Readers who wish for a more detailed reminder of the steps which have led to these great advances may refer back to NATURE, vol. 91, p. 1, where Prof. Righi of Bologna contributes an article appreciating, from the Continental point of view, the work of Sir J. J. Thomson up to the date 1913.

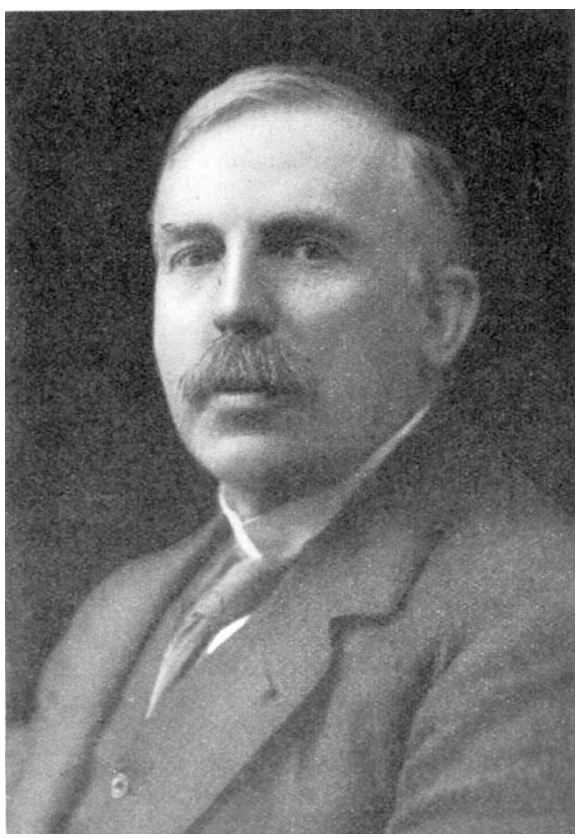
Students and disciples all over the world could contribute far more details. His own son, the professor of physics at Aberdeen, is one of the brilliant products of the Cavendish Laboratory; and many prominent physicists, such as the present Lord Rayleigh, could testify with intimate knowledge of the work of that laboratory during Thomson's régime. They know the doubts and hesitations which had to be set at rest before the absolute uniformity of electronic charges could be confidently asserted. They know the persistent help given by Mr. Everett, his laboratory assistant for nearly forty years. They are acquainted with the incipient stages of many discoveries. But an older physicist esteems it a privilege to write this brief appreciation of the achievements of one who has worked with unexampled power in the borderland between chemistry and physics, who has introduced into that great science of chemistry revolutionary conceptions the end of which none of us can see, and who is still happily flourishing and active.

Sir Ernest Rutherford, O.M., P.R.S.

By Prof. NIELS BOHR, For.Mem.R.S., University, Copenhagen.

FOLLOWING the kind invitation of the editor to write a few words in appreciation of the work and influence of the present director of the Cavendish Laboratory, I presume that the readers of NATURE will not need any detailed exposition of his achievements. As, however, I am one of those who have had the good fortune to come into close personal and scientific contact with Sir Ernest Rutherford, it is a great pleasure to me to try to describe briefly how we, who are proud to count ourselves among his pupils, regard him.

My own acquaintance dates from the period when Rutherford, after years of ardent and successful collaboration with Sir J. J. Thomson in the Cavendish Laboratory, had left Cambridge, and —after his stay at McGill, where his work on radioactive substances had established his fame—in Manchester had founded a school for investigations in radioactivity. This centre attracted young scientists from all parts of the world. In the spring of 1912, on my first visit to Manchester, the whole laboratory was stirred by one of the great discoveries which in so full a measure have been the fruits of Rutherford's endeavours. Rutherford himself and his pupils were eagerly occupied with tracing out the consequences of his new view of the nuclear structure of the atom. It would give only a poor impression of our trust in his judgment for me to say that nobody in his laboratory felt the slightest doubt about the correctness and fundamental importance of this view, although naturally it was much contested at that time. I remember being told by Hevesy soon after my arrival the story circulating in the laboratory of how Rutherford, shortly before his discovery, in a conversation with Moseley expressed the opinion that after all the troublesome investigations of the preceding years—during which he had such faithful assistance from Geiger — one would have had quite a good notion of the behaviour of an α-ray, were it not for the return of a minute number of these rays from a material surface exposed to an α-ray bombardment. This effect, though to all appearances insignificant, was disturbing to Rutherford, as he felt it difficult to reconcile it with the general ideas of atomic structure



Photo] [*J. Russell and Sons.*

FIG. 6.—SIR ERNEST RUTHERFORD, O.M., P.R.S., Director 1919–

then favoured by physicists. Indeed, it was not the first, nor has it been the last time, that Rutherford's critical judgment and intuitive power have called forth a revolution in science by inducing him to throw himself with his unique energy into the study of a phenomenon, the importance of which would probably escape other investigators on account of the smallness and apparently spurious character of the effect. This confidence in his judgment, and our admiration for his powerful personality, was the basis of the inspiration felt by all in his laboratory, and made us all try our best to deserve the kind and untiring interest he took in the work of every one. However modest the result might be, an approving word from him was the greatest encouragement for which any of us could wish.

When the War broke out, the little community in his laboratory was dispersed. Having, however, then taken up a lecturing post in Manchester, I had the opportunity in the succeeding years of witnessing the undaunted spirit and never-failing cheerfulness of Rutherford even in the most difficult times. Although the study of the more practical physical problems arising in connexion with the defence of his country took up practically all his time and energy in those years, he could still towards the end of the War find leisure to prepare for, and finally accomplish, perhaps his greatest scientific achievement, the transmutation of an element through the disintegration of the atomic nucleus by impact with α-rays; an achievement which may be said indeed to open up a new epoch in physical and chemical science.

Just at this time Rutherford was, on Thomson's retirement, offered the directorship of the Cavendish Laboratory as his unrivalled successor. I remember on a visit to Manchester during the Armistice hearing Rutherford speak with great pleasure and emotion about the prospect of his going to Cambridge, but expressing at the same time a fear that the many duties connected with this central position in the world of British physics would not leave him those opportunities for scientific research which he had understood so well how to utilise in Manchester. As everybody knows, the sequel has shown that this fear was unfounded. The powers of Rutherford have never manifested themselves more strikingly than in his leadership of the Cavendish Laboratory, the glorious traditions of which he has upheld in every way. Surrounded by a crowd of enthusiastic young men working under his guidance and inspiration, and followed by great expectations of scientists all over the world, he is in the middle of a vigorous campaign to deprive the atoms of their secrets by all the means which stand at the disposal of modern science.

The Cavendish Laboratory: 1876–1900.

By Sir Richard Glazebrook, K.C.B., F.R.S.

It is fifty years since I first entered the Cavendish Laboratory. Eight years previously physics, in the form of questions on heat, electricity, and magnetism, had become a part of the Mathematical Tripos, and in 1869 a syndicate had reported in favour of founding a special professorship to take charge of these subjects, providing him with a laboratory, a demonstrator, and apparatus to make his teaching practical. Two years later, in 1870, the Duke of Devonshire offered to provide the material part of the scheme "so soon as the University shall have in other respects completed its arrangements for teaching Experimental Physics."

Clerk Maxwell became professor on March 8, 1871, and the laboratory was handed over to the University by its donor, the Chancellor, on June 16, 1874, confident, as he said, "that within its walls researches will be carried out which will advance to no small extent the fame of our ancient University." A prophetic statement; for within those walls have worked Maxwell, Rayleigh, Thomson, and Rutherford, men whose names will ever be landmarks in the history of British physics.

To complete the history of the building, a large ground-floor room for the practical instruction of the M.B. students was added in 1893, while in 1906 Lord Rayleigh offered to devote the greater part of the Nobel prize awarded to him to defraying much of the cost of a new wing; this was completed in 1908. In more recent years the erection of the new engineering laboratory has set free buildings and space adjoining the Cavendish, and a further important extension has been added to the laboratory.

To go back, however, some fifty years. In those days students came slowly. W. M. Hicks was the first. Wm. Garnett had become demonstrator on the opening of the laboratory. J. E. H. Gordon was the first to submit for publication the results of a research conducted at the Cavendish in a paper on the magnetic rotation of water, read before the Royal Society in 1875. When I became a student along with W. N. Shaw and Poynting in 1876, Chrystal and Saunder were at work on the verification of Ohm's law; Schuster joined a few months later. W. D. Niven had an investigation in progress, and soon afterwards Donald MacAlister carried out a modification of the well-known Cavendish experiment on the inverse square law of