directory. But even a relatively unsophisticated user of Iodine-131 (for example) should at least know that the material is available as an unprocessed tellurium target, or as a processed material in carbon tetrachloride; or in organic solvents; or in various solutions; or with a pH of 3, or 7, or 9; or in various kinds of solutions; or in gelatin capsules; or sterile; or isotonic. There are over 30 suppliers. The materials have various specific activities and various total activities. The prices range from a few dollars per millicurie to "on request." There are calibrated sources, standard sources, simulated sources for beta measurement, or simulated sources for gamma measurement.

The first edition of this directory was an administrative nightmare—incomplete, inexact, and unusable. The second edition contains the very elementary information necessary to a purchasing agent. Part I is a tabular list of unprocessed and processed isotope preparations. Part II (half the book) is a tabular list of compounds with one of five different radioisotope labels giving the compound, the supplier, the specific activity, and the price.

The index to Part I is unnecessary since the tables are themselves an index. The index to Part II appears to be useful. A one-page statement on "safe handling" is an advertisement for other IAEA books (which incidentally are not very good). There are 14 very interesting pages describing 61 suppliers of radioisotopes. There are two and one-half pages of definitions of terms that must have been written after midnight.

I did not find this book adequate on the three or four occasions on which I had to use a directory. But I cannot say this book is no good because it is good. I cannot say it is not useful because for some people it might be very useful. I cannot say it is incomplete because any such directory is incomplete the day after it is written. However, there are commercial publications more useful to me that are just as detailed (but not international) and much cheaper (especially to us taxpayers). When I contemplate the use of an isotope I usually telephone the nearest commercial representative for which, incidentally, I need a telephone book.

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(About the Reviewer: Dr. Marshall Brucer now basks in Tucson, Arizona, but was for eons the Chairman of the Medical Division of the Oak Ridge Institute of Nuclear Studies. He obtained his M.D. from the University of Chicago and became an accomplished parachutist in connection with research during World War II. His reputation is world-renown. On a scientific mission to the Far East in 1957 (your editor was there, too), he received a hero's welcome in Japan; he analyzed our scientific aid to the Philippines with ice-water clarity; and he "up-staged" the lot of us at Madam Chiang KaiShek's.)

Adventures in Radioisotope Research. The collected papers of GEORGE HEVESY. Pergamon Press, New York, 1962. 2 Vols., 1047 pp., index table of contents, references, $30.00. All original languages translated into English.

George Hevesy was born in Budapest on 1 August 1885. From reading the last articles in this book I would say he is now about 40 years of age. But he must be older. He was a student of Einstein's in Zurich, and of Rutherford's in Manchester. He worked with Moseley before the First World War. He always called on Marie Curie when he passed through Paris. He was at the Bakerian lecture in the Royal Society when J. J. Thomson demonstrated two neon isotopes in April, 1913. He was skiing with Aston when he first heard about the mass spectrum photograph indicating that chlorine-35 was different from chlorine-37. He and Rutherford were enjoying a description of the origin of beta rays by Niels Bohr in 1912 when Bohr stated "Argon is not the right argon." Frederick Soddy gave isotopes their name in 1913. But Hevesy was already working with Paneth using radium D as a tracer of lead. It does not matter who was first. There was so much going on just before the First World War that whoever it was that first thought of "isotopes," Hevesy was probably there helping.

The two volumes of *Adventures in Radioisotope Research* are a collection of 100 of Hevesy's papers. (He lists 376 papers in his bibliography at the end of the second volume.) Some were written in German; some in whatever language happened to be required by the journal; all have been (I think) well translated into English. A few papers are on purely inorganic chemistry, a few on activation, and some on activation analysis. Many papers (and probably the first ones) are on radioactive tracers in bone, brain, fat, liver, hens' eggs, embryos, muscle cells, plasma, red cells, and on isotopes in animal, vegetable, and mineral. The volumes begin with a 30-page article by Hevesy describing his scientific career. After each few articles there is a short comment of Hevesy's current opinion with most interesting historical asides on the old papers, some of which are now a half century old (but not out of date).

The 98th paper in the second volume is Hevesy's Nobel Lecture, on December 12, 1944. The 99th paper is his Faraday Lecture on March 29, 1950. The 100th paper was given at the International Meeting of Nuclear Medicine in Turin, Italy, in 1956. These last three reprinted lectures could easily be mistaken for a textbook on the biochemistry of radioisotope tracers.

Hevesy is wrong in thinking that the first clinical applications of radioisotopes was in the late 1930's with P^{32}. The first clinical use might have been by Lomholt investigating the therapeutic application of bismuth hydroxide, or it might have been by Christiansen, Lomholt, and Hevesy investigating labeled bismuth preparations in the therapy of syphilis. But the first clinical study was probably Blumgart, Weiss, and Yens (in the *Journal of Clinical Investigation* of 1927) studying circulation time in the human. Whoever or whatever was first, it is interesting that Hevesy's name is either on the publication or his method was used. If I were a better physicist, or a better chemist, or a better botanist, or a better biologist, I could probably find other errors, but at this point I stopped criticizing and read for pleasure.

The volumes are well-printed, but you expect a better job of binding for $30.00. The illustrations are those contained in the original articles. I would like to have seen a picture of Hevesy because this is, whether so-labeled or not, a commemorative set of volumes. The translation appears to be good, but I would like to know who the translator was. The references do not seem to be well done. Even though almost any selection of Hevesy's papers is bound to be good, I would like to know by whom and how they were

selected. I could have certainly made a better selection in the field of medicine. Probably any other specialized scientist could have made a better selection in his own field.

But in spite of these picayune criticisms, these volumes are delightful reading for the scientist (any branch) who just wants some vacation reading. It is a reference work for the historian of science. It is almost a textbook for the radioisotope chemist and biologist and clinician. If I had to burn my library tomorrow, these are among the last books I would burn.

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(*About the Reviewer: See previous book review.*)

Directory of Nuclear Reactors, Vol. IV. International Atomic Energy Agency, Vienna, July 1962, 324 pp. Price: U.S. $5.00; elsewhere: Sch 105-(30s. stg; NF 20; DM 17, 50).

This volume of IAEA's Reactor Directories supersedes Volume I issued in June 1959 which covered 35 nuclear electric plants then in operation or being constructed. Volume IV presents up-to-date data and drawings for these earlier reactors supplemented by information on 20 new reactors, construction of which started in the interim. This would seem to make the coverage of active power reactor projects complete; however, some nuclear electric plants presently being designed or constructed have apparently been overlooked. Notable among the omissions are: Sizewell, EDF-3, EL-4, HTGR, Bodega Bay, SENN, SELNI, SENA, and VVER-7 (East Berlin).

The selection of power reactors included in Volume IV, as in Volume I, has apparently been limited to those with actual electrical generating capacities greater than 2 Mw. For this reason relatively large maritime power reactors such as the Lenin or Savannah reactors, and experimental power reactors, such as the Dragon, MSRE, Halden, Borax-5, EBR-1, PRO, etc., are not included although all of these have the capability of producing appreciable quantities of electricity. For the sake of completeness, it is suggested that the editors of the Power Reactor Directory abandon the criterion of "useful electricity" and present data on these other power reactor projects.

The material presented for each nuclear power project includes general information on the reactor and on its core, physics data, sketches of the reactor and fuel elements, flowsheets, heat transfer, and cost information. Thus Volume IV comprises a condensed source of technical information which is ideal for making general surveys of reactors or finding specific bits of information on particular reactors; however, no attempt has been made to satisfy the needs of engineers interested in design details of individual projects. For such information, one must refer to the pertinent design reports which are listed in a bibliography at the end of each section. An easily accessible, up-to-date source of vital reactor statistics is, however, often needed by those working in the nuclear power field; therefore, Volume IV should be a very useful addition to technical libraries or as a desk reference volume.

In contrast to its excellence from a technical standpoint, the Directory is very poorly bound with a paper cover that cannot withstand hard use. This method of binding was chosen deliberately so that the pages may be easily extracted and placed in a loose-leaf binder, presumably to permit regrouping of pages or adding of new material as desired. It is doubtful that this flexibility is needed or even practical. First of all, because of the transitory nature of the nuclear power field, periodic revisions of data for the majority of reactors may be necessary as was the case for the Volume I reactors; and second, such a loose-leaf volume would be unsuited to library use because of the possibility of lost pages. A hard bound edition of Volume IV would, therefore, appear to be desirable with subsequent supplements and/or revised editions appearing as needed.

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(*About the Reviewer: A graduate of Worcester Polytechnic Institute with B.S. in Chemistry in 1936 and M.S. in Chemical Engineering in 1938, Lane was W.P.I.'s first exchange fellow, attending the University of Goettingen, Germany, 1938–39, specializing in physical chemistry. He started work at the E. I. du Pont Company in the field of physical property measurements, dialysis technology, and diffusional operations. His work in atomic energy started in 1942 at the Metallurgical Laboratory, University of Chicago. Since that time, he has held posts of Assistant Director, Technical Division, Clinton Laboratories; Chief of the Evaluation Branch, AEC, Washington; and Director, Reactor Engineering Division, Oak Ridge National Laboratory. At the present time he is Director of Reactor Evaluations and the Thorium Utilization Program and is on the Tennessee State Advisory Committee on Atomic Energy.*