the new Minister of Education, brings to her office more than administrative ability; she must have also the vision and grasp of essential issues, the firmness of decision, and the energy in action which are required alike to resist sectional pressure and to promote the policy which the country needs. Educational policy is of such critical importance, and the damage which unwise retrenchment can do is so great and irreparable, that the exclusion of the Minister of Education from the new Cabinet will be viewed with regret by all who appreciate what is at stake. It cannot but make Miss Horsbrugh's task more difficult in securing either the right economies or the increased spending which in technical education, and especially in technological education, is imperative even to-day.

## LECTURES ON THEORETICAL PHYSICS

## Vorlesungen über theoretische Physik

Von Prof. Arnold Sommerfeld. Band 1: Mechanik. Vierte, neubearbeitete Auflage. Pp. xii+276. 18 D. marks. Band 2: Mechanik der deformierbaren Medien. Pp. xv+376+4 plates. 18 D. marks. Band 3: Elektrodynamik. Pp. xvi+368. 18 D. marks. Band 6: Partielle Differentialgleichungen der Physik. Pp. xiii+332. 18 D. marks. (Wiesbaden: Dieterich'sche Verlagsbuchhandlung, 1947-1949.)

CYCLE of lectures on theoretical physics is a A normal feature in a Continental university. The lectures, which would be attended in general by mathematicians and physicists, form a three-year cycle; each section is made self-consistent. The present series is based on such a cycle, given by one of the greatest teachers of theoretical physics. In Great Britain, where theoretical physics is just beginning to be recognized as a separate subject, some of this material would appear in lectures on applied mathematics, some as part of a physics course and some of it not in any undergraduate course. These books, therefore, cannot serve directly as texts for any of the standard courses, but they provide many ideas that could be incorporated with advantage. The emphasis is always on the physical concepts. Mathematical techniques are developed, where they are necessary, with Sommerfeld's characteristic skill, but they are never allowed to become aims in themselves.

The course on mechanics covers, in one semester, what would take about two years in a British honours course. Of necessity, therefore, it is somewhat short on points of detail, but what is omitted is mostly manipulation. Statics, as such, occupies only about five pages, and this in my opinion represents a correct assessment of its didactic value. There is a good selection of examples which provide a welcome change from the 'ladder-leaning-against-a-wall' type. This is followed by a section containing detailed and instructive comments on the solutions of each problem.

In the second volume hydrodynamics and elasticity are treated together. Thus the general principles can be treated in a concise and transparent way. The emphasis is very strongly on the general principles, in this case somewhat at the expense of mathematical techniques. In the later sections on hydrodynamics, such relatively advanced problems as boundary layers and turbulence, as well as supersonic flow and shock waves, are mentioned, whereas the treatment of the theory of potential flow is brief and the method of complex variables has been completely omitted.

Vol. 3 builds up Maxwell's equations from the familiar integral theorems, giving enough examples to bring out the significance of each term in the equations, and the later chapters then show how one solves them. Here again, potential theory is passed over quickly, whereas those problems the solutions of which involve new physical principles are discussed at length. Relativity and the Lorentz theory of the electron are covered fully, and there is a short chapter on the equations for moving media.

In the preface to Vol. 6, on the differential equations of mathematical physics, Sommerfeld refers to "the pre stabilized harmony" between what is interesting mathematically and what is relevant physically; and, in fact, this volume illustrates particularly well his attitude to mathematics, in his insistence on correlating his mathematics with the physical situation at every step. In every case the object of a mathematical argument is not to provide rigorous proof. though he is quite capable of rigour where the validity of a step is in doubt, or where one has to guard against dangerous exceptional cases. But the chief interest is always in showing a new concept to be reasonable, because it corresponds closely to a significant feature of the physical situation, and to be useful for getting practical results. Fourier series and integrals are discussed together. The general properties of partial differential equations, including their characteristics, are summarized and illustrated by a full discussion of problems in heat conduction. A chapter on spherical harmonics and Bessel functions is followed by a discussion of eigenvalue problems in general, and the last chapter, by way of illustration, covers the classical theory of radio waves, to which Sommerfeld has made so many basic contributions.

To me these volumes represent an almost perfect choice of topics for a basic course on theoretical physics, though I must admit some prejudice in this matter, having learnt most of my theoretical physics from Sommerfeld's lectures. It is not clear whether the missing two volumes on optics and on thermodynamics and statistics are to be published; it would be a serious loss if before his death Sommerfeld had not carried the work on these to a point where others could complete it. I shall eagerly await an English translation of this series, so it can be made available to at least some English-speaking undergraduates.

R. E. PEIERLS

## ELEMENTARY GENETICS

## Elementary Genetics

The Physiology of Descent. By Wilma George. Pp. vii+172. (London : Macmillan and Co., Ltd., 1951.) 10s. 6d. net.

WRITING an elementary book on genetics is certainly a difficult task : a large number of essential facts, the theories that unify them and some speculations as to future developments have to be concentrated into less than two hundred pages. None of the previous few books of this kind succeeded in striking a sound balance and the present one is no exception. In one important respect, however, it