NEWS. 3.9.25.

ATOM RESEARCH WORKER

Sir Ernest Rutherford Arrives

MAYORAL RECEPTION

"After an absence of 11 years I am revisiting Australasia, partly to see relations in New Zealand, where I was born, and also to lecture at the chief universities in the Commonwealth," said Sir Ernest Rutherford, F.R.S., the distinguished scientist, who arrived from Britain by the Ascanius today.

He is in charge of the Cavendish Laboratories at Cambridge, where important research work in physics has been undertaken.

"During my visit to Australia," he said, "I will not do any research work, but in addition to lecturing will investigate the progress of local universities. Lady Rutherford will proceed direct to New Zealand to stay with her relatives, and we hope to return to Britain in January.

"In many directions at Cambridge we have been investigating the disintegration of atoms by alpha particles which are liberated by radium. Charged with helium, the atoms are projected spontaneously and used as a bombarding element, which is by much the swiftest and most energetic available.

"We have been able to show that a number of the lighter elements can be altered in structure. Apparently in all cases a hydrogen atom is expelled with speed, and it is supposed that disintegration results. The elements are actually altered, but the effects are too small for observation, so chemical means of investigation are adopted.

"Scintillations are what we are able to observe with the microscope, for the particles expelled produce a flash of light on zinc sulphide. It is not difficult to detect the effect of a single atom. The best method of observation consists of using a microscope in a darkened room.

"Mr. Blackett, one of my assistants, has actually photographed the collision of an alpha particle with a nitrogen nucleus, so we are enabled to investigate visually what happens, for the photograph can be enlarged."

Sir Ernest said that he had not recently undertaken any wireless experiments, although he was a member of the British Radio Board.

"In beam wireless Professors Appleton and Watson Watt are conducting a number of interesting experiments," he added. "Other fields of investigation receiving attention are the nature of atmospherics and aerial disturbances, and the effect of the so-called sky-ceiling which reflects wireless waves back to the earth. This is called the heaviside layer and is considered to exist 60 to 100 kilometres high. It is believed to consist of ionised air, and the reflection is thought to be caused by the action of other charged particles being struck by the radio waves. This condition of the upper air is partially produced by the sun's action."

On Thursday and Friday evenings Sir Ernest Rutherford will deliver lectures on the structure of atoms in the Brookman Hall, School of Mines.

Reception by Lord Mayor

Sir Ernest Rutherford was the guest of honor at a reception tendered by Mr. C. R. J. Glover (Lord Mayor) and Mrs. Glover (Lady Mayoress) at the Adelaide Town Hall at noon today.

Among those present were Sir Douglas Mawson (President of the Royal Society), Professor Mitchell (Vice-Chancellor of the University), Professors Darnley Naylor (classics), Chapman (engineering), Kerr Grant (physics), T. Harvey Johnston (zoology), and Howchin, Drs. H. Basedow and A. A. Lendon, Messrs. C. T. Madigan, G. F. Dodwell (Government Astronomer), A. A. Simpson, C.M.G., T. E. Day (Surveyor-General), W. S. Bailey (Director of Botanic Garden), N. M. G. Gratton (head master Scotch College), and J. Haslam (head master King's College).

Mr. Glover extended a warm welcome to the guest. He said that Sir Ernest Rutherford was no stranger to Adelaide, having been in the city in 1914 with the British Association for the Advancement of Science. He had earned a world-wide reputation as a scientist, and it was an honor for Adelaide to have so distinguished a visitor.

Professor Mitchell said that it was impossible to speak in too high terms of Sir Ernest. He had received the Nobel Prize for his work, and had gone on doing wonderful things. His name had been written forever on the atom.

It was doubtful if there had been anyone who had done more wonderful work in the realm of science than the guest, asserted Sir Douglas Mawson. His work was not only valuable in its application to pure science, physics, and chemistry, but geological scientists had benefited greatly.

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Sir Ernest, who was warmly applauded, said that he appreciated the welcome extended to an apparently insignificant unit in the atom of this universe. When in Adelaide in 1895 he called at the University and saw the work being done by Professor Bragge, who now held the chair which the speaker occupied at the Manchester University. He greatly appreciated the valuable work that Professor Bragge and his distinguished son, who was born in Adelaide, were doing.

The layman might say, "Why all this excitement about an atom?" They must bear in mind; he continued, that this earth and themselves were built of atoms, and it was of the utmost importance that they should know whatever they could about the units of their structure. When they knew the whole of physics and chemistry and applied sciences they would see that it was of fundamental importance.

In the last 25 years, he concluded, substantial progress had been made.

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A DISTINGUISHED SCIENTIST.

ARRIVAL OF SIR ERNEST RUTHERFORD.

A CIVIC WELCOME.

Sir Ernest Rutherford, accompanied by Lady Rutherford, arrived in Adelaide on Thursday by the Blue Funnel liner Ascanius. A civic reception in honor of the distinguished visitors was tendered at the Town Hall by the Lord Mayor (Mr. C. R. J. Glover) and the Lady Mayoress.

Among those present were:—Sir Douglas Mawson (president of the Royal Society), Professor Mitchell (Vice-Chancellor of the University), Professors Darnley Naylor (classics), Chapman (engineering), Kerr Grant (physics), T. Harvey Johnston (zoology), and Howchin, Drs. H. Basedow and A. A. London, Messrs. C. T. Madigan, G. F. Dodwell (Government Astronomer), A. A. Simpson, C.M.G., T. E. Day (Surveyor-General), W. S. Bailey (Director of Botanic Garden), N. M. G. Gratton (headmaster Scotch College), and J. A. Haslam (headmaster King's College).

The Lord Mayor said it was a privilege to welcome Sir Ernest Rutherford to Adelaide. He had won a world-wide reputation in science, and they, as Australians, were glad to be able to advance some sort of claim to nationhood with him, because he was born in New Zealand. He trusted the stay of the distinguished visitor would be happy and pleasurable.

Professor Mitchell said it was a privilege to welcome a man like Sir Ernest Rutherford to Australia. Six months ago the scientists of Australia thought they had failed to induce him to visit the Southern Hemisphere, but Professor MacCallum had succeeded in getting him to change his mind. He could not speak too highly of Sir Ernest Rutherford's work. After receiving the Nobel prize he had done still more distinguished work, and his name would be for ever associated with "the structure of the atom."

Sir Douglas Mawson, F.R.S., as president of the Royal Society, extended a cordial welcome to the visitor. No one was more distinguished in the realm of science to-day than Sir Ernest Rutherford. In fact, he doubted if there ever had been anyone more notable—he was so fundamental, so thorough, and complete that his works would stand for all time. Geologists had gained enormously by the studies of radio activity which were the outcome of Sir Ernest Rutherford's works. More than any other they had afforded an opportunity of placing time and figures upon geological research. He had put geological chronology on a very fine basis. (Applause.)

Former Visit to Adelaide.

Sir Ernest Rutherford, who was greeted with tumultuous applause, conveyed his warm appreciation of the kind welcome extended to "a comparatively insignificant unit—an atom of the universe as I am to-day." In happy vein he became reminiscent, and referred to his earlier experiences when as a youngster, "and a very fresh youngster, too," he stayed in Adelaide for a few days, called at the University to see Professor Bragg, and saw the work the professor was doing at that time. That was in 1895, when he first went to England. Subsequently he had been in very close association with Sir William Bragg and his distinguished son, who was

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born in Adelaide, and who now occupied the chair he (Sir Ernest) held in Manchester University. No one appreciated more than he the work Professor Bragg did in Adelaide, and the continuation of the work which, in conjunction with his son, Sir William was now doing in England.

Sir Ernest touched upon the difficulties he had experienced in getting time to visit Australia. This was due, not to any desire on his part not to visit the Commonwealth, but to "the natural laziness of my disposition." He held a position that was very hard to get away from. He wanted the opportunity to visit his parents, who were still alive in New Zealand, and at the same time he was anxious to visit the universities in Australia. He did not want to be worked too hard, but greatly feared, from the number of invitations he had received, and the great hospitality extended to him, that even his "big constitution" could not stand more than the three weeks he had allowed himself for his stay in Australia. (Laughter.)

The Importance of the Atom.

In referring to his work at Cambridge, Sir Ernest made light of his achievements, and said he was fortunate in the way the work he was engaged in "came out." He always had at the back of his mind that someone would come along and alter it, and show that things were not quite what they seemed. (Laughter.) He was waiting for that person to appear, but there was no one in sight at the moment. His own work was mainly connected with experiments—a sort of continuation of the old radio-active experiments to try to find out the construction of the inside of the atom, which really controlled the atom. That was a very mysterious and intricate world. There were methods of attacking it, though no doubt it would be a long time before we could hope to know very much about it. Naturally the layman might ask, "Why all this excitement about this atom?" When it was borne in mind that the earth and we, ourselves, were all composed of atoms, it was naturally of the highest importance that we should know whatever we could about the units of our structure, and when we realised that physics and chemistry and most of the other applied sciences were all dealing with the atom or its composition it could be seen that it was of fundamental importance. Quite apart from that the subject was the great philosophical question of the age—what was the nature of the fundamental units of which matter is composed? In the last twenty odd years substantial progress had been made, much greater than at any stage of his career he had thought possible.

Sir Ernest concluded by saying that the most startling thing that came out of his investigations was the extraordinary simplicity of the relations of the elements to each other. It was all a simple arithmetical relation.

A DISTINGUISHED SCIENTIST.

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AN INTERVIEW.

The study of the structure of the atom has drawn within its ambit some of the most brilliant minds of the world. One of the most illustrious of living scientists is Sir Ernest Rutherford, who is now in Adelaide. He is an outstanding figure, noted for his ability as a speaker and for the spectacular nature of his addresses. Sir Ernest is not only an intellectual giant, but he is big in every way, with large conceptions. Standing well over 6 ft. in height he has an immense breadth of shoulders and is magnificently proportioned—an ideal specimen of an athletic man who has lived a vigorous outdoor life. It is difficult to associate him with the accepted ideas of one who spends his time amidst chemicals, microscopes, minute calculations, laboratory experiments, and the thousand and one scientific instruments requisite in probing the hidden secrets of nature and science.

He has a personality that radiates enthusiasm, and even a brief conversation is sufficient to satisfy those who are privileged to listen to him that he is completely wrapped up in his work. On ordinary everyday subjects he is prone to silence, but once started on the topic of his own special investigations he waxes eloquent. He possesses the happy knack of interesting his hearers to the exclusion of everything else.

In the course of an interview with a representative of "The Advertiser" on Thursday, he spoke in glowing terms of the great work being undertaken by the British Department of Scientific and Industrial Research in England, which provided funds for the carrying out of experiments which would be too severe a strain upon the exchequer of individual universities. He attached immense value to a new apparatus provided by the department by means of which experiments would shortly be practicable in the magnetic field of a magnitude greater than

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had hitherto been possible with electric magnets. The field obtained by the latter was measured in units of about 50,000, whilst with the new method it was hoped to obtain fields of rather more than 1,000,000.

Radio Activity.

Speaking of his work at the Cavendish laboratory, Cambridge, Sir Ernest said it was to a large extent centred in the subject of radio activity and the disintegration of the atom—naturally as in radium, or artificially by means of bombarding atoms of matter with swift particles emitted from radium. Those questions were being attacked by two general methods. One was known as the scintillation method, in which the atom of matter produced a weak point of light on certain phosphorescent materials like zinc sulphide, which could be observed by means of a microscope in a darkened room when the eye was thoroughly rested. The other method was to photograph the track of the particle by means of a beautiful method discovered by Professor C. T. R. Wilson. In that case it was occasionally possible to observe a collision between an alpha or radium particle, and the nucleus or centre of the atom of matter. One could thus observe the effects of that extraordinarily powerful collision. In that way some information could be obtained of the effect produced by those violent emanations. When nitrogen of the air was bombarded evidence had been obtained that the hydrogen atom was liberated at high speed, whilst the alpha particle appeared to be battered by the atom.

Questioned further regarding the scope of the British Department of Scientific and Industrial Research, Sir Ernest said it worked on lines proved to be of great assistance to research in general, not only in financing and assisting technical research, but in providing special grants to young investigators of promise, and also in financing special research. The general idea was to work as fully as possible in connection with the universities and to help them to train their young men of promise, who would take their part in the scientific world of the future. The department had been of great general value to the community, and there was no doubt that it had been thoroughly successful in its main ideals. In the training of students it was realised that they should do their work in the university, and that the work should be of a fundamental and not of a technical character. The opinion was held that better results would be achieved by training young investigators than by allowing them to tackle difficult problems at the start.

Sir Ernest said he understood that Sir Frank Heath, who was head of the Department of Scientific and Industrial Research in England, would visit Australia shortly to discuss matters of organisation with the Governments.

Sir Ernest Rutherford will leave for the eastern States on Sunday. He will break his journey at Melbourne, and then proceed to Sydney. He will remain in Australia for three weeks before going to his home in New Zealand. Lady Rutherford left by the express for Melbourne yesterday.

THE STRUCTURE OF THE ATOM.

A REMARKABLE ADDRESS.

The Brookman Hall at the School of Mines was filled to its utmost capacity on Thursday evening, when Sir Ernest Rutherford delivered a lecture on "The Structure of the Atom."

The professor is a speaker of unusual power and eloquence. He speaks without notes, and notwithstanding the fact that his lecture was of a highly technical character, he succeeded in investing it with a degree of interest that kept his audience spellbound.

To the man in the street it naturally seems a matter of little moment whether the structure of an atom can be defined, but to the searcher after knowledge, the far-seeing student, it is fraught with a deep significance. Extraordinary though it may appear, such are the ramifications of Western civilisation that the atomic theory may have a bearing on the prices of such household necessities as soap and candles, and the value of consols might take an upward flight merely as the result of successful experiments. One delightful feature of the lecturer's observations was that he did not talk over the heads of his audience. He took them into his confidence, and carried on a conversation—a monologue, it is true, but one could sense an atmosphere of academic co-partnership.

To hear Sir Ernest describe the battering of atoms of matter by particles emanating from radium was rather like listening to a general describing the disposition of his forces on the field of battle, except that instead of referring to battalions, brigades, and divisions the lecturer dealt in millions and tens of millions, and showed by the aid of a splendid series of lantern slides and animated pictures how deductions could be drawn from photographic and visual observations, proving with mathematical exactness the charging attitude of atoms under different conditions.

In happy vein he laughingly referred to his visit to Adelaide in 1895 as a callow young man, desirous of seeing the world, and also of seeing Professor Bragg, who had exercised a marked influence on