

are over one hundred wells producing in the Welland and Essex fields, but most of the gas is piped across the border to Buffalo and Detroit.

#### SALT.

Salt was first discovered in Ontario, when boring for oil at Goderich in 1865; and it has since been found at various points in southwestern Ontario, from Goderich to Essex Co., where it has been obtained within the last few months. Practically, all the salt produced in Canada comes from our province. The amount running from 30,000 to 60,000 tons, and the value from \$100,000 to \$230,000.

No salt is mined in the province, all being made from brine pumped from wells and evaporated; but the amount is unlimited; beds of rock salt from six to one hundred feet thick having been proved to exist under hundreds if not thousands of square miles of territory.

It is to be hoped that the attempts now being made on a small scale to develop the chemical industries dependent on salt as a raw material may be successful. If we produced our own soda, soap, hydrochloric acid and bleaching powder, we should materially increase our home manufactures and add to the demand for Ontario salt.

#### THE METALS.

Turning now to the metals, we need not refer specially to lead, which has been worked in an experimental way only at a few points in the Ottawa valley; some thousand of tons of ore having been produced in all, but very little of it smelted or marketed.

#### IRON.

Iron is of much more importance. Ontario possesses deposits of all the chief ores of iron. The upper Laurentian of the Ottawa valley contains, especially near outcrops of crystalline limestone, many ore bodies, some of considerable dimensions, most of them magnetite but some hematite. Southern Ontario has more or less extensive areas of bog ore, and Western Ontario can boast of immense beds of magnetic ore in the Atikokan and Greenwater lake regions; and of still greater beds of hematite along the Mattawin river; while low grade siderite or carbonate of iron, has been found to the east of Port Arthur.

In the early days of the province iron ore was not only mined but also smelted in furnaces of small and antiquated forms, but producing charcoal iron of excellent quality. A good account of those primitive operations may be found in the report of the Bureau of Mines for 1892, where we find that magnetite was used in the Marmora region and bog ore on Lake Erie. Some novelties were tried, such as the use of wood for smelting in a furnace at Madoc. The iron was usually cast into stoves, potash kettles, etc., and found a ready sale in the province.

No iron has been smelted, I believe, since 1844 or 1845; though similar charcoal furnaces are working, apparently with good success, under quite similar conditions in the Province of Quebec.

These old furnaces were of course immensely protected by the difficulty of transporting such a cheap and heavy metal before railways were available. Probably only a few hundred tons of iron were produced in all, since the furnaces were of very small capacity.

Since those days a considerable amount of magnetite and also some hematite has been mined at various points in Hastings and counties to the east.

Between 1859 and 1873 Ontario and Quebec together shipped 207,000 tons of ore to the United States, much the larger proportion being from Ontario. From 1873 to 1891 there were shipped 423,700 tons; and, in all, Ontario seems to have exported more than 600,000 tons, but since 1891 no work of importance has been done in our mines, the rich and cheaply worked deposits of Minnesota and the imposition of duties in the United States having driven our ores from the market.

The main obstacle in the development of our iron mining industry has been the lack of mineral fuel for smelting, and it will be of much interest to see how the experiment at Hamilton of smelting Ontario ores with American coke will turn out.

It is probable that before long Ontario iron mining will again be of importance, especially in the region west of Port Arthur, where inexhaustible beds of hematite and magnetite form the Canadian extension of the wonderful Minnesota iron region, which now leads the world in production.

There seems no good reason, except lack of capital and enterprise, why some point on the upper lakes, where ores, flux and fuel can be brought together cheaply by water, should not become a Canadian Cleveland with a great iron industry; and we may not unreasonably hope to see this in the future.

#### COPPER.

The copper mining of Ontario is naturally divided into two periods, an earlier one when the Lake Huron mines were operated, and the present when copper is obtained from the Sudbury ores as nickel-copper matte. The product of the Bruce, Wellington, and other Lake Huron mines, between 1846, when they commenced, and 1876, when they ceased work, is valued in the Report on the Mineral Resources of Ontario at \$3,300,000. In 1886 we find copper once more quoted in our statistics, 164,000 lbs. having been produced; in 1892 there were 1,936 tons; in 1893, 1,431 tons. This copper is in reality only a by-product of the ore worked for nickel. There is some chance that the Mamainse deposits, which are really an extension of the famous Michigan region, may be worked before long, but the immediate prospects of copper mining as distinguished from nickel mining are not very bright, the low price of the metal discouraging fresh ventures.

#### NICKEL.

Ores of nickel were observed many years ago in connection with the copper ores of Lake Huron, but no deposits of value were found until the C. P. R. penetrated the wilds north of that lake in 1882, disclosing the great masses of copper pyrites and magnetic pyrites in what is now the Murray mine, near Sudbury. Before long these ores, first valued for their copper, were found to contain the more valuable metal. Nickel is first mentioned in our statistics in 1889, but the amount produced is not given, since the Canadian Copper Co., the only producer, refused to make its returns public. In 1890, 718 tons of the metal are reported; in 1891, 2,303; in 1892, 2,082; in 1893, 1,642; and in 1894, 2,570½ tons.

We have only one important rival as a producer of this metal, the French island of New Caledonia in the Southern Pacific, which provides an output about one-third greater than ours. The New Caledonia ores are of a totally different character from ours, consisting of garnierite, a green magnesian silicate; while ours are sulphides, chiefly pyrrhotite and pentlandite. There seems no doubt that our ore exists in unlimited quantities, and the only question to be considered is the amount of the metal which the world can consume. At present the supply seems to equal the demand, and, since the initial plant is costly, there is no object in new companies going into the mining of nickel. The price has been steadily falling, and, as satisfactory methods of refining it are perfected, this splendid new metal must take a more important place in the world. The use of nickel steel comes slowly into favor, and the great saving in weight for a given strength should bring this alloy into use for structural purposes, especially in shipbuilding. If the British government could only be convinced of its value in armor plates we should soon have a boom in nickel mining.

With refined nickel quoted at 45 and 47 cents per pound one would suppose there ought to be a market for solid nickel table-ware and kitchen utensils. Imagine a set of silvery kettles and frying pans replacing the present black utensils in the kitchen!

It is most desirable, however, that we should refine at least a part of our nickel in Ontario, instead of shipping all the matte to the United States or the Old World.