

Books

Machine Translation of Languages. Fourteen Essays. Edited by William N. Locke and A. Donald Booth. 243 pp. (Chapman & Hall, England) The Technology Press of Massachusetts Institute of Technology and John Wiley & Sons, Inc., New York, 1955. \$6.00. *Reviewed by Philip M. Morse, Massachusetts Institute of Technology.*

Depending on one's degree of familiarity with modern computing equipment and on one's interest in literary style, one's reaction to this book's title could range from "Marvelous!" to "How foolish can people get?" Actually, as the contributors to this symposium of fourteen essays hasten to explain, no one is proposing that a Japanese *hokku* could be fed into one side of an electronic monster and that an equivalent couplet in properly rhymed and scanned English would come out the other side. The contributors to this book point out, however, that a great deal of mechanical drudgery must precede any adequate translation and that some of this drudgery might possibly be taken over by a properly designed machine, even if the human brain will always be required to complete the task.

Perhaps the first step is to let a machine take the place of a dictionary, providing from its memory, for each word or phrase in the original language, the equivalent word or words in the final language. Even this step, however, is a quite difficult one, as several of the essays in this book amply demonstrate. Problems of multiple meanings, of the effects of syntax and so on, cannot be neglected.

The limitations and possibilities of machine translation are discussed in an introductory essay by Warren Weaver, written in 1949 after considerable discussion with linguists in this country and in England concerning their experience with problems of translation and of decoding in World War II. Since that time several study groups, in England and in this country, have investigated possibilities: in particular a project at MIT, which was instituted in 1951, now publishes a journal *MT* (*Mechanical Translation*). Many of the essays in this volume are progress reports by members of these various groups. I believe they would all agree that they have not yet reached even the stage of feasibility studies, that their reports are but preliminary discussions of how a feasibility study might be carried out.

But even these small beginnings may well be of interest to physicists, even though it doesn't hold out

much hope of making quick translations from the Russian physics journals in the near future; for it illustrates again the changes in points of view which are produced when one starts to mechanize or quantify any activity. As physicists or engineers, we are familiar with the fact that attempts to mechanize some activity hitherto done by manpower have usually led to a deeper understanding of the nature of the activity, whether it be as simple as the lever or as complex as the heat engine. This is turning out to be true with nonmechanical activities as well. Attempts to use machines in breaking enemy codes during the war provided the new point of view from which communication theory has developed, for example. It is quite possible that the most valuable result of an attempt to mechanize translation will be a new insight into the nature of languages. As Weaver says, in his essay, "Whether or not it leads to a useful mechanization of the translation problem, it could not fail to shed much useful light on the general problem of communication."

Statistical Aspects of the Nucleus. Conference, Brookhaven National Laboratory, January 1955 (BNL 331). 113 pp. Office of Technical Services, Department of Commerce, Washington, D. C., 1955. Paperbound \$0.80. *Reviewed by P. Morrison, Cornell University.*

Last January the Brookhaven people played host to a group of theorists and experimentalists who work in classical, or at least semiclassical nuclear physics. This means the physics of nuclei studied as whole systems, and not simply as bags of target nucleons. The subject under discussion, very meagerly described by the official title, was in fact the model of complex nuclei and its relation to nuclear reactions. The special properties of individual states were largely overlooked, for in the nuclei and energy ranges mainly considered, very many levels play a role. The shell model and the glories of nuclear spectroscopy give way in these pages to a consideration of nuclear shapes and sizes, of the frictional properties of nuclear matter for incoming nucleons, of the way in which these optical parameters can be related to the proper wave-mechanical description of the system, and of what comes out of the nuclear black box when you put a given fast neutron into it. These are old questions, and in part do refer to the statistical aspects of the nucleus. But principally here considered are not the older versions of statistical nuclear theory, but the many deviations and exceptions which a closer look with better data is forcing upon physics.

The work is up to date, even with the long delay of the review, and no specialist will be without this little report. The offset text and clear and numerous graphs are very well worth the study. The discussion is here reported verbatim, and the net effect is less clarity and critical insight than a certain enthusiastic confusion. No student can build his study upon this kind of work, but anyone can test the recency of his ideas by comparing them with the ones given in this often exasperat-

ing but always stimulating series of technical papers and less specialized reviews and summary. Thomas, Saxon, Weisskopf, Gugelot, and many others guarantee the authenticity, if not always the correctness, of the work.

Proceedings of the 1954 Glasgow Conference on Nuclear and Meson Physics. Edited by E. H. Bellamy and R. G. Moorhouse. 352 pp. Pergamon Press, London and New York, 1955. \$9.50. *Reviewed by* *Erich M. Harth, Duke University.*

It has become clear with the publication of these proceedings that the lasting success of a scientific conference depends to a large extent on the presentation of the permanent record of that meeting. Too often, hastily edited notes which are hard to obtain, difficult to read and of doubtful reliability, are all that remains of the labors of many experts.

The presentation in book form of the more than one hundred papers given at the Glasgow Conference has been a real pleasure to anyone working in the field of nuclear physics. The editing by Drs. Bellamy and Moorhouse is of uniformly high quality.

The papers are divided into eight sections: Nuclear Forces and Nuclear Scattering, Nuclear Data and Nuclear Models, Photodisintegration, Beta- and Gamma-Ray Transitions, π -Mesons, Field Theory, High-Energy Experimental Technique, and Heavy Mesons and Hyperons. The sections are opened with a review paper by an outstanding expert in the field "so that physicists who are not specialists in that particular branch receive a comprehensive introduction to the reports of the latest researches which follow". The discussions following the papers have been included, and extensive references have been added throughout.

The diversity of the subject matter precludes a summary of the contents of this volume. The theory of Gell-Mann and Pais on heavy unstable particles—to mention only one of the more spectacular results presented here—is given for the first time in its complete form. More recent experimental findings have borne out this theory to a remarkable degree.

Electricity. By Eric de Ville. 159 pp. Penguin Books, Inc., Baltimore, Md., 1955. Paperbound \$65. *Reviewed by* *J. R. Pierce, Bell Telephone Laboratories.*

To readers who grow somewhat weary of popular books which profess to explain the most abstruse parts of modern physics, this small book will have welcome features. It explains in generally clear and simple terms and with the aid of clear line drawings, such truly intelligible matters as electrical instruments, bells, bridges, generators and motors, the telegraph and telephone, wireless, television and radar, and it has something to say about the atom and about electronic computers. In general, the emphasis is more on practical importance

and industrial use than in understanding the fundamental physical background of electricity. The book is illustrated with 20 admirable photographs of various historical and modern devices.

While the book is simple and clear, it is not entirely without fault. For one thing, the historical approach is used throughout, and this leads to the inclusion of certain matters, such as description of Daniell and Leclanché cells, which by this time we could perhaps ignore.

For another thing, while most of the statements of the book seem to be based on authorities of one sort or another, these authorities apparently range from old to modern and have not been fully reconciled. Thus, in the case of electric current, we read on page 27, "Exactly how the electric charges pass along the wire we do not yet know", while on page 89 we are told that "The electrons can be thought of as a cloud which is free to move independently of the atoms from which they come." On page 77, the myth that electron impact moved the paddles in a tube built by Crookes is perpetuated. On page 46 there is listed among the advantages of turbo-alternators over reciprocating engines, quietness, but not efficiency.

Thus the reader is not always completely safe as to details and the proper interpretation of the things which he finds in the book but, by and large, what he finds is at least intelligible and practically important. One could perhaps wish for a somewhat better digested and deeper book covering similar ground.

Beta- and Gamma-Ray Spectroscopy. Edited by Kai Siegbahn. 959 pp. (North-Holland Publishing Co., Netherlands) Interscience Publishers, Inc., New York, 1955. \$20.00. *Reviewed by* *Bernard T. Feld, Massachusetts Institute of Technology.*

The phenomenal development of low energy (classical) nuclear physics in the last decade has been such that even the experts cannot hope to maintain more than a superficial familiarity with all of its aspects. In this circumstance, it has become necessary to depend on authoritative surveys of the various branches of the field, appearing at reasonable (and constantly decreasing) intervals, to preserve the continuity and ease of intercourse so necessary to continued progress.

The volume here under review is the outstanding effort to date in this direction. It covers only a limited field—that of the investigation of nuclear energy levels by the study of the beta- and gamma-ray spectra of radioactive nuclei—but with a thoroughness and authority which will render it indispensable to workers in these and related fields for years to come. It is a book by experts for experts, but its scope is sufficiently broad so that it will be used, and frequently so, by practically all nuclear physicists.

It would be foolhardy for this reviewer, even if space allowed, to attempt a detailed summary of what is contained in the 959 pages—26 chapters made up of 42