Problems . . .

A COLLECTION OF PROBLEMS IN ATOMIC AND NUCLEAR PHYSICS. By I. Ye. Irodov. Trans. from Russian by Steven Dedijer. 239 pp. Pergamon, Oxford, 1966. $9.50

by L. Marton

Good problems are necessary for teaching, both at the undergraduate and mostly at the graduate level, and the collection by Irodov is an excellent example of a useful collection, complete with answers. The answers are not uniformly explicit. A great number of the answers contain only final numbers, whereas a selected number of them indicate the intermediate steps taken in arriving at the answer. It is the kind of book that will be appreciated by both the teacher and the student. Its problems (several hundred of them) are at a fairly sophisticated level and range over practically *all* of contemporary physics.

There are a few minor criticisms to be listed. Sometimes the author, so to say, changes horses in mid-stream. I would like to give one example.

The problems are organized in groups carrying various titles such as "Wave Properties of Particles" or "Properties of the Atomic Nucleus" or "The Atom in a Magnetic Field," etc. Each such chapter starts with a summary of the most important equations relevant to the chapter. With these equations definitions are given for the symbols used. Sometimes, however, in the problem the same symbol is used for a very different quantity. It requires, therefore, a very alert mind for the student to recognize whether such a switch occurs, to avoid pit-falls. The example I had in mind, for instance, is in problem 4.28, where A is used for resolving power in the electron microscope, whereas the listing at the head of the chapter used A for the numerical aperture of the objective.

Another slight criticism is that only a very slight proportion of the problems require error estimates. If a new edition of the book comes out, I think greater emphasis should be laid on limitations of the experiments.

Slight confusions in some places may be due to the process of transla-

tion from Russian to English. Most of them are quite harmless. For instance, in problem 15.33, the energy is given in BeV whereas the answer to that problem is in GeV. The number of proofreading errors is unfortunately high.

At the end of the book there are a few useful tables, which may advantageously be expanded in a new edition. The confusion listed above between BeV and GeV could be avoided by having, for instance, a more extended table of decimal prefixes.

The book is nicely presented, but for use by the average student may be a trifle too highly priced.

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The reviewer is chief of international relations at the National Bureau of Standards.

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PROBLEMS IN UNDERGRADUATE PHYSICS. Vol. 2, Electricity and Magnetism. By S. P. Strelkov, I. A. El'tsin, S. E. Khaikin. Trans. from Russian by D. E. Brown. Trans. edited by D. ter Haar. 204 pp. Pergamon, Oxford, 1965. $5.50

by Robert L. Weber

Students and teachers in introductory and intermediate physics courses will doubtless find in this collection some challenging problems they have not considered before, and at a level appropriate to their course. There are 521 problems presented in ten categories: electrostatics, dc circuits, magnets, magnetic field of a current, electromagnetic induction, ac circuits, electric currents in liquids, thermoelectricity, electronics and electromagnetic waves. The problems are self-sufficient. There are no data tables. No regard is paid to the number of significant figures in numerical calculations. Metric units are used, esu and emu. There are some 200 clear line drawings.

The editor, D. ter Haar, remarks: "During the course of the translation . . . the authors provided a large list of amendments and additions to their Russian text . . . Many of the additional problems are on topics which have

developed during recent years." However, in volume 2 there is little evidence of new topics or of any new approach to physics teaching. Many problems are reminiscent of the Duncan and Sterling textbook of two or three decades back.

One page is devoted to Dolivo-Dobrovol'skii's invention of the three-wire dc distribution system, but there is no other peculiarly Russian emphasis. In discussing magnetism, expressions for field intensity H are used; magnetic induction B is not mentioned.

The inclusion of answers, and many complete problem solutions (93 pages), is especially welcome in a book of this kind when it is used in independent study. It is also interesting to know what the authors consider an adequate explanation to such a question as: "Why do two parallel wires carrying current in the same direction attract one another, whilst two parallel cathode beams repel one another?"

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PROBLEMS IN UNDERGRADUATE PHYSICS. Vol. 4, Molecular Physics, Thermodynamics, Atomic and Nuclear Physics. By V. L. Ginzburg, et al. Trans. from Russian by D. E. Brown. Trans. edited by D. ter Haar. 236 pp. Pergamon, Oxford, 1965. $5.50

by Robert L. Weber

More interesting, modern and sophisticated problems appear in this smoothly translated book than in, say, volume 2 of the series. There are some 365 problems dealing with molecular physics and thermodynamics, and some 300 dealing with atomic and nuclear physics. Answers and solutions, which occupy 118 pages, add greatly to the value of this book for use in independent study.

The problems range in difficulty from simple one-step applications of a definition or principle to problems requiring approximate solutions and the