peared in 1913 and did so much to correct previously accepted bases for design of bridges and other steel structures. Both French papers are translations, by others, from material that Timoshenko had prepared in Russian. The German and English papers are his own expression, but it is evident that in every instance he was wise enough to accept competent editorial assistance in these acquired languages. Not a single paper betrays any of the mannerisms, such as omission of articles, characteristic of most technical papers written by the Russian-born.

D. H. Young's brief biographic sketch of the author is probably the most nearly complete story of Timoshenko's career that has been published. Born in the Ukraine in 1878, the son of a surveyor, he was educated as a railway engineer. The years before World War I he spent chiefly as a teacher in the Engineering Institutes at Kiev and St. Petersburg, learning English by studying such mathematical works as our own English classic in the field of applied mechanics, Love's *Theory of Elasticity*. Driven from Russia by the Bolshevik revolution, he spent a brief period in Jugoslavia, arriving in this country in 1922. During his 5 years in industry, chiefly with Westinghouse, he organized the Applied Mechanics Division in the American Society of Engineers, now the most fruitful source of applied mechanics literature in the entire field. Since 1927, he has been educating engineers, not only the students at the University of Michigan and Stanford University where he has held increasingly important academic positions, but all practicing engineers who are concerned with the design of machines or structures. Obviously, there is material in this life for a full-length biography, and one may hope that Young will undertake it.

In making this collection, the editors have discarded "a few papers, the content of which was deemed to be of more technical than scientific interest." Engineers will make no complaint; they have a gold mine in the volume as published. In the eyes of the design engineer, however, it is Timoshenko's chief virtue that his work, however scientific, invariably has some concrete design application and, moreover, it has an application that the engineer can comprehend and utilize. While others delight in pure abstractions, Timoshenko does not scorn a concrete result or even a numerical answer. He always offers the bridge that we so badly need between pure mathematics and practical design. Through him and his able colleagues we have progressed from "mechanics" through "applied mechanics" to "engineering mechanics," of which Timoshenko is the great disciple.

Physically, this book is a thing of beauty, worthy of the man whose collected works it holds. Handsomely bound, with an attractive type face on excellent paper, the format is marred only by the use of Continental numerical punctuation in the English texts (3.000.000 for 3,000,000 and 0,742 for 0.742). This is an idiosyncrasy that will offend British readers no less than Americans and is inadequately explained by the fact that the book was printed in the Netherlands. The preface states that these papers "are reprinted as they were originally published, any corrections or additions appearing in the form of footnotes." Spot checks indicate that this verbatim reproduction has been carried out meticulously, with the exception of the unfortunate numerical punctuation mentioned. The absence of a single corrective footnote in the entire 642 pages shows the care with which the original papers were prepared and proofread by the author.

This is a volume that any mathematician or any mathematically literate engineer or scientist should be happy to own. It could be used as a textbook, not so much in mathematics as in the art of scientific communication. It should be the *vade mecum* of every young scientist who aspires to express complex mathematical concepts in a manner that will help the designers of our machines and structures to create a better and safer world.

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Die Welt der ungewohnten Dimensionen. Versuch einer gemeinverstandlichen Darstellung der modernen Physik und ihrer philosophischen Folgerungen. Arnold Hildesheimer. Sijthoff, Leiden, 1953. 368 pp. Illus. + plate. Fl. 17.90.

This book on modern physics written in German is for the intelligent layman, defined in this case as a person possessed of at least 10 grades of Central European primary and secondary schooling. A native of Germany and a citizen of Israel, Hildesheimer is a broadly educated industrial chemist with considerable professional success in both countries. According to the biography on the dust jacket, he must have received his doctor's degree about 1910. In other words, although not an active participant in the development of contemporary physics, he has had full professional education and experience in a neighboring field. The book shows that the author also has maintained an active interest in philosophy and, more particularly, the philosophic implications of modern physical theories.

The author's background is pertinent to this review insofar as the writing of a nontechnical book on modern physics and modern epistemology is a highly personal business. To what extent prospective readers will enjoy such a book will depend to some extent on the degree to which they are "in resonance" with the author's approach, given factual competence.

Apart from an introductory section, which deals with the nature of scientific knowledge and its limitations, the book devotes approximately 100 pages each to three parts concerned with classical physics, relativity, and quantum theory, respectively, and about half as much space to a concluding (fourth) part on epistemological implications. According to the various prefaces, the book was read in whole or in part by W. Heisenberg, Gall, a teacher of mathematics and physics at Haifa, and Max Born, O. R. Frisch, and H. Groot. This battery of distinguished readers is both

guaranty and testimony for the fact that this book is not the work of a dilettante but of a competent and serious person who worked hard and well on both the scientific and the educational aspects of his undertaking.

In his preface, Hildesheimer claims that most of the semipopular books written by others deal either with quantum physics or with relativity but not with the whole of modern physics; moreover, those written by eminent scientists, such as Einstein, are not really comprehensible to the layman. I tend to disagree with these judgments. I distinctly recall that, as a young boy in secondary school, I read several books on relativity, among them those by Bertrand Russell and by Einstein, and that Einstein's presentation made the best sense to me. Both Gamow (in the "Mr. Tompkins" series) and Einstein (in the *Evolution of Physics,* with Infeld), have balanced their respective presentations. One thing may be said against Hildesheimer's work: like most scientists not themselves active in the field, he is overly impressed with the present accomplishments of physical theorizing. There is a great deal of discussion of controversial material of an epistemological character, although there is no mention of the Einstein-Rosen-Podolsky experiment and the ensuing discussion by Bohr and others. There is no discussion at all of quantum field theory and, more generally, of the relationship between relativistic field theory and quantum theory. But these topics should be of interest to the layman who is interested in the frontiers of science as well as its philosophic implications.

All in all, Hildesheimer's book will be of interest to those who read German fluently and who find it useful to read several semipopular books on modern physics by authors with different points of view. Such readers will find Hildesheimer's book well written and easy to understand.

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Progress in Nuclear Physics. vol. 3. Otto R. Frisch, Ed. Academic Press, New York; Pergamon Press, London, 1953. 279 pp. Illus. + plates. $9.50.

This excellent volume contains a number of articles on topics in nuclear physics. The editor has apparently made the decision to keep the area covered by each author well circumscribed, permitting a rather detailed and complete review of each subject. This makes the volumes of this series complementary to its American analog, *Annual Review of Nuclear Science,* where on the whole fairly large areas are brought into perspective by a necessarily qualitative discussion.

The present volume contains a number of articles on instruments: "The diffusion cloud chamber" by M. Snowden; "Energy measurements with proportional counters" by D. West; "Solid conduction counters" by F. C. Champion; and "The production of intense ion beams" by P. C. Thonemann. Articles that have to do with nuclear physics proper are "Oriented nuclear systems" by B. J. Blin-Stoyle, M. A. Grace, and H. Halban; "Stripping reactions" by R. Huby; and "The collision of deuterons with nucleons" by H. S. W. Massey. Two topics on electrodynamics also included are "Cerenkov radiation" by J. V. Jelley and "Annihilation of positrons" by M. Deutsch. These are, of course, not properly nuclear physics; but the first has instrumental applications, while the second is of a most fundamental importance, providing sensitive tests of quantum electrodynamics as applied to the two-body problem.

It is a pleasure to record that these articles are well written, are authoritative, and for the most part are complete. The instrumental papers include sections detailing the theory of the instruments as well as giving experiments either already performed or twinkles in the eyes of the author, in which the instrument is used. We must exclude the discussion of solid conduction counters from this description, since it is hard to make them reliable. Here the author concentrates on the information of the structure of materials revealed by these investigations. The papers on nuclear physics proper present both the theory and the experiment and are careful to point out the possible experimental and theoretical avenues where further work is indicated.

The book contains a name index as well as a short subject index. Each article contains an extensive and, in itself, an extremely useful bibliography.

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Progress in Cosmic Ray Physics. vol. II. J. G. Wilson, Ed. Interscience, New York; North-Holland, Amsterdam, 1954. xi + 322 pp. Illus. $8.50.

Like its predecessor, which was published in 1952, this volume consists of surveys or reports on several topics of current interest in cosmic-ray physics, written by experts in the fields covered. The usefulness of thoughtful reviews, expeditiously published, is quite obvious in such a turbulent subject; research workers will expect to find here many facts and references, collated with critical judgment, and in general they will not be disappointed. The book is satisfactory; if it misses the high level of some of the contributions in volume I, the differences are mainly that the subjects are less uniformly interesting, and the delay between writing and publication has stretched to well over a year.

The latter fact is most keenly apparent in the chapter on the heavy unstable particles. The editor has assigned himself this task and, in summarizing the experimental facts and their interpretation, has followed fairly closely the sense of the Copenhagen conference of 1952. The past year has seen some of that interpretation swept away, as new facts have clarified many difficult points (and of course raised others).

R. D. Sard and M. F. Crouch, writing on nuclear