METALLURGY

Iron Ore for 100 Years

Prediction of exhaustion by 1950 is unwarranted as the great Mesabi range in Minnesota may produce on a large scale for over a century.

➤ THE GREAT Mesabi range in Minnesota, barring some now unforeseen development, will be producing iron ore from open-cut operations on a large scale for at least 100 years, predicts Dr. A. B. Parsons in *Mining and Metallurgy,* (Sept.), published by the American Institute of Mining and Metallurgical Engineers. He refers to a report that the known reserves of the Lake Superior district will be exhausted in 1950 if mined at war production rates as misleading.

This report was made in 1942 by E. W. Davis, of the Minnesota Mines Experiment Station, to the War Production Board. These Minnesota mines produced about 85% of the ore that provided the United States with steel for fighting the war. The record shipment from the area was 91,542,000 long tons in 1942; the 1944 shipment was less than 80,000,000 tons, sufficient to meet the needs.

The report by Mr. Davis was based on an annual shipment of 100,000,000 long tons, and dealt only with proved reserves of ore of "merchantable," or direct-shipping grades containing 51.5% iron. Dr. Parsons' study is based largely on figures in the Davis and other reports.

Now that the war is over, Dr. Parsons estimates that average annual shipments will shrink to about 50,000,000 tons a year, because New York State, Alabama and the Far West may in the future contribute more to the total than before the war. The "proved reserves" in Minnesota are much lower than the actual reserves, he feels, because "as soon as it is proved by drilling, first-class ore in Minnesota becomes subject to an ad valorem tax that amounts to about 2 1/3 cents per ton per annum."

This tax, he states, is one good reason for not developing ore too far in advance of the time it is expected to mine it.

As a further source of vast iron ore supplies, Dr. Parsons indicates the possibilities of beneficiating, or treating, ores containing from 35% to 40% iron and from 20% to 40% silica. Since 1930, he says, "about 20% of the ore sent down the Lakes was a product brought up to shipping grade by beneficiating this intermediate material — intermediate between the well-leached direct-shipping ore and the unleached iron-bearing taconite."

These taconites, he declares, particularly those in which the iron oxide is mostly in the form of magnetite, might supply 10,000,000,000 long tons of high-grade concentrates.

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MEDICINE

Blood Substitute Used

The Germans used a chemical, Periston, instead of plasma for treatment of shock in their wounded. Is not acceptable by American standards.

➤THE GERMANS used very little blood plasma for treatment of shock in their war wounded. Apparently they never got around to setting up donor centers such as the American Red Cross organized early in the war.

Instead of plasma, the Germans used a synthetic chemical called Periston. American scientists turned thumbs down on it when they studied it. It is a polymer, polyvinyl pyrrolidone, made in the course of developing new plastics. This and related polymers in some ways physically resemble albumin which is probably what led to development of one of them as a blood substitute.

Periston is one of the war developments of the German chemical industry reported by the industrial intelligence staff of the Chemical Warfare Service. Some of it, however, had been obtained from Germany at least two years ago and studied by scientists on the blood substitutes committee of the National Research Council. Although the Germans are reported to have used over 300,000 units of Periston for military personnel, apparently without harmful effects, the blood substitutes committee was of the opinion that it was probably more harmful than materials American medical scientists would accept for a blood substitute. They also found that it was not sufficiently effective to be recommended for use by American physicians and surgeons.

Penicillin was another aid to American wounded which the Germans apparently did not have. They relied mainly on the sulfa drugs for fighting infection in wounds. One of these, Marfanil, was used so widely that apparently they failed to develop a satisfactory production method for penicillin.

A new sulfa drug, Globucid, developed by Schering, was produced in quantity because of its lower cost compared to sulfadiazine. Two other germ fighters, 3065 and 3214, were still under study when the war ended. These were dibromo and tetrachloro compounds of Salicil.

The Germans produced large quantities of atabrine for malaria and investigated other antimalarial drugs, among them a quinoline derivative called Sontochin. Some showed promise but apparently nothing better than atabrine was developed.

When imports of opium were cut off, lower-yielding domestic poppies were used as a source of this important pain-relieving drug.

Hormones and vitamins, both synthetic and natural, were apparently in large demand and production in Germany, the report states. In a number of instances, technical improvements were made in their method of manufacture. The Germans tried to synthesize vitamin A but failed.

German drug manufacturers gave meticulous care to purification of the final products and to the forms of the end products. They used equipment similar in type to that used elsewhere but carried on their operations on a smaller scale than American drug manufacturers. Kettles, tanks and stills, for example, were usually of only one- or two-quart capacity, except in the cases of drugs produced in large volumes such as the salicylates. Even the sulfa drugs were made in equipment of only moderate size.

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Nitroglycerin is now 99 years old; it was in 1846 that an Italian scientist found that combining nitrogen, oxygen and glycerin produces a highly explosive substance.