the Adelaide University had made a material contribution to the world's knowledge of radio-activity. Much new and important work had been done in the past year, and this he proceeded to discuss. In the first place Professor Rutherford, who had been working in Montreal, in Canada, had shown that the alpha particles, when it ceased to give evidence of its motion through the air, was still moving at a speed something like 6,000 miles a second. The range of the alpha particle in the air was the distance it went before its speed fell to the velocity named. The discovery that the remaining velocity of the particle was so great was certainly very surprising. What became of it afterwards was a matter of wonderment. Professor Rutherford wrote to him in a private letter that he was at present engaged in trying to discover the remaining history of the particle. Professor Rutherford had carried out a series of experiments, which had confirmed the results arrived at in Adelaide. Professor Rutherford had done this mainly because certain experiments had been performed in Paris by M. Becquerel, which seemed to run counter to the conclusions come to at the Adelaide University. M. Becquerel had argued from his experiments that the particle did not gradually lose its speed as it went through matter, as had been supposed by himself (Professor Bragg), and M. Becquerel had published his experiments in some of the Continental journals. Professor Rutherford's experiments, however, showed the point at which M. Becquerel had erred, and his results had also been published in various scientific papers in the early part of the year. Professor Bragg's own reply to M. Becquerel was published later, for the letters had to travel round the world. Almost immediately after the publication of his first result, M. Becquerel himself had found his mistake, and subsequently he described experiments which showed him to be in agreement with the results obtained at Adelaide. Professor Rutherford's experiments had also brought out the singular fact that when the speed of the alpha particles fell to the velocity named, it not only ceased to be capable of electrical effects, as Professor Bragg had shown, but it also ceased to be able to affect a photographic plate or to cause minerals to phosphoresce. A piece of research work had been carried on during the year which dovetailed beautifully with this new result. It had been shown by Sir James Dewar that a photographic plate could be acted upon by light, even at a temperature as low as 400 deg. Fahr., below zero. All chemical actions practically ceased at so low a temperature, and it was clear therefore that the photographic action was not primarily a chemical effect at all, but was probably electrical. There were certain substances which responded electrically to the stimulus of light. For instance, a large number of bodies discharged negative electricity when ultra-violet light fell upon them. The point was of considerable importance in physiology, for it was generally supposed that mountain-tops discharged negative electricity into the air under the effect of brilliant sunshine. These so-called photo-electric effects had also been found by Joly to be in existence at extremely low temperatures, and it was therefore to be inferred that the photographic action was probably one of these photo-electric effects, and not

a chemical one at all. This had formed the subject of Joly's address to the Photographic Convention of the United Kingdom during the past year. It would now be seen that Professor Rutherford's discovery of the property of the alpha particle, in so far as it lost this power to affect a photographic plate at the same moment that it lost its electrical power, was in every way consonant with the theory of photography. Probably, therefore, the photographic effect upon a plate exposed in a camera consisted in the unscattering of electrons from their proper place, the displacement being capable of being carried on at any temperature. The material so modified would afterwards respond to the chemical action of the developer at ordinary temperatures.

Professor Bragg showed some interesting photographs which had been forwarded to him by Professor Rutherford. These illustrated the radiating power of radium in a very curious way. The process of producing the photographs was as follows:—Metal rods were exposed to the emanations of the radium, and had so become radio-active themselves. When placed upon a photographic plate curious patterns were formed, which depended upon the shape of the rods themselves. The unravelling of these patterns was easily effected by the new theory of the alpha rays, and formed a pleasing confirmation of the correctness of this theory. The lecturer explained that an ordinary incandescent body of the same size would have given no pattern at all upon the plate.

CHAIRMAN FOR EVER.

From 'Plain Spoken':—"In my own name, and in the names of others, I want to protest against the monopoly, so long established, of the chief position on boards and other societies in Adelaide, because this monopoly is against the public interests. The men who hold on to the positions so tightly are good enough, no doubt; but they ought not to keep all the dignities to themselves. I am told that the University Chancellorship, the Chairmanship of the Public Library Board, the Presidency of the School of Industries, and the Chairmanship of the Geographical Society and the Teachers' Association have been held for many years by two men; and that the committees connected with them think that new blood would be an improvement, but don't like to say so. If these gentlemen knew that their monopoly of office was having the effect of disheartening the good men on their committees, with natural ambitions, would they continue to block the way to promotion? I hope not. But they must not wonder if the people concerned are getting tired of seeing them always in the chair, and thus having a tendency to prevent new ideas being advanced. I think no public board or society should have the same President more than two years running. Will the monopolists take the hint in time, and give other men a chance?"

Register 20th June 1906.

Ad. 25th June 1906

The Rev. F. Slaney Poole, M.A., has been advised by cable that his daughter, Miss Dorothy Poole, B.A., has obtained second-class honours in the mediaeval and modern languages tripos at the University of Cambridge. Miss Poole was formerly St. Alban scholar, and during her career at the University of Adelaide won the John Howard Clark Scholarship, and graduated B.A. in 1902. Since that time she has been a student at Newnham College, Cambridge, spending vacations at Hanover and Weimar. Miss Poole will probably return to South Australia in the course of the next two or three months.

UNIVERSITY EXTENSION LECTURES.

Professor Bragg, in the Prince of Wales' theatre at the Adelaide University on Tuesday night, will deliver the second of his series of extension lectures on "Radio-activity, with special reference to recent discoveries." As before, the lecture will be illustrated by photographs of experiments made by Rutherford, Becquerel, and others. Next month Professor Henderson is to deliver three lectures on "Poets of the nineteenth century—Wordsworth, Tennyson, and Browning." In respect to the series the professor remarks:—"In reference to the poetical works of Wordsworth, Tennyson, and Browning there is no difficulty in regarding poetry as self-expression. All three wrote under the inspiration of high ideals, and their lives were dominated by certain fundamental thoughts and feelings to which in various ways they gave expression. The main purpose of these lectures is to explain the nature of their idealism by reference to selected poems, the most important of which are 'Lines written above Tintern Abbey' (Wordsworth); 'In Memoriam' (Tennyson); 'Rabbi Ben Ezra' (Browning)." During July and August Acting-Professor Dettmann is to deliver three lectures on "Classical and Shakespearean drama; a development and a contrast." The series will be divided thus:—First lecture—Introductory—(a) Classicism and romanticism; (b) The nature of tragic art; (c) Some typical sixteenth century plays. Second lecture—Shakespeare and the Greeks; third lecture—Shakespeare and the Romans.

Ad 22nd June 1906.

EDUCATIONAL HINTS FROM ABROAD.

Mr. G. E. Blanch, headmaster of the Church of England Grammar School in Melbourne, who has just returned from a trip round the world, has recently written a report concerning some of the results of his observations during the journeyings. In Germany Mr. Blanch found that the internal fittings of the schools were more complete than he saw anywhere in America or England. Each room is provided with 35 electric lights fixed to the ceiling. Single desks with curved backs are used, and each boy can select a desk adapted to his own height. No Latin is taught in German preparatory schools. In the upper schools 32 hours per week are required for class work, against 22 hours so spent by the American boy and 24 by the Australian lad. The masters only average about 21 hours a week in teaching. Their opinion is that the long hours of study imposed too great a strain on the German boy. Mr. Blanch mentions incidentally that suicide amongst schoolboys, which in Germany has increased to between 50 and 60 cases in the year, is practically unknown in England and America. Corporal punishment is no longer inflicted in the secondary schools of America, and in Germany the headmaster of each school alone possesses the right to inflict it, but rarely exercises the power. In England Mr. Blanch found that the school furniture was neither so modern nor so comfortable as in Germany and America, but, on the other hand, the facilities for the practical teaching of physics and chemistry were more complete than in either of the other countries, and much better than in Australia.

Reg. 26th June 1906

NOTES AND QUERIES.

"CHAIRMAN FOR EVER!"

From 'Fairplay':—"In my humble opinion 'Plain Spoken' deserves the thanks of the community for his letter in The Register of Saturday. Personally I have long thought nothing short of presumption the tenacity with which the holders of the various offices have clung to them. They have discharged their respective duties fairly well, but a change in such matters often proves beneficial to all concerned; and we have sufficient talent in South Australia to select from, so that there need be no fear of the positions suffering in consequence of a change. Not only so, but there are many who are really entitled to have their services recognised, and all the honour and glory should not be monopolized by a select few. Two years is certainly long enough for any man to occupy these positions."

Reg. 23rd June 1906

ELDER CONSERVATORIUM.

What promises to be a most interesting concert of chamber music will be given on Monday evening next. This will be the first staff concert of the session. One of the chief instrumental numbers will be Brahms's great quintet for piano and strings, op. 34, which will be performed for the first time in Adelaide. Other numbers will be Gade's "Novelletten trio" and Beethoven's sonata for piano and violoncello, op. 5, No. 2. The vocal intermezzi will comprise three songs by Franz and "The jewel song," from Gounod's "Faust." Miss Guli Hack will be the vocalist, and the instrumentalists will be Messrs. Reimann (piano), Heinicke (violin), Kugelberg (cello), assisted by Miss Elsie Cowell (violin) and Miss Elizabeth Delprat (viola). Mr. Arthur Williamson will accompany. His Excellency the Governor and Lady Le Hunte have signified their intention to be present. Tickets for the single concert and season tickets may be obtained at the office of the University.