

metals. At present, and for the foreseeable future, this potential exceeds any anticipated requirement. Domestically, arsenic is treated more as a nuisance than an object for recovery in refining processes and only one firm presently produces it. Coincidentally, more than half of the United States demand is met through imports, some of which materializes in the domestic treatment of foreign base metal ores. The technology of recovering byproduct arsenic and its marketable compounds is complicated and relatively inefficient. Processing improvements probably could be made, but the low price and fluctuating market, coupled to the limited demand outlook, discourages investment in plant improvement and process development.

Because of its toxic properties, arsenic disposal practices deserve continuing attention. As one of the contaminants in smelter stack gases, improved control is a factor in the overall problem of minimizing air pollution and effecting better waste disposal systems.

ASBESTOS

The United States is the world's largest consumer but supplies only approximately 15 percent of its requirements from domestic sources. The term "asbestos" applies to a variety of natural occurring mineral fibers, some types of which have important defense and specialty characteristics. Complete dependence upon foreign supply for some types is minimized by adequate stockpiles but poses long-term concern. In view of past unsuccessful incentive programs designed to encourage domestic development of the more strategic grades of asbestos, the potential for such development seems poor.

Synthesis and substitution have been investigated as means of minimizing reliance upon uncertain supplies of selected grades, with an eye to the growing markets for asbestiform materials. Only a few substitutes are, at present, economically competitive. While considerable research has been directed to synthesizing fibers that have properties similar to the best natural substances, it has met with only limited success. The development of practicable technologic advances in this broad area would have substantial industry impact, both in regard to traditional use patterns and to the emergency of new applications and products.

Serious health hazards are present in the whole sequence of extracting, processing, and utilizing mineral fibers, and the expanding use of these substances directs attention to a need to better understand and manage the problem.

BARIUM

The United States is the world's largest consumer, and while it produces about a fourth of the world output, it is still a large importer. Barite (BaSO_4) is the mineral form most important in commerce. Consumption is a direct factor of the need for weighted muds in oil and gas well drilling, with over 70 percent of the demand stemming from those activities. Resources are abundant and widely distributed. Low cost of barite precludes the employment of substances that might otherwise be used as substitutes in the drilling mud market. The uses for which there are no practical substitutes are minor at present in terms of the abundance of the commodity. However, inquiry into the production of various barium compounds with properties that promise the possibility of future large-scale markets has some attraction because of the relative low cost and availability of barite. In particular, a potential exists for an appreciable use of barium chloride for water treatment and water pollution abatement if a lower cost method is developed for its manufacture.

Although ore reserves and processing technologies are adequate to insure ample supplies of barite, barium compounds, and chemicals for many years, increasing process efficiency and better beneficiation methods could improve recoveries and increase product quality.

BERYLLIUM

Because of cost and technologic limitations, the only present commercial source of beryllium is beryl, hand-cobbed in a primitive fashion from certain pegmatites. Only a fraction of the domestic demand is derived from United States sources. World reserves of beryl are not thought to be very large, but other beryllium minerals and some fine-grained beryl occur in relatively large low-grade deposits both within the United States and abroad. Though the subject of considerable exploration and investigation, the commercial significance of such sources in the foreseeable future is uncertain despite past recurring extraordinary efforts to