hitherto produced within the empire in only small quantities, thus helping to make the empire self-contained as regards most important items for defence and commerce. The small plant which has been started has been putting out regularly 600 pounds of zinc per day for the last eight or nine months: and now a new 10-ton plant has been installed, permitting a production of 15 tons daily. The ultimate size of the plant at Risdon for the production of zinc is expected to have ten times the capacity of the present unit. It is also hoped to turn attention by and by to other industries made possible by the government hydro-electric undertaking. The success of the enterprise at Risdon will, it is confidently anticipated, favorably affect the zinc industry of the empire.

MANGANIFEROUS ORE IN OREGON

DEPOSITS of manganese and manganiferous ores in many parts of the United States have been examined during the last two years by geologists of the United States Geological Survey, Department of the Interior. This is essential work, because the limitation of shipping facilities has reduced the imports of manganese ore from other sources than the West Indies and Central America in 1918 nearly one third below those of 1917 and there is a prospect that they will be still further reduced in 1919. The importation of the iron-manganese alloy ferromanganese has decreased in much greater proportion and probably will soon be stopped altogether. To offset these decreases in the supply of manganese the Geological Survey has assisted in stimulating the domestic and the near-by foreign production by examining the manganese deposits in this country and in the West Indies with the view of determining the availability of the ore. The producers of domestic manganese ore have responded actively to the call made on them and have increased their production from 27,000 tons in 1916 to 116,000 tons in 1917. It now appears that the production of ore in 1918 will be 185,000 tons.

Manganese is used in various ways. Metallic manganese in the form of ferromanganese is alloyed with steel to make manganese steel and manganese dioxide is used in the manufacture of dry batteries, in glassmaking and in the chemical industries. Manganese, however, is used principally in making all Bessemer and open-hearth steels, in which it is incorporated in the form of iron-manganese alloys, which will serve as deoxidizers and purifiers of the molten metal. More than 95 per cent. of all the manganese consumed in this country is used for this purpose.

An examination of several manganiferous deposits in Oregon, including a reconnaissance of 150 square miles near Lake Creek, Oregon, was made in July, 1918, by J. T. Pardee, a geologist of the United States Geological Survey, Department of the Interior, in company with Henry M. Parks, Director of the Oregon Bureau of Mines and Geology. Mr. Parks has kindly placed at the disposal of Mr. Pardee the results of his previous work in this area, and Messrs. Parks and Pardee are jointly responsible for the estimates and conclusions here given.

So far as known the manganiferous deposits of the Lake Creek district are confined within an area of about 150 square miles in the east-central part of Jackson county, Oregon. The area is rather sparsely settled, and farming is the principal industry. The nearest large town is Medford, which is 15 miles directly southwest of the deposits but nearly twice that distance by the available roads. Eagle Point, a town on the Pacific & Eastern Railway, is the most convenient shipping point. The surface of the region is hilly and in places mountainous, but only moderately rugged. The local relief ranges from a few hundred feet to 2,000 feet or more, and the general elevation is between 2,000 and 2,500 feet. Streams are numerous, though most of the smaller ones become dry in summer. The climate is mild and the year is made up of a wet and dry season, corresponding to winter and summer. Most of the rather heavy winter precipitation falls as rain. The greater part of the surface that lies below 2,500 feet is covered with a mixed growth of madrona, manzanilla, and chapparal bushes and rather

scrubby oaks. At higher elevations fir and pine tres are abundant.

The area is underlain by igneous rocks that appear to be chiefly basaltic and andesitic flows and tuffs. The sequence of the rocks in part in the Lake Creek district comprises, beginning with the lowest flow, a platy basalt, 500 feet or more thick; a red basalt tuff, commonly manganiferous, 100 to 300 feet or more thick; a platy basalt, a few feet to 100 or more feet thick; dark gray to buff,locally manganiferous, andesitic tuffs and breccias, a few feet to 500 feet thick; vesicular to compact massive gray and purplish gray andesitic flows and tuffs, about 500 feet thick; and dense black basalt that weathers light gray on the surface, a few feet to more than 100 feet thick.

About 1,500 tons of ore, containing at least 15 per cent. of manganese, is "in sight." In addition, incomplete prospecting by drilling and by open cuts indicates that at least 4 acres are probably underlain by 10 feet of ore (about 120,000 tons) containing probably 10 per cent. of manganese. The surface indications in other parts of the district warrant an estimate that they may yield 130,000 tons more of material carrying at least 10 per cent. of manganese, so that the probable reserves of ore of this grade amount to at least 250,000 tons.

EXHIBIT OF MINERALS USEFUL IN WAR

Graphically displayed in the Hall of Minerals of the American Museum of Natural History is a series of minerals intended to visualize the steps necessary in the development of war munitions from the crude ore to the finished product, and to point the urgent need of domestic production. Included in the exhibit are the rarer minerals such as mercury, nickel, manganese, chromium, tungsten, vanadium and molybdenum, and under each specimen of these a label indicating in what particular industry it is used. For instance we find molybdenum steel is used in the construction of the inner tubes of large guns, as it has been found that this metal best resists the erosion caused by the gases developed by smokeless powder.

There are also displayed small distribution maps showing the occurrence of the ores in the United States and other countries, giving locations of the principal supplies prior to the war, and indicating regions in this country worthy of development. Particularly interesting is the display of finished products. Through the courtesy of a number of prominent manufacturers, material has been secured which illustrates how these minerals and metals are extracted and are being turned into tools for our army forces. By this means one can trace the application of mercury from cinnabar—how the primers are charged with fulminate of mercury which explodes the hand and rifle grenades now being so successfully used in pushing back the Teuton forces. One may also see a sectional barrel of the three-inch naval gun with its lining of molybdenum steel. Also interesting and instructive is the series showing the many stages required in the manufacture of a completed nickel-jacketed bullet like those now being used by thousands in our rifles, machine guns and revolvers.

Stamped on the lead insert of the .303 caliber cartridge used in the Lee-Enfield rifle of the British Army, are the letters "U. S.," which must have served as a reminder to the Kaiser's troops, in the early part of the war, that these particular arguments were made in the United States. Another display makes comparison of these modern messengers of death with those in use during our Civil War.

LIBRARY OF THE EDGEWOOD ARSENAL LABORATORY

Major Wm. Lloyd Evans, Chemical Warfare Service, has addressed the following letter to Colonel Wm. H. Walker, commanding officer:

As we are becoming more settled in our laboratory work, the need for the well-known handbooks and chemical journals becomes more apparent daily. We are badly in need of such works as Beilstein's *Organische Chemie,* Landolt-Börnstein, *Tabellen, Journal of the American Chemical Society, Journal of Industrial and Engineering Chemistry, Metallurgical and Chemical Engineering, Journal of the Society of Chemical Industry, Transactions*