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 $.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-