

POWER FROM ATOM

Electric Current Multiplied 160 Times

"STARTLING FIND"

Special Cable To "The Advertiser"
LONDON, April 31.

"Reynolds' News" says it has been secretly reported to the Royal Society that Drs. Cockroft and Walton, working in the Cavendish Laboratory, at Cambridge, as a result of long experiments, have succeeded, by employing an electric current of 100,000 volts, in splitting an atom, producing the equivalent of 16,000,000 volts.

"This means that the electrical power produced by ordinary means may in future be multiplied 160 times," the paper says.

It adds that Lord Rutherford, when asked for a statement, replied, "I gave an account of Drs. Cockroft and Walton's experiments at a meeting of the Royal Society on Thursday. Your conclusion is fairly correct."

STARTLING, IF NOT REVOLUTIONARY

What Prof. Kerr Grant Says

"The announcement, if taken literally, is startling," said Professor Kerr Grant, last night. "I cannot, in fact, believe that the cable is to be interpreted quite literally—that the total power applied can be multiplied 160 times. Such an achievement would be revolutionary indeed; perhaps disastrously so for the present state of social organisation."

"A much more likely meaning is that by applying 100,000 volts to some type of electric corpuscles, probably protons (the positively charged nuclei of hydrogen atoms), high speed rays are produced which are found to have the power of effecting disintegration of some other type of atom, with the consequent ejection of another type of corpuscle (electrons, alpha rays, or neutrons, or perhaps something hitherto unknown), which has an energy of 16,000,000 volts. This could be so, and yet the number of secondary high voltage rays is so few (say, one to 10,000) of the original rays, that the over-all efficiency is still below 1 per cent. But even then the discovery is of the greatest interest and importance, if not so alarming."

Disintegration In Mass

"If my suggested interpretation is correct, it means that disintegration and transmutation can be effected in mass, and not, as hitherto, atom by atom. Even if the power applied to the production of the primary radiation were no more than one horse-power the current would be 100th of an ampere. That would correspond to millions of millions of millions of protons a second. To get such an output from radium many hundred tons of this expensive substance would be required."

"One surprising feature is the very moderate voltage used—100,000 volts. While I was in Cambridge last year Dr. Cockroft and Dr. Walton applied 800,000 volts to a vacuum tube. But they had not then made experiments on the effect of such high voltages, though they had recently reported the successful application of this high voltage to protons. I think the cable news indicates further results of these experiments."

Adv. 5-5-32

SCHOOL OF MINES DIPLOMA

For some time the council of the S.A. School of Mines has been negotiating with the Institution of Electrical Engineers, London, for recognition of the school's Associateship Diploma in Engineering as a full qualification for admission to the institution. Advice has been received from England that the diploma will be accepted by the institution as exempting from the whole of the graduation examination. It has been the practice of the institution to exempt from examination graduates from universities within the British Empire, but this is probably the only instance in which similar treatment has been accorded to any technical college or school of mines in the Commonwealth.

Adelaide Might Have Led in Splitting Atom

ADELAIDE might have led the world in splitting the atom but for lack of money. In August, 1926, at the opening of the new physics building at the University, Prof. Kerr Grant predicted that science was on the eve of a great discovery in atom-splitting. His prophecy has been fulfilled in London, as a result of experiments by Drs. Cockroft and Walton.

Prof. Kerr Grant has at his finger tips every important development in atomic research. He is recognised as world authority on it.

"Give me £100,000 and I will show the public what the next step will be," he said today, when asked what scientists would do next about splitting the atom. Lack of means has been his chief handicap.

He stressed the desirableness of experimenting with high voltages in atomic research. "If we are to take part in the advancement of scientific knowledge, here is an immense opportunity."

Just how accurately Prof. Kerr Grant gauges the position is shown by the following extract from his speech of August, 1926:—

"Other universities in the Empire have already created sub-departments of atomic physics, and there is no doubt that Adelaide will soon have to do likewise. A new field is just opening up in the exploration of the nucleus of the atom, and the artificial transmutation of these nuclei into others. Highly important results will come before long."

"The prime essential in the technique of such investigations is a machine capable of developing voltages 10 times as high as any now obtainable—say, 10 million volts. I am convinced that the design and construction of such a machine is only a matter of time, of money, and of hard thinking. I hope that we shall enter upon this field in the near future, and if we do I shall not hesitate to appeal to the generous public of South Australia for the necessary financial support."

THAT was six years ago, and Prof. Kerr Grant, through lack of funds, is still unable to go ahead with many of his important plans in atomic research. The professor said today that Dr. Cockroft's latest claim on atom-splitting was hard to understand.

"Dr. Cockroft says that when he bombarded hydrogen atoms at 120,000 volts some atoms broke into helium atoms," he added. "Helium might conceivably break up into hydrogen, but hydrogen could not break into helium, because the nucleus of the helium atom—the essential part of the atom—is built up of four hydrogen nuclei and two electrons."

"Dr. Cockroft may mean that when hydrogen nuclei are driven through a thin window of metal foil with a speed caused by an electric driving force of 120,000 volts, into hydrogen gas, a certain number—one in 10 million—of helium atoms is produced"

"But this would not be atomic disintegration. It would be something even more revolutionary—atomic synthesis, or building up. This seems improbable, but I cannot place any other interpretation on Dr. Cockroft's statement."



Prof. Kerr Grant at Work

THE man in the street has but a vague idea of atoms. Here is a simple explanation:—

Matter is composed of atoms in the same sense as a house is built of bricks. An atom is the smallest portion of any element that can take part in physical and chemical processes and yet preserve its identity. An atom is so small that in every visible speck of matter here are millions.

The smallest drop of sea water contains many millions of atoms of gold, although a ton of sea water contains only about a fiftieth of a grain of gold.

Despite their minuteness atoms are the seat of a surprising amount of energy. When this energy becomes effective, as in radio-active elements, which break up of their own accord, a tiny atom of helium is flung off with such astounding speed that when it strikes a zinc sulphide screen, the impact of each projectile produces a visible flash of light.

Atoms consist of two parts—the nucleus or central part, very highly condensed, comprising all the substance of the atom, and the outer part consisting of circulating electrons. The number of these electrons varies from one in the case of hydrogen to 92 for the heaviest atom—uranium.

The atom can be permanently changed by altering its nucleus, which is extremely stable. It had always been thought that enormous energy would be required to break it up. Certain radio-active atoms break up spontaneously. Until recently all attempts to do this artificially had failed.

THE atom was first split by Lord Rutherford in 1911. The achievement of Drs. Cockroft and Walton marks a further step towards artificial disintegration. They have succeeded in breaking up only one particle for every 10 million used to bombard it. The reason for this is that direct impact on the nucleus of an atom occurs only once in 10 million times. The bombarding particles miss the "bull."

So the discovery has no immediate commercial value, even though the energy of the split atoms is from 100 to 100 times that of the particles being fired into them. And the cost of the work is too high to make it of any practical value.

Adv. 6-5-32

Conservatorium Organ Recital

At his organ recital in the Elder Conservatorium Hall during the lunch hour yesterday, Mr. John Horner presented a Bach programme. He opened with the D minor toccata and fugue, in which the richly resonant reeds of the organ were well displayed and its sonorous pedal stops skilfully used. The allegro from the first sonata followed in effective contrast. The gavotte from the sixth cello suite, revealing Bach in merry mood was delightfully interpreted. The brilliant finale was the prelude and fugue in A minor. Mr. Horner's playing throughout was marked by excellent technique, felicitous phrasing, and resourceful registration.

Two Bach cantata excerpts were well sung by Mrs. Alex. Burnard. "It is Fulfilled," to organ accompaniment, was followed by "Sighing, Weeping," with the recitalist at the pianoforte. Particularly in the latter, the singer's crystal-clear tone, her inerrancy of pitch and triumphant technique, created a deep impression.

Mr. Horner's recital on May 12 will include Max Reger's "Introduction and Passacaglia," and Basil Harwood's C sharp minor sonata.

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ADELAIDEAN'S BIG JOB

By R. T. FOSTER

London, March 31.

Adelaidean As Forestry Chief

SIR Roy Lister Robinson, formerly of Adelaide—he was Rhodes Scholar for South Australia in 1905, and won high honors at Oxford—took over a big job on Monday as chairman of the Forestry Commission, which has the supervision of Britain's forests and is busily engaged in repairing the ravages made upon them by the war. To meet the national emergency 450,000 acres of trees were cut down, which is equal to the whole of the plantable area acquired by the commissioners. "What we are trying to do," Sir Roy explains, "is to get back a substantial stock of growing timber in case trouble breaks out again. Many of the woods in this country have been very badly managed, and so have been unproductive. We have planted 210,000 acres since 1919, and have made grants to private landowners or corporate bodies, who have planted 85,000 acres. But against that total of nearly 300,000 acres must be set the fact that a lot

of tree-felling has been going on. The landowner who used to keep the countryside going is impoverished, and the woods have to come last, even if he is not forced to sell them. He cannot put money down and wait for woods to grow up. So, as I see it, there is going to be more and more need for the State to carry out reforestation." The 180 forestry areas under the commissioners' control are scattered from Cornwall to the north of Scotland. They are being planted with pine, beech, and oak trees, and the Commissioners are encouraging small holders in the forests. Despite the dampness of Britain's climate the foresters are not exempt from the fire menace. During the ten weeks' "drought," which broke last week-end in time to drench the Easter holiday-makers, there were numerous heath and forest fires. In one instance, it may tickle Australians to read, a member of the local fire brigade rescued a baby rabbit from the flames and carefully restored it to the parental burrow!