

The Volta Conference at Rome.

THE second Volta Conference was held in Rome from Sunday, Oct. 11, until Saturday, Oct. 17, and was devoted to the subject of nuclear physics. The proceedings were opened on Sunday morning by a reception, at which addresses were given by the Marchese Marconi and Prof. Corbino—the Prime Minister, the Duce Mussolini, presiding. Six morning sessions and three afternoon sessions were held, during which many interesting contributions were made. A full report of these is to be published shortly by the Royal Academy of Italy.

The subject of penetrating radiation was handled by Dr. B. Rossi, and led to a very interesting discussion. It appears that we are yet a long way from understanding this phenomenon, but a variety of new methods of investigation are now being applied, which at least promise to yield important information. A considerable part of the conference was devoted to the discussion of the general applicability of our present theoretical ideas to nuclear problems, and it appeared, largely through the important contributions of Prof. N. Bohr, that we cannot expect the present quantum mechanics to apply to the nucleus without undergoing such a fundamental change that it might almost be said to involve a new mechanics, including the present quantum mechanics as a limiting case. In particular, it may be noted that it appears difficult to calculate the probabilities of occurrence of the different nuclear processes to within even an order of magnitude, so that it is quite impossible to decide whether there is or is not a discrepancy between theory and experiment in comparing such experimental results as the number of long-range α -particles and the number of quanta of the corresponding radiation emitted by the excited nucleus. The position appears to be that we should scarcely anticipate that the quantum mechanics would apply even to the α -particles in the nucleus as well as it does, and there is clear evidence that the questions connected with the electrons in the nucleus raise problems quite outside its scope.

Most of the nuclear phenomena which are open to experiment were discussed, such as the values of

the nuclear moments, the artificial and natural disintegration of the elements, the excitation of nuclear γ -rays, the absorption of radiation by the nucleus, the information about the α -particle stationary states in the nucleus and their association with the γ -rays, and also the transference of energy from the excited nucleus to the electronic structure.

The general impression appeared to be that a definite stage in attacking the problem of the nucleus had already been reached in that recognised experimental methods had been adopted, and the general scope of the information they could provide was understood. The problem of the nucleus can at least be divided into several smaller problems, and to each there is now a definite approach by experimental methods.

The α -particles and the protons seem likely to be treated at least approximately by the present quantum mechanics, and it is possible that in the not far distant future a reasonable account of the behaviour of the light and heavy nuclei may be given in terms of certain experimentally defined stationary states of α -particles and protons, the existence of which may at least be made plausible by theoretical calculations based on the equilibrium of such particles inside a potential box. On the other hand, the question of the behaviour of the electrons appears to introduce problems which are not found elsewhere in physics. This point was specially emphasised in connexion with the discussion of the continuous spectrum formed by the disintegration electrons from radioactive bodies.

It would be difficult to express adequately the thanks which the delegates owe to the organisers of this conference, not only for the admirable arrangements which were made for the scientific discussions, but also for the magnificent hospitality which was shown to them. The success of this conference was largely due to the untiring efforts of Prof. O. Corbino and the secretary to the conference, Dr. E. Fermi, who managed to combine both the necessary firmness in directing the conference with the freedom which is so essential for fruitful discussion.

Radio Research in Great Britain.*

THE Report for last year of the Radio Research Board to the Committee of the Privy Council for Scientific and Industrial Research is of interest, as it marks the beginning of a new stage in the investigations. In the earlier work, apparatus and methods have been perfected so that trustworthy and consistent results can be obtained. It is now considered undesirable to proceed further in this direction. Scientific research on which future progress depends is divided into two branches. The first is the fundamental research undertaken without any immediate practical application in view.

* Department of Scientific and Industrial Research. Report of the Radio Research Board for the Period ended 31st December 1930. Pp. iii+90+4 plates. (London: H.M. Stationery Office, 1931.) 2s. net.

The second is to initiate experiments likely to indicate solutions of the urgent problems at present engaging the attention of radio engineers.

The Board considers that, while a proportion of the problems of fundamental research can be undertaken in the confines of a university laboratory, there are many problems that cannot be carried out in this way, as they require the co-operation of observers at great distances apart. This work is continued by the Board, although priority is given to experiments the application of which is clear. During last year, close collaboration was maintained with the radio research boards established by the governments of New Zealand and Australia. Priority is being given to the study of high frequency