

Reg. 1st July '03.

Reg. 1st July 1903.

(Reg cutting see next page)
Advertiser 2nd July 1903

THE ELECTRON.

WHAT IS RADIUM?

THE LATEST MARVEL.

Professor Bragg gave the last of his series of extension lectures on the electron to a record attendance at the University on Tuesday evening. Continuing his explanation of the means of studying the electron, he dealt with the effect which ultra-violet light has upon the air through which an electric charge is straining to pass. By the means of the rays thrown off by a burning magnesium wire he showed how a charge was permitted by their influence to pass between a piece of gauze and a zinc plate, both insulated, when before the rays were active the charge could not overcome the resistance of the intervening air. These ultra-violet rays were shown to possess the strange power of fluorescence, which was in another form of their power to split up a medium into atoms. These experiments concluded his theoretical demonstration of the properties of the electron, but he went on to show that the electron had practical properties in the concrete. The discovery of uranium in 1896, and soon afterwards thorium and pitch-blende, and again from the latter radium, polonium, and actinium, had provided the practical source of the electron, and put its study on a sound basis. The professor started with the fundamental experiment that thorium was able to influence the surrounding gas and split it up into electrons, as the Rontgen rays had done in previous experiments. This was done by inserting thorium powder in the neighbourhood of two insulated metals, between which an electric charge was vainly trying to pass. The thorium split up the air and overcame its resistance to the transference as the other experiments had done, showing that it had in itself the property of giving off electrons. He then explained that these rays of electrons were of three kinds. The first, or alpha rays, could only exist for a very little distance from the body; they were practically impervious to the influence of a magnet; they were deviating and non-penetrating. The second, or beta rays, were both deviating and penetrating, and traversed the air to a much greater distance, having almost the same properties as the original cathode rays. The third rays, which penetrated to a much greater distance, were as yet but little examined. He remarked that the reason the beta rays could traverse the greater distance was that they were much less in mass than the alpha, which, being larger, encountered more resistance, and were unable to advance so far. He explained in detail the difference and relation between these rays and the properties which the latest scientific research had discovered. Then, taking thorium as a ground upon which to base his experiments, he showed its influence by a number of interesting experiments. A precipitate of thorium and ammonia gave another substance with properties other than those of thorium, while this thorium X gave rise in its turn to emanation and that to radio-activity. Thorium was sprinkled in a tube and air forced over it, along tubes through excessive heat and excessive cold, and through strong sulphuric acid and cotton wool, but by what scientists termed "emanation" its influence was unimpaired and had the same effect upon a strained medium as the substance itself.

—Radium.—

The much-discussed radium had the same qualities as thorium, only to nearly a million times as great an extent. It gave off electrons with many times greater power, and made examination of their properties considerably easier to the scientist. M. Curie and his wife had obtained it from examination of pitch-blende, and they claimed for it the property of eternal heat. That might be so, but neither heat nor light was in the substance itself. It shot out countless numbers of electrons, which, striking upon the neighbouring bodies, or even back again upon itself, caused heat and light. The property of radium was in the electrons which it cast off, and the property of the electron was in its influence upon the surrounding medium. The sun shot off electrons, and as they streamed into the atmosphere their excitement in the ether caused the formation of the wonderful aurora. The same electrons, meeting those emanating from a comet in proximity to the sun, caused them to stream out into a tail.

—Matter.—

The electron, however, led to the most important study of all things—Matter. As the electron moved through space it possessed energy, both by means of its charge and its movement. Take away the latter property, which might be common to all, and matter might be measured by its charge alone. The electron, considered only in relation to its charge, was an entity by the external influence it exerted. Electricity always existed on the outside, and if that electricity was the measure of the electron, of what did the centre of the electron consist? This was discussing the theory of matter. If everything was measured only by the external influence of its charge, and matter became an empty expression, it might be crossed out of the three fundamentals of our comprehension, and leave only ether and electricity.

—The Experiments.—

Those who have attended the series of lectures given by the professor have been afforded a treat never before presented to a South Australian audience. The lecturer has elucidated the confused theories as to the position and substance of the electron with such skill and force that even those who have had practically no previous scientific training have been able to follow and understand his steps, and go away with a clear conception of what the electron is and means. This has been greatly augmented by a number of remarkable experiments, many of which, it is believed, have never been shown publicly in Australia, and some original ones in the world. A large amount of apparatus was employed in these experiments; yet not a single one failed at the appointed hour. For some of them, what seemed to the unscientific eye a tangled network of little copper wires, were suspended above the stage, each of which played its individual part in the manipulation of the different experiments. In order that no time should be wasted, a special keyboard, designed by Professor Bragg, and executed by Mr. Rogers, was used. By this means, although the different apparatus appeared hopelessly mixed up, each experiment could be performed by the manipulation of little runners, and the corresponding alteration in the currents. Passages of charges were shown to the whole room by the use of a powerful lantern, which, sending a beam of light on to a quadrant electrometer, caused a spot of light to move up and down on a scale at the back of the room.

—End of a Popular Series.—

There is a French proverb which says that appetite comes with eating. Certainly Professor Bragg's audiences can appreciate this adage. Each lecture has deepened their interest in this remarkable study, until the University theatre has proved altogether too small for the crowd which has endeavoured to hear the lectures. Among the audience have been practically all residents of Adelaide who are interested in scientific research, either as amateurs or professionals; and the furore of applause which greeted the lecturer on the conclusion of his series on Tuesday evening was an eloquent answer to the enquiry whether they have been satisfied with what they have heard and seen.

Evening Journal 2nd July 1903.

PIONEERING AND COMMERCE.

"Great is my admiration for the Australian pioneers," said Professor Henderson on Wednesday evening, "and I often feel I would like to lift my hat to them. The stage of commerce now being run is one in which the mere application of pioneering qualities and the mere making of wealth will not do. The discussion on preferential tariffs, and the fact that Mr. Chamberlain has his eye on Germany, and that Mr. Balfour talks about England being unable to compete with America, lead up to the conclusion that England is waking up to the fact that it must educate its workmen so as to get the best results in all its articles of trade. Mr. Chamberlain, while running the commercial idea in England, is at the same time intensely interested in the educational question, as is shown by his advocacy of the introduction of a chair of commerce in the Birmingham University."

ATHLETICS IN EDUCATION.

In an admirable lecture in the Elder Hall on Wednesday evening Professor Henderson spoke of the value of athletics as a means of culture. He said that athletics might be carried to excess; but the man who took his part on the football field and kicked his way to a recognised goal was learning to rise to an emergency, to work with his fellows, and to develop something of that corporate spirit of capacity to work with other people that was of the utmost importance in civic and national life, and he was a stronger man for it. He believed that England owed something of her colonizing power to the fact that Englishmen had been taught for generations to play games. By athletics a man did not take away from life; he added to it. There should be an athletic training at every stage of education if they wanted their students to have "grit." To give a man the capacity to rise to an emergency, to endure, to co-operate with others, would increase his business capacity and his usefulness, and so far give him a power to make money which he otherwise would not have.

LECTURE AND CONCERT AT THE UNIVERSITY.

On Wednesday evening Professor Henderson delivered a lecture on "National wealth" at the University. It was especially designed for those teachers who are in Adelaide for the conference, and they were present in large numbers by special invitation. Professor Henderson was introduced by Dr. Barlow, who occupied the chair.

The Professor said that the question of national wealth greatly depended on the point of view, and the sense of proportion was an important element. Liberty had been by some taken to mean "doing as you please." This was the definition of the licentious or the laetic. Herbert Spencer defined it as having regard to the welfare of others, and this nearly approximated the truth. Similarly wealth might be defined in various ways, but he wanted to take a wide point of view. Ruskin's definition was "that there is no wealth but life," and, further, that "that nation is the richest which nourishes the greatest number of human beings." There were the internal and external sources of wealth, money or capital, and physical endurance, resourcefulness. The last were the pioneer qualities, and true nature constituted, not only wealth, but the very foundations of existence. He would not disparage monetary wealth. Money meant power. Some of them knew what it was to be on the financial balance when it was difficult to make both ends meet, and this meant such a strain that it was impossible to devote natural energy to the best advantage. Money was necessary to keep body and soul together, but was not the ideal conception of wealth. Take the case of a hard smoker. Tobacco and cigars cost money. In excess they cost inward capital as well. Excessive smoking, therefore, used up both kinds of capital. The same might be said of drinking. Brain power was the ability to think. Capital could be spent on some kinds of outward pleasure, which enhanced the value of man's inward capital. In this sense, a footballer was preparing for the struggles of life. In educational training there ought to be athletic impulses everywhere. People needed blood and life in their veins. A nation's best asset was the possession of mental, moral, and physical capabilities. Lord Rosebery had said that for the building up of the Empire men of ability were necessary, men who would go anywhere and do anything. This was a splendid panegyric on the pioneers of Australia, who had no tracks to guide them. But something more than pioneering capability was necessary. The two nations that England was afraid of were Germany and America. When he regarded the sums of money spent by Germany on education, he was forced to believe that advancement was not only a matter of preferential tariffs, but of education. If one wanted to get the best out of men one must put the best into them. Though some firms failed in this way, others in England accepted it as a principle, and gave their employes encouragements in art and education. And they had found the experiment a success. When the question of national wealth came to be considered, it was not only necessary to increase external wealth, but inward, natural, human capital. He had been in many countries of the world, and on returning to Australia had been struck by the appearance of wealth in it. But what were they going to do with that wealth? Use it to make more? They had a perfect right to do so, so long as it was used on the right lines. So far he had spoken of two kinds of wealth—dead and living. There was a third, the capacity to admire the beautiful either in art or nature. The world had at times been denounced by some religious-minded persons. It was said to be a sort of charnel-house. But to one seeing the beautiful, it was a beautiful place. Rich persons had paid perhaps £5,000, or £10,000 for a picture, but even Turner's wonderful sunsets were not as beautiful as nature, which cost—only education. They had bodies to be fed and clothed, and it was foolish to denounce the industries that supplied them, but Ruskin was right when he said that that nation was richest which nourished the greatest number of human beings. This was the ideal the production of which teachers should have before them.

The visitors were entertained at a concert under the direction of Professor Ennis, and the admirable programme provided was much enjoyed.

Register 3rd July 1903.

Mr. Outhbert Lillywhite, who graduated B.Sc. at the Adelaide University in 1899, has been appointed a junior master in the Townsville Grammar School, Queensland. Recently Mr. Norman Jolly, also a graduate of the University of Adelaide, received an appointment in the same school as a junior master, and he has been promoted to a higher position. The head master (Mr. F. T. Miller, M.A.) was so pleased with Mr. Jolly's success as a teacher that he made enquiries with the view of securing another scholar from the same University, and he offered the position referred to in his school to Mr. Lillywhite.

His Excellency the Governor (Sir George Le Hunte) will preside at the twentieth annual social meeting of the Salvation Army Rescue and Prison Gate Brigade to be held at the Town Hall on July 18.