## ROGER JOSEPH BOSCOVICH

Roger Boscovich, S.J. (1711–1787)
Forerunner of Modern Physical Theories. By H. V. Gill. Pp. xviii+76. (Dublin: M. H. Gill and Son, Ltd., 1941.) 7*s*. 6*d*.

THOUGH the author speaks (p. 64) of "Newton and other scientists of the time, including Boscovich" as though they were roughly contemporary, this is clearly misleading; for Newton was nearly seventy when Boscovich was born at Dubrovnik (Ragusa) in Dalmatia. This means that one was a man of the seventeenth, the other of the eighteenth century. Similarly, when at the outset of his "Theoria Philosophiae Naturalis", Boscovich asserts that his own system is midway between that of Leibniz and that of Newton, it may be suspected that this is true in the sense that, but for the matter of dates, both would have expressed equal disagreement with his ideas. It is, in fact, hard to understand what he did mean, for the particles of his system never came into mutual contact and they are not subject to the action of a surrounding medium. Yet Boscovich emphatically denied the possibility of action at a distance.

In spite of this inconsistency in his natural philosophy, Boscovich was a voluminous writer who achieved a considerable reputation in his lifetime and even now cannot be dismissed altogether lightly. In order to understand these facts it is necessary to have a clear account of the physical theory which Boscovich developed. But the present small work scarcely touches the history or explains why the theory took the shape it did, or in what way it was founded on the contemplation of experimental facts. In the absence of this background the system seems purely intuitive and to owe its power of adaptation to later problems to good fortune rather than to intrinsic merit.

Indeed the origin of this eighteenth century system seems to have been in the main metaphysical. Its greatest influence was exercised in Great Britain, and particularly in Scotland. In this way it came to the attention of Lord Kelvin, who found a use for it in his later work on elasticity and molecular physics. Similarly J. J. Thomson, when presented with the puzzling properties of his newly discovered electron, had recourse to the ideas of Boscovich. Now again Fr. Gill recalls the Boscovichian corpuscle and sets it to the task of explaining the interference and diffraction of light, the Bohr atom and even wave mechanics in a primitive form. More than this, Boscovich had some clear ideas of the principle of relativity as it involves the perception of scale and orientation. His view of space and time was interesting, though clearly derived to a great extent from the Newtonian theory of fluxions.

The Boscovichian particle is an infinitesimal centre surrounded by a field of force which is alternately an attraction and a repulsion at different close distances, ultimately becoming a positive attraction of the normal gravitational type. Further than this the nature of the particle is undefined, and so it makes a capital plaything for the physicist. But more is wanted to establish a scientific reputation on a sound foundation, and contacts with the past are even more important than contacts with the future.

Hence it may be regretted that here so slight a sketch of the life and character of Boscovich has been included. Yet, if the object was to present a scientific hero, it may have been wise. In truth, Boscovich seems to have been spoilt by success in early life. His character was warped by vanity, egotism and petulance; finally, disappointed with the measure of appreciation which came to him, he became the prey of melancholy and before his death sank into fits of madness. Reverting to the practice of an earlier age, Boscovich wrote a long work, "De Solis et Lunæ Defectibus", a synopsis of astronomy in verse, which Delambre described as uninstructive to an astronomer and unintelligible to anybody else. It is hard without proof to accept the legend of greatness. In some ways Boscovich seems a survival from an age long past rather than a forward-looking man of the eighteenth century. For that century had its really great men, and Boscovich can scarcely be reckoned of their company. H. C. PLUMMER.

## NEWTONIAN ATTRACTION

An Introduction to the Theory of Newtonian Attraction
By A. S. Ramsey. Pp. ix+184. (Cambridge: At the University Press, 1940.) 10*s*. 6*d*. net.

THE preface states that this book was written at the suggestion of some students who were unable to find a book on the subject suitable for their requirements. The seven chapters deal with preliminary mathematics; gravitational attraction and potential, simple applications; attraction and potential internal points, spheres; theorems of Laplace, Poisson and Gauss, general theory; Green's theorem; harmonic functions; attraction of ellipsoids.

In writing an account of a branch of applied mathematics in which the subject-matter has long since been stabilized, an author can still choose his method of presentation, and it is interesting to see that in the first chapter the reader is introduced to vector methods. With the vector notation established, one rather regrets that the matter is not pushed to a conclusion with the introduction of Gauss's general theorem in the symbolic form

$$\int \boldsymbol{n} X \, dS = \int \nabla X \, dv$$

for the relation between surface and volume integrals. From this form flow the various particular cases of this theorem and Green's theorem. There is the added advantage that the emphasis is thus laid on a statement which is of general application to potential theory whether in gravitation, electricity, magnetism, or hydrodynamics. Indeed, the student of any one of these subjects is seldom forcibly presented with a clear picture showing how much belongs simply to general mathematics and how much to the particular subject which he is studying. Gauss's normal induction theorem and Poisson's equation may be cited as instances.

The book as a whole is intended for students taking an honours course, but the needs of the student reading for a pass degree are not forgotten. The author writes with the clarity and flair for exposition to which readers of his other text-books are accustomed. There are numerous examples at the end of each chapter, many taken from Cambridge and London papers, the easier examples being divided from the more difficult. The book completes the series on mechanics which the author has produced in recent years and takes a worthy place among them. L. M. MILNE-THOMSON.