Book Reviews

McGraw-Hill Encyclopedia of Science and Technology. McGraw-Hill, New York, 1960. 15 vols. $175.

An heroic amount of work went into the production of this large, comprehensive, multivolume encyclopedia of science and technology. The publisher's staff of 15 editors was guided by a distinguished editorial advisory board consisting of Roger Adams, Joseph Barker, Detlev Bronk, George R. Harrison, Sidney D. Kirkpatrick, William Rubey, and Edmund Sinnott. There were 64 consulting editors on special topics, for example, E. U. Condon on theoretical physics and E. L. Tatum on biochemistry. Over 2000 scientists and engineers wrote articles (frequently several articles) on the topics of their special competence. Finally, there were unknown numbers of clerks, copy editors, compositors, proofreaders, pressmen, and others involved in getting this mass of material into print and ready for distribution and use. With so much time, talent, and money devoted to the task, the result should be very good indeed.

It is. But it is much too big and comprehensive to be adequately reviewed by one person. I read a number of articles, some on familiar topics and some on fields I do not know, and I paid particular attention to the index. But this is not enough. So I asked for help, and secured the comments of a mathematician, a technical editor, a physicist, an ichthyologist (ichthyology, by the way, is not listed in the index), a reference librarian, the author of two of the encyclopedia articles, and one or two other generous helpers. The following comments are based on their examination of the volumes as well as my own. But even so, all we can claim is that we have sampled—we hope fairly—the great mass of material the encyclopedia makes available.

That the articles should vary in quality is inevitable, and nothing else should be expected. The article on Boolean algebra, one consultant reports, is excellent ("I do not know of any other place where the graduate student or high school teacher could find a similar treatment") while the article on calculus is pedestrian and out of date. Another says, "I find much greater satisfaction with the general articles on biological principles and phenomena and on major groups of animals than I do with the articles about specific animals which are often very general, cursory notes."

Some articles are followed by a short list of references for further reading. Some lists include up-to-date references, and others include only textbooks and older citations. Publishers' names are omitted from references, and so are page citations.

In level of difficulty there is also variation. The publishers state that "Most of the articles, and at least the introductory parts of all of them, are within the comprehension of the college undergraduate in science or engineering, or of the especially interested high school student." The claim is generally justified, yet one consultant reports, "In some cases the reading level may even go beyond the first-year graduate student unless he is willing to look up references and really dig at it. In other cases the material could easily be read by a high school student or high school teacher." Another consultant, also a scientist, says, "some are beyond my depth."

There must have been a very large number of difficult decisions about the proper amount of space to devote to a particular topic. Some articles seem too brief; others give quite extended discussions. The following more or less random examples illustrate the range: 10 pages on alternating current circuit theory, 6 on quality control, 13 on radar, 25 (plus several other references) on radioactivity, 3 on reproduction in plants, 28 on reproduction in animals, 3 on rice, 18 on sea water, ⅔ on the Schmidt camera, ½ on science, 2¼ on scientific methods, 2 on distilled spirits, and 14 lines on the screw jack.

What to include and what to exclude is always a problem. There are no index references to "scientists" or to biologists, physicists, earth scientists, or psychologists. Yet there is an item on Gestalt psychologists. Scientific organizations and agencies, such as the National Science Foundation, are in general not included, and neither are topics on scientific education, manpower, documentation, communication, and so forth.

The books are of reasonable size and weight, and easy to handle. The paper is of good quality, and the type legible. No sensible publisher would claim to produce 15 volumes without errors, and there are errors here. A mislabeled drawing, a misspelled name, an incomplete reference, and a few similar minor blemishes turned up in our examination of a number of articles. But the illustrations, usually line drawings but sometimes halftones, are quite adequate, and one can read a good while before running onto a typographical slip.

The key to an encyclopedia is its index. Volume 15 is entirely index. It gives, first, a list of the names of contributors (articles are signed by initials) so that one can identify the author of any article. Then follows an alphabetical list of contributors with the titles of the articles written by each. Finally there are 434 pages, four columns to the page, of subject index. Here it is that one goes to locate information on atomic weights, marine propellers, the rhinoceros, crystal defects, paleozoic floras, or any of nearly 10,000 other entries. Suppose one wants to find the table or list of the symbols used to identify the chemical elements, as one of my consultants did. The index lists "Symbols, chemical" and "Chemical symbols and formulas," but the article referred to in these two entries does not give the wanted information. Looking up "Chemical elements" provides a cross reference to "Elements (chemical)" under which there are 32 subheads, but symbols is not one of them. The information is, however, to be found in convenient form in the article on "Elements (chemical)." The joker in this situation is that the information is also available, although usually less conveniently, in over a hundred different places, for it is given in the article for each of the

individual chemical elements as well as in several other articles. Yet, not knowing this, and using the encyclopedia for the first time, it took considerable persistence on the part of an experienced technical editor to locate the information wanted.

Another example: the entry "earth resource patterns" is listed with 14 subheads, but before one comes to it there is the main heading "Earth" with 30 subheads and some cross references, then a series of items such as "earth (age of)" to "earth (origin of)," each with a number of subheads, and then another series starting with "earth-current measurements" in which, in proper alphabetical place, one comes upon "earth resource patterns." The secret here is that the index first lists items in which "earth" is used as a noun, for example, "earth (core of)," and then begins a new alphabetical sequence in which "earth" is an adjective, for example, "earth interior." Just why "earth (core of)" and "earth interior" were selected as index entries instead of "earth core" and "earth (interior of)" or why the same form was not used for both entries, I do not know. In any event, the unwary reader may well overlook an item in the index because of this arrangement of noun and adjectival usage. Whoever plans to use the encyclopedia to a considerable extent will undoubtedly learn how it was constructed; a first-time user, even an experienced librarian, may fail to find the desired entry even though it is there.

The principal use for an encyclopedia is to find information you don't already have. The *New Yorker* recently (24 December 1960) reported an interview with Harry S. Ashmore, the new editor of the *Encyclopaedia Britannica*, in which Mr. Ashmore quotes Robert Hutchins, chairman of the board of editors, as saying, "You assume that no brain surgeon will read its article on brain surgery to enable him to operate, but the article must be so well done that if he does read it some night, it won't offend him." By this criterion, most of the articles we examined were satisfactory. When we examined articles on topics strange to us, there were fewer criticisms. One consultant summarized: "In no such instance did I complete an article with the feeling of dissatisfaction. I felt that upon reading the article I had a much clearer notion of the specific topic," and then added, "It would be fine to have this encyclopedia in our library and it could be recommended for home use as well. At least in my family, where there is a considerable interest in science, I found all members reading the volumes with interest and wishing that we might have them readily available."

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China Crosses the Yalu. The decision to enter the Korean war. Allen S. Whiting. Macmillan, New York, 1960. x + 219 pp. $7.50.

This book is of interest not only because of the importance of its subject but also because it shows the possibilities and limitations of any study of Chinese Communist foreign policy. At one point the author lists four main sources of evidence: official statements made for foreign consumption; a content analysis of the material intended for internal consumption, which appeared in the officially controlled Chinese press; U.S. intelligence reports and material obtained by interrogation of Chinese prisoners; and Peking's diplomatic activity, particularly toward India and the United Nations. Whiting argues: "None of these sources provides a comprehensive picture of decision making in Peking, nor is the evidence always subject to one exclusive interpretation. At some points the four types of data each support incompatible hypotheses. At important junctures, however, they suggest a pattern of policy clearly and consistently enough to constrict the range of reasonable explanation for Chinese Communist actions" (pages 52–53).

The weight of evidence is against any serious Chinese involvement in the start of the Korean war. Relations between Peking and Pyongyang do not seem to have been close. It was not until August 1950 that an ambassador from Peking presented his credentials at Pyongyang, and there is evidence of earlier disputes between the North Koreans and the Chinese Communist authorities in Manchuria, which were resolved only by Soviet mediation. The emphasis of Chinese Communist publicity was on the conquest of Taiwan and Tibet, and Chinese troop dispositions appeared to be primarily designed for these objectives. The only bits of contrary evidence are the return to North Korea of Korean troops from the Chinese Communist forces and, beginning in April 1950, a movement of the Fourth Field Army from South China to Manchuria. However, the return of Korean troops to Korea can be explained as part of a general settlement mediated by the Soviet Union, and the movement of this particular army to Manchuria can be explained as part of a plan to return army units to their original base areas.

When the Korean war started comment in the Peking press was delayed for 2 days, and the comments which did appear in the early period of the war suggested that the Chinese Communist leaders did not wish to present the Korean conflict to their public as an issue of primary importance to China. On the other hand, the reaction to President Truman's order to the Seventh Fleet to neutralize Taiwan was immediate and violent.

This action by the United States seems to have ended plans for an attack on Taiwan in the near future, and there was a redeployment of Chinese forces from South and Central China, some to Manchuria and some to Shantung. But the Chinese Communists did not use the most favorable opportunity for intervention when the United Nations forces had been driven back to a small area around Pusan and a little extra support on the North Korean side might have put the Communists in complete control of Korea. The material from the interrogation of prisoners shows that even the forces in Manchuria received little preparation for intervention until shortly before they crossed the Korean border in October.

There is an interesting discussion of the complicated negotiations at the United Nations and of the evidence that the Soviet representative may have been looking for some way to reach a compromise before the U.N. counterattack started. One point of special interest is the change in the Chinese attitude toward India. To begin with, Chinese comments had been strongly critical of Nehru's neutralism and had denounced him as a tool of the imperialists, but Indian support for Pekings' admission to the U.N. and Indian proposals for a compromise in Korea gradually brought about a change in attitude.

No conclusive deductions can be made about the precise reasons which finally made the Chinese Communists decide to intervene in the Korean war. Soviet pressure for intervention to prevent a complete North Korean defeat