the type of training represented in America by technical institutes. There are in the U.S.S.R. something like 1500 of these institutions, which offer training in engineering, science, medicine, pedagogy, law, and agriculture. The courses are generally 4 years in length, with admission being highly competitive and based on the completion of at least 7 years of instruction. Entrance requirements are being raised, and in the near future the Soviets may require a full secondary education. Graduates in recent years have numbered about 60,000 per year in the field of engineering alone, as compared with about 11,000 in the United States.

College-level engineering education in the U.S.S.R. requires many more hours of class attendance than in the United States, and a much greater degree of specialization. Approximately a quarter of the time is spent on the general sciences, and another quarter on general nonspecialized engineering. Only about 6 to 8 percent is allotted for political and socioeconomic courses, which could probably be better called indoctrination courses. Narrow specialized engineering instruction takes the rest of the time except for physical training and military instruction.

The inescapable conclusions to be derived from the book, with all due allowance for possible errors, are that in technological areas the Soviet Union is graduating more trained personnel than is the United States, and that from a purely technical viewpoint Soviet training is probably at least as good as, and quite possibly better than, that received by American engineering and science students.

One ray of comfort may be drawn from the possibility that the extremely high degree of specialization in scientific and engineering fields may carry with it such a lack of flexibility or adaptability that the individual who cannot work in the field of his immediate specialization may be considerably less useful, or perhaps frustrated entirely. However, in view of the high degree of selection in the Soviet educational system, it seems probable that many of those in the field of science and engineering have sufficiently able minds so that this result will not occur. Still, it does represent one possibility that may limit the effectiveness of Soviet technology.

Another possibility is that the great emphasis in the U.S.S.R. on education may lead to changes in the Soviet philosophy. It is conceivable that the emphasis on education may sufficiently emancipate enough minds in the U.S.S.R. so that the seemingly widespread acceptance of the present official Soviet philosophy will no longer be possible.

On the whole, this volume presents a study that is challenging in its significance to American educators, both technical and general, to American industrialists, and to American citizens generally.

HENRY H. ARMSBY
Office of Education, U.S. Department of Health, Education, and Welfare

The Soviet Academy of Sciences. Hoover Institute Studies, Series E: Institutions, No. 3. Alexander Vucinich. Stanford University Press, Stanford, Calif., 1956. 157 pp. $2.

One by-product of the cold war has been our realization that what goes on in the U.S.S.R. affects us directly. Thus it is only prudent for us to keep ourselves informed on things Russian and for our scientists to keep a constant check on their colleagues in the Soviet Union. Fortunately, most scientists can learn the status of their specialties in the Communist countries without taking too much trouble, and the scientists as a whole can evaluate the accomplishments of Soviet science quite accurately. We know, for example, that Soviet mathematics, atomic physics, and engineering are truly excellent but that Soviet biology, medicine, and agriculture are backward and permeated by quacks. But over and beyond such information, there exists a mass of background knowledge that can be made available to us only by those who are experts on the Soviet Union. Alexander Vucinich, the author of *The Soviet Academy of Science,* is such an expert.

The work begins with a historical account of the Academy of Science from its founding in 1725 by Peter the Great to the latest tasks imposed on it by the current reigning syndics. The Soviet Academy has now become unique and is quite unlike any academy of science outside the Communist world. Today it plans, organizes, and supervises all scientific research in the Soviet Union. It controls numerous lesser scientific institutions, employs a large staff of scientists and administrators, and dispenses an enormous budget. It has recently acquired a number of new functions, one of which is the training of future scholars and scientists. The individual academicians have great social prestige, receive large salaries, and have many perquisites that are highly desirable.

The academy, however, is subordinated to the Council of Ministers, and the academicians both individually and collectively take their orders from the political authorities. They must be ready at all times to shift their ideology whenever the party line changes. When necessary, they must attack the science and the scientists of the West, rewrite the history of science, and search out the heretics in the ranks of the scientists below them. This latter function is important, for the academicians are responsible for the ideological purity of all Soviet scientists.

The Soviety Academy of Sciences contains a great deal of factual information that is not found elsewhere. It describes the internal organization of the Soviet Academy, its attitude toward pure and applied science, and its role in planning the activities of scientists in the various 5-year plans. The appendixes list the scientific organization of the academy, the different academies of the several Soviet republics, the periodicals published by the academy, and the names of the academicians. The whole is a small but useful compendium. It also gives an exceptionally clear picture of the conditions under which scientists have to labor in the new, socialist Utopia.

CONWAY ZIRKLE
Botanical Laboratory, University of Pennsylvania

The Mighty Force of Research. Editors of *Fortune.* (15 articles reprinted from *Fortune*) McGraw-Hill, New York, 1956. 308 pp. Illus. $4.

Fifteen articles that appeared in *Fortune* between January 1953 and August 1955 are here brought together in a hard cover. The resulting book gives a well-integrated and easily readable account of the state of applied and basic research and research support by foundations, universities, government, and industry. Several chapters are mainly concerned with technology. The chapter titles give some idea of the scope of the treatment: "The strange state of American research" (support of applied and basic research, research by the General Electric and Bell Telephone Companies, and the role of private foundations and the government); "The young scientists" (a survey by interview of the opinions and characteristics of 20 outstanding scientists under the age of 40, ten from industry and ten from universities, supplemented with the results of a questionnaire of 87 additional young scientists; the generalizations about scientists, derived from so small a sample, are of questionable validity); "Science for sale" (contract research and development with special reference to Arthur D. Little, Inc.); "The inventor in eclipse" (decline of the free-lancer and the rise of the industrial research team; decline in number of patents); "New light on the brain" (an account of recent research on the brain with special reference to H. W. Magoun, H. H. Jasper,