and remained obscure until the class of people to which he had directed it no longer existed. Nonetheless, since 1927 Sung's book has been reprinted in China eight times because of its clear, elegant, and usually reliable descriptions, accompanied by over a hundred attractive and well-conceived illustrations of agriculture, the preparation of foodstuffs, the manufacture of textiles, dyes, weapons, and vehicles, the exploitation of metals, minerals, and precious stones, and the making of ceramics, paper, and ink. Many of his methods had been in use for centuries, and many (those of intensive rice culture, small-field irrigation, oil extraction, and hand papermaking, among others) are still in use today.

Because the book contains so much fresh observation (Sung used books and hearsay too, but not by preference), readers who are as interested in ideas as in techniques can learn a great deal from it about how Chinese perceived the natural world. For example, Sung refers three times to what we know as natural gases—one which was piped out of salt wells in West China and burnt to evaporate the brine, one which poisoned coal miners unless a hollow bamboo was inserted in the shaft to draw it out, and a "foggy" one which suffocated gem miners who were exposed to it too long. His technical term for "gas" was the common word *ch'i*, which originally meant "breath of life," like the Greek *pneuma*. Long before Sung's time it had become one of the most overworked words in the language. The translators correctly render it in other contexts as "quality," "properties," "vapor," "power," "essence," and "odor." Clearly, *ch'i* does not necessarily imply a material substance at all. Its breadth of meaning was a great obstacle in the way of a clear conception of "gas," which had to wait for the introduction of modern science.

Despite the difficulty of Sung's style, this is perhaps the most accurate English rendering to date of any lengthy classic from the Chinese scientific tradition. The translation is free enough to read naturally in English, but not so free as to violate the sense of the original. The annotations answer most, though not quite all, of the questions which will occur to the alert reader (*1*). The bibliographies are random, and the index perfunctory. The woodcut illustrations (all of those in the first edition, and others done for an 18th-century encyclopedia which quoted Sung) are beautifully reproduced. The design of the book as a whole is so exceptional that the high price is not unjustified.

N. SIVIN

Department of Humanities, Massachusetts Institute of Technology, Cambridge

Note

1. For a longer and more technical assessment, see N. Sivin, *Isis*, in press.

Science and Technology Supplements

Three volumes have been published that supplement *The McGraw-Hill Encyclopedia of Science and Technology* [rev. ed., 1966; reviewed in *Science* **152**, 903 (13 May 1966)].

The McGraw-Hill Yearbook of Science and Technology (David I. Eggenberger, Exec. Ed. McGraw-Hill, New York, 1966. 461 pp. Illus. $24) is the fifth yearbook that serves to update both the 1960 and 1966 editions of the *Encyclopedia of Science and Technology*. The first 90 pages, called Preview of 1966, are devoted to nine brief and timely articles or essays: "Air pollution," by Aaron J. Teller; "Biosonar," by Thomas C. Poulter; "Computers and the mind," by Leonard Uhr; "Molecular biology," by Alexander Rich; "Mycotoxicoses," by Clyde M. Christensen; "Origin and evolution of the atmosphere," by Heinrich D. Holland; "World protein needs," by Max Milner; "Terrestrial navigation," by Peter C. Dandretto; and "Programmed learning," by Lawrence M. Stolurow. Next comes a 16-page section of "photographic highlights" followed by the 320-page encyclopedic portion that updates the 15-volume encyclopedia by incorporating new materials based on new developments or additional bibliographic research. The volume is indexed and is a valuable acquisition for owners of the parent work, as well as for those who buy only yearbooks as a means of keeping abreast of the progress of knowledge.

McGraw-Hill Modern Men of Science (Jay E. Greene, Ed. McGraw-Hill, New York, 1966. 630 pp. Illus. $19.50) contains brief biographical sketches of 426 contemporary scientists. The biographees were selected from among the recipients of the major awards and prizes for scientific achievement conferred since 1940, including 45 Nobel Prize winners. Approximately 300 of the sketches were written by the biographees. Each sketch contains a succinct account of the person's scientific and technological achievements, stated in as lucid language as the nature of the material makes possible. The reader is referred to articles in the encyclopedia "for further background" on the individual's fields of interest and activity. Many popular biographical accounts of scientists are strong on personal trivia and offer only fragmentary details of scientific contributions and professional achievement. This volume is unusually valuable because of its emphasis on the biographees' scientific work and achievements. The executive editor has told me informally that if the volume is successful a second will be forthcoming, for the one just published includes biographical sketches of only about one-half of those whose achievements merit inclusion.

The third supplement, **McGraw-Hill Basic Bibliography of Science and Technology** (David I. Eggenberger, Exec. Ed. McGraw-Hill, New York, 1966. 748 pp. $19.50) contains selected and annotated listings of 8000 books in all scientific and technological fields. Theodore C. Hines, associate professor of library service at Columbia University and a recognized authority in science and technology reference literature, served as coordinating editor. Subject headings correspond to the titles of articles in the encyclopedia and are additions to the references given at the ends of the articles. Citations include concise notes on contents and level of difficulty. The emphasis is on primary sources: textbooks, handbooks, research monographs, and original works. In a topical guide, the encyclopedic subject headings are grouped into 100 major categories of scientific or technical specialties and disciplines. The organization of this bibliography will make it more useful to teachers, students, and research workers than standard bibliographic works which are arranged according to standard library classification systems. On the other hand, it will not be as useful to librarians and others desiring a comprehensive acquisition guide as the standard works now in general use.

HILARY DEASON

AAAS