

CESIUM

Current supply is derived wholly from imports (contained in the mineral pollucite) although some small domestic resources are known. It is commonly associated with beryllium and lithium minerals, in pegmatites and is extracted by expensive hand-cobbing and sorting procedures. It also covers in small quantities in certain brines and saline deposits. While cesium has a number of unique and potentially highly useful properties, present costs encourage the substitution of other materials for it wherever practicable. The element is not rare in nature and technologic improvements that would tend to reduce production costs would, in turn, promote further inquiry into new uses and some small industrial growth.

One specific property is significant in the development of ion propulsion rocket engines and certain thermic ionic devices. Recent research and development applications such as in advanced power and propulsion systems for space craft under study by NASA may develop sufficient new demand to provide industry with an incentive for developing large scale, efficient processing techniques and plants and for intensifying the search for and development of domestic sources of cesium.

CHROMIUM

In common with most other major consuming countries, the United States relies, and will continue to rely, upon imports to meet its essential needs. The certainty of such supply in a number of instances is speculative. Supply and industry relationships and other aspects of the commodity are complicated and variable. The most urgent problem here attaches to establishing appropriate international relationships, with the situation in regard to this commodity specifically in mind. (Southern Rhodesia, Republic of South Africa, U.S.S.R.).

While the nature and extent of known domestic occurrences do not encourage much hope for the ultimate improvement of our resource position, the geologic probability of the presence of deep-seated deposits is not understood. Improvements in ore finding, including geophysical, techniques might eventually improve the domestic productive capacity.

In common with the other alloying elements, the evolution of techniques permitting more flexibility in substitution would minimize supply crises in periods of emergency, tend to lower requirements, and possibly improve products. The broad subject of substitutability deserves attention now.

Evolving practices in the metallurgical industry infer radical changes in the chromium ferroalloy industry, the total demand for chromium, and an increased market for lower-grade chromite. The direct production of stainless steel from chromite and iron ore could radically change the entire chromium ferroalloy industry and result in a shift in demand from high cost metallurgical grade to lower cost chemical grade chromite. If this development does not take place, then changes can be anticipated for the chrome alloy processing industry as countries with chromite deposits become more industrialized and export chromium alloys and/or stainless steel products in place of chromite. Most chromite refractories are used in open hearth steel furnaces, but are not used in the growing basic oxygen furnace process. Consequently, as open hearth furnaces are phased out, the consumption of chromite refractories will decline.

Zinc oxide associated with some types of chromite is not recovered. Some shipments of Southern Rhodesia chromite contain 0.5 percent zinc.

In the production of chromium alloys the disposal of waste slag and air pollution from smelting operations pose environmental problems.

Technology for recovery of chromium from laterites could extend world resources by up to 50 million tons and spread the geographical supply base. This work would also expand cobalt and nickel resources. The problem is difficult, however, and will require long lead time (10-15 years) to resolve; delay until supply shortage is evident would negate effectiveness of this approach.

CLAY

The term embraces a variety of substances with substantially different use-patterns and supply-demand relationships. Essentially they are bulk commodities that support from local sources a variety of substantial industries that are vital in regional economies and important to the national economy. Anything that demonstrates the commercial feasibility of new industry based upon innovations that improve the quality of the raw material or permits the development of latent