

uranium, although usable deposits of the latter are of much less frequent occurrence than are those of the other three metals. It isn't the quantity, it is the concentration that matters.

Among the reasons for our meagre knowledge of our mineral heritage is the fact that in only a few countries has there been any systematic and detailed geological and mineralogical study of the national domain. Even in the United States of America, where more attention has been given to this matter than in any other country, estimates of available resources are recognized as being little better than intelligent guesses. For example, in 1914 the taxable iron ore reserves of the famous Mesabi range were estimated at 1,386 million tons. In 1947 the reserves were still in excess of 900 million tons, although in the meantime many hundreds of millions had been withdrawn. Similarly a competent authority in 1945 estimated the proven oil reserves of the United States at a figure more than four times as great as the accepted estimate made in 1915 in spite of the tremendous withdrawals during the generation that had intervened. Since that time the great oil fields of the Middle East have been discovered, and promising fields in other areas have been opened. Thus any attempt to estimate the real extent of world reserves of oil becomes an exercise of dubious value. Yet we cannot escape the fact that this resource is being consumed at a rate never before approached in history, and that the rate of consumption is steadily and rapidly rising.

Since the beginning of this century the depletion of our mineral resources has been proceeding at an unexampled rate. Indeed, the quantity of mineral products consumed between 1900 and 1949 far exceeds that of the whole preceding period of man's existence on earth. It is a grim commentary of human intelligence that a great proportion of the minerals used during the last five decades has been criminally wasted in the waging of the most destructive wars in history.

The increase in consumption since 1900 have covered all the more important metals and minerals. During that time production of pig iron, lead and tin has more than doubled; zinc and copper have quadrupled, aluminum, nickel, tungsten and others have shown still greater ratios in increase.¹ A similar expansion has occurred in the use of industrial minerals, while the use of certain metals used in alloys has risen to astronomical heights.

The rate of consumption of any mineral resource is, of course, subject to a variety of influences. Under conditions of free enterprise mineral deposits are normally exploited only when the margin between the costs of production and the price the consumer will pay will yield a profit to the operator. Obviously, therefore, any improvements in mining, milling or refining techniques that result in lower production costs or in an increase in the percentage of the metal recovered, will correspondingly increase the total of our commercially available resources. The more efficient we become in the utilization of low-grade ores, the more satisfactory our supply position. The same result can also be obtained in the free market when the consumer is willing or able to pay increased prices. It is only in times of emergency, and unfortunately this usually means in

¹ Under present conditions something over 100 million tons of pig iron, about 3 million tons of copper, 2 million tons of aluminum and 1½ million tons each of lead and zinc are annually required. (This does not include the large and growing consumption of scrap metals.)