for the accelerator sophisticate who would undoubtedly find the development greatly overdetailed. As a reference volume on accelerator technology the book has substantial value, particularly in its very complete bibliography.

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(*About the Reviewer: Professor Blosser currently heads a group at Michigan State University engaged in the construction of a 50 Mev variable-energy sector focused cyclotron. Prior to going to Michigan State, he was group leader of the Cyclotron Analogue project at Oak Ridge National Laboratory.*)

(Newnes) Concise Encyclopaedia of Nuclear Energy. Advisory Editors: D. E. Barnes, O.B.E., G.M., B.Sc.; R. Batchelor, M.A.; A. G. Maddock, M.A., Ph.D., D.I.C.; J. A. Smedley, B.Sc.; Denis Taylor, M.Sc., Ph.D. Foreword by H. Kronberger, O.B.E., Ph.D., F. Inst.P. Newnes, London, 1962. £8. Wiley New York, 1962. 886 pp. $25.00.

The process of having books reviewed in this Journal is such as to frequently tempt its editor to submit to the task inasmuch as the reviewer keeps the book as token compensation. However, never before has he finally yielded to the temptation, and that he does so now is testimonial to the desirability of this encyclopaedia.

Perhaps the most obvious question is: Why an encyclopaedia? Why order the content alphabetically according to subject instead of adopting a logical unfolding of the material to be covered? The answer, of course, is that it caters to the nonspecialist who wants a correct but concise description of an item. He does not have to know that a hyperon is an elementary particle found in cosmic rays in order to read about it. If he can spell it he can find it. And in these times, with so very much science for us to keep up with, the ready-reference system is greatly to be desired.

Perhaps the next question is: How much alphabetizing? Does one alphabetize only the major headings, or is this to be extended to all discrete minutiae? The editors have used the latter approach, albeit with the crutch of cross-referencing which keeps the size within bounds. Thus one can find Xi-particles, Y-particles, and Sigma-particles, all defined succinctly with a cross reference to "Mesons and hyperons" which gives more detail.

Evidently the editors have given much thought to the needs of the user. It is easy to find the items one looks for in the bold-face capitals; the headings are well chosen. Even the contributors are displayed in Encyclopaedia Brittanica's useful, though unusual, way, which caters to the sequence that the reader encounters: he finds the contributer's initials at the end of an article and then seeks his name and affiliation; so the contributors are listed in the alphabetical order of his initials. (A. E. Souch probably never before stood second in an alphabetical list of 82.) But "Dame J. V." appears with the J's, not the D's.

The list of contributors covers most United Kingdom atomic energy establishments as well as quite a few universities. There is one from the USA—Tench from Brookhaven, and one from Malaya—Skyrme, who used to be at Harwell.

There is a comparatively strong coverage of the biological and health physics aspects of nuclear energy. Thus "isotopes, artificial," occupying 1.6 in. of column, is followed by "isotopes in animal physiology" with 87.5 in. of column covering labeling to mechanism of bone growth. Eighty-eight pages are devoted to the table of isotopes, which is nicely annotated with decay schemes at the foot of each page.

The thermonuclear reactor business is covered, presumably for completeness, and as a hedge against the miracle which might rescue it from the doldrums. The reader is led on a merry chase in finding it, though. One finds "Thermonuclear reaction" but is merely sent from there to "Fusion," which advice is practical but somehow offends the purist in us. From the short "Fusion" article one finds that there is a discussion of "Controlled Thermonuclear Research, q.v." Thus this path is sanitary in that it avoids the H-bomb (no entry found for this, but "Fusion" mentions it—presumably a violation). We note also that there are no thermonuclear reactors, but only "devices," "schemes," and "experiments." With such caution this encyclopaedia should live a long time.

We had a chance to check on whether our March, 1961, editorial recommending use of "fissile" for thermally fissionable was indeed consistent with British usage. Sure enough, contributor Clarke, of Reading, Berks, says *fissile materials* are "materials which are capable of undergoing fission by thermal neutrons." Our satisfaction, however, is dulled by the preceding entry of contributor Green of Aldermaston for *fissile*: "The term loosely applied to any nucleus which can be made to undergo fission. However, it is normally taken to mean fissionable by thermal neutrons." And it is devastated by Green's entry for *fissionable material*: "The term fissionable normally refers to material which is thermally fissile, U^{233}, U^{235}, and Pu^{239} being the most important examples." This seems to call for a malt-lubricated conference in some convenient pub between Reading and Aldermaston.

On the whole, the book is very satisfying. We thought of no pertinent subject which was not easily found. The illustrations are profuse and well done. The entries are well chosen. We are glad to have earned our copy and recommend that the reader get one too.

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International Directory of Radioisotopes, 2nd ed. International Atomic Energy Agency, Vienna, 1962. 697 pp. $9.00. Not on sale through bookstores; obtainable from International Publications, Inc., 801 Third Avenue, New York 22, New York.

This is a directory. It has about the same usefulness as a telephone book. The information operator always, and the ordinary subscriber sometimes, uses an up-to-date telephone book. A radioisotope pharmaceutical house or a well-equipped library probably should have this international

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