

only have good new lands been already cleared, but valuable mineral discovered and many of those formerly known to exist are now being mined, or this year will be mined, along the road. Seldom does a railway or at least a branch line enter a new country before the prospector and farmer, and we may, therefore, expect to find that very soon other roads also will tap the new northern mineral fields, such as the northern nickel range and the iron ranges north of Sudbury, the iron ranges north of Lake Superior at Lake Nipigon, and the gold areas in parts of the west now distant from either of the two existing roads.

#### GOLD MINES.

The first noteworthy discovery of gold was made at the Richardson mine, in Madoc township, Hastings county, in the year 1866. Since then valuable gold areas have been found from here to the western end of the province, over a distance of some 900 miles, and with nowhere a gap of more than 100 miles. And there appears no reason why gold should not be found in these stretches also when the prospector devotes his attention to them. An enumeration of the different points at which gold mining has within recent years progressed will serve to exemplify this very general distribution. From east to west the areas consist of the Eastern Ontario belt, extending through the four counties of Peterborough, Hastings, Addington and Frontenac; the Parry Sound area in the district of that name; the vicinity of Wahnapiatae lake; from Sudbury west along the north shore of Lake Huron; the Michipicoton area following the belt of Huronian rocks from Lake Superior northeasterly to Dog and Missanabi lakes; along the north shore of Lake Superior at Jackfish, Rosport and other isolated localities in the area; and from Shebandowan Lake west to the Lake of the Woods and north to Sturgeon Lake, which last area comprises practically all of the Province west of Lake Superior.

#### PLACERS.

Unlike most gold regions, Ontario has no placer deposits which have so far been proved of commercial value. From time to time auriferous sands have been discovered and immediately subjected to official examination. There are two main occurrences and one consists of the gravel and sand areas along the Vermilion and Wahnapiatae rivers, the more important beds of which follow the Vermilion River for a stretch of forty miles with a breadth of from one to three miles. It was generally conceded that the only feasible method of profitably working the sands would be by dredging, since the gold is mostly in fine colors and the average value of the sand not more than a few cents per cubic yard. During 1901 some tests were made with the sand with a plant erected on the ground, the idea being to combine amalgamation and cyanidation in the process. A forest fire wiped out the works, however, before much of value had been accomplished, and the attempt has not yet been renewed. The other area comprises the sand and gravel hills and beds in various parts of Savant Lake and district, which is reached by canoe northerly from Ignace, western Ontario. These sands also cover an extensive area. They differ from the Vermilion sands, however, in that but little gold could be collected by panning, while by fire assay values in the precious metals were frequent. To quote from the report thereon by Willet G. Miller: "These values (by fire assay) come from material, which is probably more or less refractory, in the rusty fragments of rock in the gravel. Only a very small percentage of the gold can be extracted by placer methods." Gold values, per ton by assay, ran all the way from

traces to \$2.00. Silver appeared in traces in most of the samples.

As an example of the small local occurrences of auriferous sands or other detritus, the result of either glacial action or weathering, which may be found at many places in our gold areas, those in the arsenical gold belt in Hastings county are interesting. Besides quite small beds of auriferous sand filling depressions in the rocks in the vicinity of the Deloro and other mines, one was found on the Cook property, in Marmora township, forming the bed of a swamp of less than an acre in extent, composed of large and small angular boulders of quartz and country rock carrying weathered sulphides and compactly filled with fines of the same materials. The whole was rich in gold values. It probably represents the glacially denuded portion of one of the nearby veins, deposited as a moraine against the more solid trap country.

#### EASTERN ONTARIO.

To return to the discussion of the auriferous ore bodies in place as found in the above enumerated areas: In the eastern Ontario gold belt, of which a general description has already been given before this Society and elsewhere (2), a number of mines have been producing bullion recently, although at present most of the mills are closed, presumably temporarily. These include the Belmont, one of our most promising gold mines, the Deloro, the Atlas Arsenic and the Cook. Several new companies have been formed to develop other gold properties in the district, some merely prospects adjoining these known mines, and others, older mines already considerably developed.

In 1897 the Belmont mine, then merely a prospect, was acquired by the present owners, who have systematically explored most of the important showings of ore, developed a number of them, erected the present extensive mining and milling plants, and produced from that year to date 16,789.79 ounces gold bullion, valued at \$289,301.76. Numerous and sufficient descriptions of the ore bodies have already been published (3), from which they are seen to be unusually large, but of low grade, requiring large milling plant and economic operation throughout. For this last, the mine is well equipped with a developed water power, and lies in a district handy to the main centres of the Province.

It would appear that amongst the arsenical-gold properties in this district an amalgamation of the different interests is necessary to bring about the continued profitable operation of the different mines, principal of which are the Deloro, Atlas Arsenic and Cook. This course has been advocated and attempted a number of times, but so far without definite result. The Deloro, a pioneer amongst these mines, has been operated off and on for the past thirty years or more, and during that period various methods for the extraction of gold values from the arsenical pyrites tried. In all of them amalgamation in one way or another formed a part. Chlorination and ordinary potassium-cyanidation proving commercially unsuccessful, the bromo-cyanide process was evolved, and has since been successfully adapted to the ore (4). The residue from the mill, after cyanidation, consists of these arsenical pyrites (mispickel) concentrates which then pass to the adjoining refinery for extraction of the arsenic. The total saving in the original

(2) Can. Min. Inst., Vol. V., pp. 233-225; Bur. Mines, Vol. XI., pp. 186-207.

(3) Bur. Mines, Vols. X., XI., XII.

(4) "The Treatment of Auriferous Mispickel Ores," Can. Min. Inst., Vol. V.