

# Industrial Minerals: New Study of How to Avoid a Supply Crisis

The U.S. economy, despite its astonishing appetite for industrial minerals, is now suffering no lack of these materials and no major mineral shortages are just around the corner. But, while there is no immediate minerals crisis, present circumstances nevertheless invite concern. Depletion of the richest known domestic reserves of minerals, such as iron, fluorspar, tungsten, silver, and gold, is proceeding rapidly. Competition from other industrial nations for foreign, and even domestic, supplies continues to mount. Furthermore, conflict between mining and environmental values promises to lead to significant new restrictions and costs in the production of minerals. It is now the official view, therefore, that a "critical shortage" of information already exists with respect to whether supplies of some metals will run desperately low before the year 2000.

Accordingly, last week Secretary of Commerce Maurice H. Stans, speaking for himself and Secretary of the Interior Walter J. Hickel, announced the forthcoming appointment of a National Industrial Materials Commission. The commission will project the demand for nonfuel minerals over the next 30 years, assess domestic and foreign reserves of such minerals, and evaluate government and industry policies as they affect mineral supplies.

## Panel Not to Be "Lopsided"

Although President Nixon himself has authorized establishment of the commission, its members—to number about 20—will be appointed jointly by the secretaries of Commerce and Interior from among minerals experts in government, industry, and academic life. According to Department of Commerce officials, some of the commission members will have special knowledge of industry's requirements for various minerals that are in potentially short supply, while others will be knowledgeable about reserves of these minerals and mining technology. The commission also is expected to include experts on other factors—such as the recycling of metals—bearing on the question of mineral supply and demand. In addition,

the commission membership will include one or more conservationists who will look at questions of mining policy particularly from the standpoint of environmental protection. "We don't want this to be a lopsided, all big-business type of advisory group," Rocco C. Siciliano, the Under Secretary of Commerce, told *Science*. "It's got to be representative of conservation as well as resource management." The study will cost an estimated \$250,000 (exclusive of the value of the time federal employees give to it), and it will take about 14 months to complete. It will be the first official survey of this kind since the 1952 report of the President's Materials Policy Commission, chaired by William S. Paley.

The new study will complement efforts in Congress to have the Executive Branch establish a clear, coherent national mining and materials policy. Last month the Senate passed a measure sponsored by Senator Gordon Allott of Colorado requiring the Secretary of the Interior to report annually to Congress on the state of the domestic mining and minerals industry. Later, the House of Representatives passed the Allott bill in an amended form.

As a senator from a mining state and as the senior Republican on the Interior Committee, Allott hears plenty from the mining companies about their aches and pains. Although rich deposits of iron ore, copper, and other minerals are still available abroad, these are generally beyond the reach of smaller American mining companies confronted by the problem of gradually dwindling domestic reserves. And even the giants, such as the Anaconda and Kennecott copper companies, which make heavy use of foreign reserves, never know when a new government will take power and either expropriate their property or impose stiff new taxes. Thus, the major thrust of the Allott bill is to promote formulation of policies looking to discoveries and innovations helpful to domestic mining and minerals processing.

For instance, there might be discoveries of important "blind" ore deposits, deeply buried and having no surface

outcrops, together with development of the underground mining techniques and machinery necessary for the extraction of these ores at competitive costs. Or, through advances in metallurgical research and the redesign of consumer products, ways might be found to use abundant metals such as aluminum as a partial substitute for scarcer metals such as copper and also to allow recovery and recycling of many materials now being lost.

The Allott bill would not in itself authorize greater efforts in geologic mapping, metallurgical research, and development of mining technology; nor would it repeal or amend any of the numerous existing statutes relating to mining. But in his annual report to Congress, the Secretary of the Interior would be expected to set forth such steps, legislative and otherwise, which he considers necessary to avoid mineral shortages and to foster a stronger domestic mining industry.

## House Adds Fuels

The House amended the Allott bill significantly. One amendment would place somewhat greater emphasis on the need for recycling metals and for development of land reclamation and other measures lessening the impact of mining on the environment. To that change Allott has raised no objection, but another House amendment—having the bill apply to fuels (oil, gas, oil shale, coal, and uranium) as well as to nonfuel minerals—gives him pause.

Given the huge size and the special and often intensely controversial problems of the fuels industry, Allott fears that policy questions having to do with that industry might eclipse those related to "hard-rock" minerals. The Nixon Administration officials who appeared before the House Interior Committee favored including fuels under the bill, but the Administration itself is considering fuel and nonfuel minerals separately. While the National Industrial Materials Commission is going about its work, an energy subcommittee of the President's new cabinet-level Domestic Council and the Department of the Interior will be studying fuel resources. Allott now can either have the Senate accept the bill as amended or seek to reconcile the differences between the two versions of the measure in a House-Senate conference.

As for the Administration's commission study, each of the two sponsoring departments, Commerce and Interior,

has special competence with respect to the question of mineral supply and demand. In Interior, of course, there are the Bureau of Mines and the U.S. Geological Survey (USGS). In Commerce, there is the Bureau of Domestic Commerce which has within it an office of basic materials made up of people assigned to keep track of industry's requirements for various minerals, fuels, and other resources. Under Secretary Siciliano observes, however, that "We [in Commerce] recognize that Interior has the lead role here." According to Siciliano, Secretary Stans's announcement of the commission study, which he made in Denver before the American Mining Congress, would have been made by Secretary of the Interior Hickel had he been available.

The study will give the Geological Survey a chance to press harder for funds with which to expand its investigations of mineral reserves and other resources, both on land and on the continental shelf. Only last June, William T. Pecora, director of the USGS, in a speech before a campus audience, said that "the pace of doing this kind of work has slowed . . . and I predict that our society will suffer for it because decisions will be made without background information."

The study will almost certainly call not only for an increased effort in the development of mining technology, but also for a rejuvenation of education in mining engineering. Last year, Assistant Secretary of the Interior Hollis Dole, testifying before the Senate Interior Committee, said the mineral sciences were being badly neglected. In 1969, he said, American institutions would graduate only 110 mining engineers, and many of those would be foreign students who would return to their home countries. Between 1962 and 1967, the number of institutions with accredited undergraduate programs in mining had declined from 26 to 17, and half of these programs had only a half dozen students or fewer. The situation at the graduate level Dole found similarly discouraging.

To this a footnote was added later, however, by the International Institute for Resource Economics. In a letter to the Interior Committee, the institute said that student enrollment in mining engineers with 10 years of experience, ing engineers were grossly underpaid. It reported that in a 1968 listing of median salaries for various kinds of engineers with 10 years of experience, mining engineers were at the bottom, with a median salary of \$11,750.

Because of the increasing need to mine and process the less accessible or lower grade ores, improvement of mining education and technology is seen as a key to avoiding—or at least long delaying—a situation in which certain industrial minerals are extremely scarce and costly. This view was expressed in a sympathetic report last year on the Allott bill by Lee DuBridge, then the President's Science Adviser and director of the Office of Science and Technology.

—LUTHER J. CARTER

## APPOINTMENTS



E. L. Boyer



C. A. LeMaistre

**Ernest L. Boyer**, vice chancellor, State University of New York System, appointed chancellor. . . . **Charles A. LeMaistre**, deputy chancellor, University of Texas System, appointed chancellor. . . . **Thomas C. Cheng**, professor of biology, Lehigh University, to director, new Institute for Pathobiology at the university. . . . **Charles C. Boyer**, professor of anatomy, Indiana University, to director, Center for Medical Education, Ball State University. . . . **Ralph H. Boatman**, professor of public health, University of North Carolina, to dean of allied health sciences at the university. . . . **Kenneth N. Trueblood**, chairman, chemistry department, University of California, Los Angeles, to dean, College of Letters and Science at the university. . . . **J. F. A. McManus**, executive director, Federation of American Societies for Experimental Biology, to dean, College of Medicine, Medical University of South Carolina. . . . **Peter McFadden**, chairman, mechanical engineering department, Purdue University, to dean, School of Engineering, University of Connecticut. . . . **Richard P. Schmidt**, associate dean, College of Medicine, University of Florida, to dean, College of Medicine, State University of New York Upstate Medical Center. . . . **Harold J. Day**, associate professor of civil engineering at the Carnegie-Mellon University, to chairman of en-

vironmental control, University of Wisconsin, Green Bay. . . . **Charles A. Kiesler**, associate professor of psychology, Yale University, to chairman, psychology department, University of Kansas. . . . **John F. Reed**, former president, Fort Lewis College, to chairman of ecosystems analysis, University of Wisconsin, Green Bay.

## RECENT DEATHS

**William C. Beaver**, 73; professor emeritus of biology, Wittenberg University; 28 August.

**Stuart R. Brinkley, Jr.**, 54; former professor of physics, Cornell University; 7 August.

**Glover H. Copher**, 76; professor of clinical surgery, Washington University; 27 July.

**Robert B. Dustman**, 78; retired dean, Graduate School, University of West Virginia; 23 August.

**Herbert Emmerich**, 72; retired professor of political science, University of Virginia; 7 September.

**Harold Fink**, 68; clinical professor of pathology, Downstate Medical Center, State University of New York; 28 August.

**Roald N. Grant**, 58; vice president for professional education, American Cancer Society, Inc.; 24 August.

**Donald McC. Harper**, 70; former associate professor of otolaryngology, Howard University; 18 August.

**Natalie F. Joffe**, 55; professor of anthropology, New York University; 19 August.

**J. Byron McCormick**, 75; former president, University of Arizona; 17 August.

**Charles A. Mooers**, 100; director emeritus, agricultural experiment station, University of Tennessee; 3 August.

**Samuel R. Powers**, 83; retired head, natural sciences department, Teachers College, Columbia University; 1 September.

**Jakob Seiler**, 84; professor emeritus of zoology, Eidg. Technische Hochschule, Zurich; 19 August.

**Samuel Shenkman**, 62; former associate neurosurgeon, College of Physicians and Surgeons, Columbia University; 9 September.

**Arthur L. Swift, Jr.**, 78; retired vice president for planning, New School for Social Research; 10 September.

**Albert H. Wright**, 90; professor emeritus of zoology, Cornell University; 4 July.