

# A SCIENTIST'S TRAVELS.

## PROFESSOR KERR GRANT RETURNS.

### "THE PHILOSOPHER'S STONE."

According to Professor Kerr Grant, of the Adelaide University, who returned by the Narkunda on Friday after a twelve months visit to the physics laboratories of England and Europe, the age-long search for the "philosopher's stone" which will transmute base metals into gold is still being prosecuted and has been advanced a step by research at the Radium Institute at the University of Vienna.

Professor Kerr Grant visited about 20 laboratories in England, Ireland, Germany, and Austria, and mentioned the researches at the University of Vienna as the most interesting he had seen during his tour. He spent six weeks as a guest of the university, and found it was the only place in the world where the important discoveries of Sir Ernest Rutherford in connection with the artificial transmutation of elements were being followed up. The investigators had confirmed in all essential respects the prime discovery that elements could be actually changed into other elements by bombardment of the atoms with Alpha rays from a radioactive substance. They had also invented new methods of observation which had been most successful. For example, by the use of an amplifier, such as was employed in wireless reception, but magnified a hundred million times, they had found it possible to magnify electrical disturbances, such as the passage of the Alpha rays, so that they were audible to the human ear. In points of detail there were important differences between the observations at the Cavendish Laboratory and those at Vienna. There it was believed that all atoms were transmutable in this way, whereas Rutherford and Chadwick had hitherto failed to detect any effect in the case of carbon, oxygen, and other elements. The director of the Radium Institute was Dr. Stefan Mayer, but the main impulse for the research came from Dr. Hans Pettersson, of Stockholm, the son of the noted oceanographer. It was impossible to appreciate the difficulties under which the research was being carried out without an actual visit to Vienna. The extreme poverty of the country made the institute dependent to a large extent on such outside bodies as the Rockefeller Institute, and Dr. Pettersson had raised over £3,000 from his own countrymen by his personal efforts. The changed conditions since the war had placed research under a cloud.

At this point Professor Kerr Grant digressed to deal to some extent with the general conditions of Austria since the war. The country had made a wonderful recovery, and in spite of the recent riots there was little outward sign of inward ferment. There was no doubt that under the Treaty of Versailles the south, Tyrol, a large number of German-speaking people were being subjected to what amounted almost to persecution. A union with Germany was the natural outcome of the present situation, and would no doubt be beneficial to the country.

One of the objects of Professor Kerr Grant's tour was to purchase new instruments for the University of Adelaide. He said he had taken considerable pains to find out some of the best appliances for exact measurement in all branches of physics, and he thought he might say that the University would be as well equipped in this respect as any university in Australia, at least. Among the instruments he had purchased he mentioned specially the new precision clocks, which were invented by Mr. Shortt and manufactured by the Synchronic Electrical Company in London. Two of these clocks were used in the Royal Observatory at Greenwich, and kept such good time that it was impossible to check them by stellar observation, except over periods of a week or more. It was impossible to measure their variation in a day, in which time they lost about 1-100 of a second. "They have proved that the rotation of the earth is not absolutely uniform," said Professor Grant, "but varies by one-tenth of a second in six months." One of these clocks would shortly be used to control the time signals from the Rugby wireless station, so that Greenwich time to within a tenth of a second would be broadcast all over the world. Before buying one of these clocks the professor got into communication with the Government Astronomer (Mr. G. F. Dodwell) and asked him if the Observatory was contemplating the purchase of one, as it would not be worth while having two in the State. The clock purchased by Professor Kerr Grant will be used to check the Observatory clocks, and vice versa.

Professor Kerr Grant stated that he had been most impressed with the Dutch universities. Nowhere in the world had he seen laboratories so lavishly equipped and so well staffed as those in Amsterdam, Leyden, and Utrecht. Another

feature of these laboratories was that some of them were especially designed for one special branch of research. He mentioned in particular the low temperature laboratory at Leyden, where a temperature as low as one degree above absolute zero had been obtained. This was equivalent to minus 273 deg. Fahrenheit. A number of interesting instruments which the professor has brought back he hopes to have an opportunity of demonstrating to the public of South Australia. He mentioned that in his travels he had seen the largest steam turbine ever designed being built in Switzerland. It is being constructed by the Brown-Boveri works for the Hell Gate electric service station in New York. Its power is 160,000 kilowatts, which is, roughly, 160,000 horsepower.

carried out under the general control of Professor Stephen Mayer, of the Radium Institute; the main impulse for its prosecution coming from Dr. Hans Pettersson, of Stockholm, whose father was the world's authority in regard to oceanography. Professor Kerr Grant added that Professor Mayer was a fine fellow, had been most courteous, and had made room for him in his laboratory, adding that he was welcome to stay as long as he chose.

### Austria Badly Treated.

Asked of conditions in Austria following on the war, Professor Kerr Grant said that, without having been in Austria, it was impossible to appreciate under what difficulties, indeed hardships, scientific work had been, and was being, carried on. Professor Pettersson had raised about £3,000, and the university was relying for assistance upon the Rockefeller Foundation to assist it in its work. All things considered, it was remarkable the recovery that was being made in Vienna, and at the present time, in spite of the riots that took place, there was little outward sign of inward ferment or revolution. There was no doubt that under the terms of the Versailles Treaty, Austria had been badly treated, and in the Southern Tyrol, where there were large numbers of German-speaking people, they were being subjected to what, in his opinion, amounted to persecution. A union with Germany was the natural outcome of the present situation, and probably, he thought, would have beneficial results. If all one heard in Europe was correct, the dividing up of the big countries into smaller ones had its disadvantages as well as its advantages, and coming nearer home, he was inclined to think that not everybody in the South of Ireland was so enthusiastic in regard to the advantages of separation as formerly.

### A Marvellous Clock.

Speaking in regard to the scientific apparatus which Professor Kerr Grant had secured while on his travels, he said that he had taken considerable pains to discover the best apparatus for exact measurements in all branches of physics, and he thought he might say that the University of Adelaide would be as well equipped in that respect as any similar institution in Australasia at least. He wished particularly to mention a new precision clock, which had been invented by Mr. Shortt, and was made by the Synchronic Electrical Company, of London, and which he had purchased. Two of these clocks were installed last year at the Royal Observatory, Greenwich, and they kept such accurate time that it was not possible to check their readings by star observations except at long intervals of time, when it was found that the error was less than one-hundredth part of a second per day; in fact, they had shown that the length of a day was not precisely uniform, but varied periodically by one-tenth of a second in six months. One of the clocks would shortly be used to control the time signals from the Rugby wireless station, which would be broadcast all over the world, so that they would be able to obtain Greenwich time in Adelaide to within one-tenth of a second.

### World's Biggest Steam Engine.

Dealing with the subject of the universities which he visited during his journeyings, Professor Kerr Grant said that he had been particularly impressed with the universities he had seen in Holland. Nowhere in the world had he seen laboratories so lavishly equipped, and so well staffed, as in Amsterdam, Leyden, and Utrecht. Another feature of those universities was their creation of laboratories for one special type of research, as for example, the low temperature laboratory at Leyden, where temperatures as low as one degree from absolute zero had been actually reached. He had obtained numerous other pieces of apparatus, some of which he hoped to soon have the opportunity of demonstrating to the public of Adelaide. Among other apparatus purchased was one of the amplifiers already mentioned. One of the most interesting things he had seen on his tour was the biggest steam turbine ever designed. It was of 160,000 horsepower, and was in course of manufacture at the Brown-Boveri works at Baden in Switzerland. It was intended for the Hell's Gate power supply station in New York.

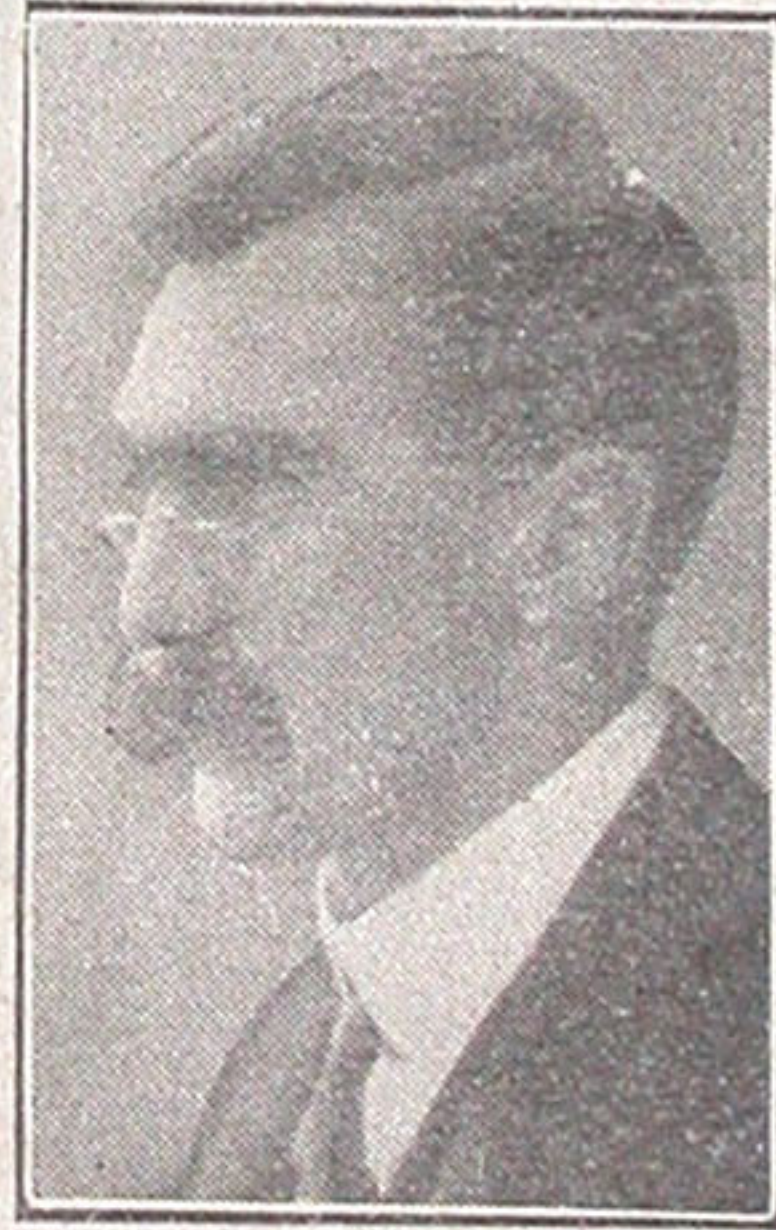
## PROFESSOR KERR GRANT'S RETURN.

### Valuable Apparatus Secured.

Professor Kerr Grant, Professor of Physics at the University of Adelaide, who has been absent from Australia for about 12 months, on a visit to Europe, returned on Friday by the Narkunda. The object of his visit was mainly to inspect laboratories and to purchase apparatus, and in the course of his journeyings he saw something like 20 laboratories in Great Britain, Ireland, Holland, Germany, and Austria. He is looking exceedingly well after his trip, which he thoroughly enjoyed, and had some interesting things to communicate to a representative of The Register, who had a chat with him on Saturday at the University.

### Transmutation of Elements.

Asked about the most interesting research work he saw being carried out during his tour, Professor Kerr Grant



PROFESSOR KERR GRANT.

said it was that being performed at the Radium Institute of the University of Vienna, at which he was a guest during the six weeks of his stay in the Austrian capital. That was the only place in the world where the important discoveries of Sir Ernest Rutherford, Cavendish Professor of Experimental Physics, and Director of the Cavendish Laboratory at the University of Cambridge, in connection with the artificial transmutation of elements, had been followed up, and had confirmed in all essentials the prime discovery that elements could be actually changed into other elements by the bombardment of the atoms with the alpha rays from radio-active substances. They had invented new methods of observation, some of which had been most successful. For example, by the use of an amplifier, such as was employed for wireless receptions, but magnifying it 100,000,000 times, they had found it possible to make audible the electrical disturbance associated with the passage of a single alpha ray through the air. The noise was like an explosion. In points of detail there were important differences between the results obtained at the Cavendish Laboratory and those secured in Vienna, inasmuch as the latter school of experimenters proved that all atoms were transmutable in that way, whereas researchers like Rutherford and Chadwick had hitherto failed to detect any effect in the case of carbon, oxygen, and other elements. The work in Vienna was being

Methods of Other Countries.  
The northern countries of Europe, Mr. McCoy went on, furnished wonderful illustrations of what science had done for the farmers. In the case of Denmark the Agricultural College of Copenhagen had furnished the country with scientifically trained men, some of whom had shown how barren heaths could be turned into profitable farms, while others were scattered over the country as expert counsellors to the farmers. The great agricultural colleges of Canada and the United States were doing similar work. In all cases the work was of university grade, and could not be undertaken by a student until he had satisfactorily completed four years' education in a high school, and spent at least one year on a farm after the age of 14. The completion of the course was marked by a bachelor of science degree in agriculture, and many who had gained those degrees were available as teachers of agriculture in the high schools, the majority of which offered a four years course in that subject. The status of a student who had completed an agricultural course in a high school was equal to that of the student who had taken any other course, and its completion entitled the student to graduate from the high school to the university.

This was not the position in Australia, where the universities followed the British tradition, and insisted in most cases upon external examinations to test the boy's knowledge in these and other subjects. The effect was to discount the value of all high school courses, except those which were traditional as secondary. This position forced the schoolmaster, who, in order to meet the wishes of ambitious parents, was obliged to teach subjects which the boy hated and could not assimilate. The master pushed the boy along on these lines, leaving the other courses, if they existed in the school, to the "duds." In his opinion parent and teacher should confer regarding the boy's future, and, having due regard to the lad's wishes and ability, should guide him in the course which would best serve his future needs.

### Equal Value of Courses.

Mr. McCoy suggested that the universities should remedy the existing state of affairs by approving all five courses—secondary, commercial, industrial, agricultural, and home economics—recognising them as of equal value, inspecting such schools as desired it, and certifying those capable of carrying one or more of the courses, and admitting to any course at the University boys and girls who were certified by the head master of an efficient school as having satisfactorily completed a full four year course. Any lack of knowledge on the part of the student at the University would soon become obvious, and unless it were made good would result in the student's failure. If the quality of the work sent up by the student at the University were below standard the cancellation of the certificates of the school from which they came could be considered. Not the least benefit which would accrue from this procedure would be the abolition of external examinations.

### A National Duty.

The speaker said they must spend more money to improve their course in agriculture, and he thought they could learn much more from the practice in Canada and the United States. In neither of those countries did education form one of the responsibilities of the Federal Government, but the Dominion Parliament, on the one hand, and Congress, on the other, had conceived it to be a national duty to ensure that the nation was provided with competent workmen and efficient farmers. To localize the argument, each said it was not the business of South Australia to educate farmers, who might migrate to New South Wales, nor was it the business of the latter State to provide trained carpenters for Victoria, any more than Victoria should provide machinists for Queensland. Each argued that it was the nation's business to see that the nation was provided with skilled workmen and efficient farmers, and to this end the Federal Government paid to the various provinces or States annual subsidies amounting to millions of dollars to encourage vocational education, which included tuition in agriculture. If the University, the Agricultural Department, the School of Mines, and the Education Department, were together spending £60,000 a year on agricultural education, and a like sum on industrial subjects, and the Federal Government did for the various States of Australia what was being done by the countries to which he had referred, they could in South Australia expand their activities by £20,000 in teaching agriculture, and a similar amount on technical education, bringing the total up to £160,000, of which the Commonwealth would pay one-half. The result would be better farmers, more highly skilled workmen, and a saving to the State of £40,000 a year. He commended those matters to their earnest consideration. Already the Commonwealth authorities were assisting the States to make good roads, and while they were desirable he regarded education as being most important. (Applause.)