

Chapters 4 and 5 deal with partial differentiation and with integration respectively and include studies of the del operator, line, surface and triple integrals, Green's and Stokes's theorems, and irrotational and solenoidal vectors. Chapter 6, on tensor analysis, dismisses the subject in a mere thirty-seven pages, but nevertheless it manages to present a concise account of the main essentials of the classical approach. For example, it includes co-ordinate transformation, covariant, contravariant and mixed tensors, the metric and conjugate tensors, lowering and raising indexes, the Christoffel symbols, and the curvature tensor, in addition to stating other topics of a kindred nature.

There are 195 problems (without answers), and although the book is said to be for students of engineering and mathematical physics, one can scarcely imagine that many of them will find much satisfaction from solving the problems except as exercises in pure mathematics. The type-setting and printing are excellent, but the work bears some evidence of hasty proof-reading. Considered as a condensed text in the classical manner, the book can well be recommended; and while it may help the embryo mathematical physicist, I much doubt that it will do the same for the young engineer.

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FOOD FROM FRESH WATERS

Fertilizers in Fishponds

(Colonial Office, Fishery Publication No. 5, 1954.) By C. H. Mortimer. With additional material and a foreword by C. F. Hickling. Pp. iv+56. (London: H.M.S.O., 1954.) 25s. net.

IT is often remarked on the Continent of Europe that in Britain scarcely any freshwater fish are exploited for food. Indeed, many who went to Britain during and after the Second World War investigated the possibility of carp farming on the German model. But sea fish is so readily available everywhere in the British Isles and, if truth be told, so much more palatable than carp, tench and pike, that it seems unlikely that such an industry could be established, even if the summer climate should prove to be warm enough to allow farmed fish to attain an economic growth-rate.

Nevertheless, during the War we had to consider to what extent our own fresh waters could contribute to our food supply, and Dr. C. H. Mortimer prepared for the Freshwater Biological Association a bibliography of publications on the use of manures to increase the productivity of fish ponds. In the event, we never had to exploit our fresh waters, so this paper did not attract the attention it deserved. Soon after his appointment as fishery adviser to the Colonial Office, Dr. C. F. Hickling appreciated the contribution freshwater fish could make towards remedying the serious protein deficiency that exists in so many tropical and sub-tropical countries and, by example and precept, has aroused an interest in fish farming throughout the British Colonies.

The literature on the subject is scattered and scanty, so no doubt Hickling found Mortimer's bibliography useful, with the happy result that they have collaborated to revise and extend the earlier publication and have produced a paper that every fish farmer and every freshwater biologist in the world should have. It is a very good bibliography, but it is a great deal more than that. The first forty

pages are in fact a critical review of the literature and are most readable and informative. Then follow 108 pages which contain 351 references, and in every case where the title of the paper is not an adequate description of it there is an abstract. These abstracts vary in length from one line to rather more than four pages, and the long summaries of the most important publications are sometimes illustrated by graphs and tables. So the reader may find the information he needs in the abstract and can certainly discover whether the full paper is worth consulting—a very important matter in parts of the world remote from libraries. Lastly, there is an adequate index, making the publication handy to use.

H.M. Stationery Office ought surely to issue publications of this kind in something more durable than a paper cover. This book will be in constant use and will inevitably have to be given a permanent binding, so why should not the publishers do their job properly?

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PROPERTIES OF MATTER

Properties of Matter

By H. N. V. Temperley. Pp. vii+323. (London: University Tutorial Press, Ltd., 1953.) 21s.

AN outstanding feature of this excellent book by Mr. H. N. V. Temperley, which is intended for the degree student, is its emphasis on essentials. The usual descriptive matter is greatly condensed; indeed, only one experiment (the determination of g) is described in full, but this is done in great detail to illustrate the general principles of correcting for experimental error. The reader is left to supply for himself (guided by a mathematical appendix) the intermediate steps in the derivation of formulae; and the author deals very thoroughly with the applications of classical mechanics to the behaviour of solids, liquids and gases.

The book is interesting to read for two reasons. The first is Mr. Temperley's graceful economy of words; an author who is as careful of his writing as of the subject-matter compels attention, besides setting a good example. The second is his outlook; for, as he says, although no especially striking advance has taken place in the twentieth century in the field of classical physics, there is no sign of any slowing-down of progress, quite the reverse, and the subject is still a very long way from being a 'closed' one. He gives many examples of the recent applications of classical physics—work at very high and very low pressures, ultrasonic absorption and the second coefficient of viscosity, the propagation of shock waves, and the behaviour of metals under plastic flow, to mention a few. The effect of this is to assure the student that classical physics is not only the grammar of the subject that he must master, but is also in its own right a living branch of the subject, with a future as well as a distinguished past.

Each chapter has a bibliography and examples for solution, and there is a collection of examination questions, chiefly from Part I of the Cambridge Natural Sciences Tripos and the London B.Sc. examinations. One's only criticism is of the publisher's modest statement that the book is suitable for students preparing for degrees in science; it would be fairer to describe it as invaluable for degree students preparing to be scientists.

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