been paying dividends steadily from a ten stamp mill.

The aggregate of stamps dropping in British Columbia, however, does not equal that in the Province of Ontario.

The Rossland district, to the west of the Columbia, close to the border-line, has been of a somewhat more recent date, and there a cupiferous-pyrrhotite, identical in appearance to the Sudbury nickel-carrying ore, is found in places to have a large amount of gold associated with it. Extending west from Rossland the formation is of a copper-bearing character, and quartz copper veins carrying gold, and greenstones carrying copper ores are the prevailing ores of "Boundary Camp" and vicinity.

The chief development has been in a class of ore that requires smelting. At Trail the copper-gold smelter treats the Rossland ores. At Nelson a copper-silver smelter treats the "Silver King" ores, and on the Kootenay Lake a smelter has been operated until recently on silver-lead ores. From the Slocan most of the high grade ores are sent out of the country, as their richness permits them to pay the freight, and several concentrating plants, which dress out the refuse rock, are there located.

The present day operations in the Cariboo chiefly consist in modernizing the methods of gold working by using hydraulic jets or "giants" to wash the gravels which have gold distributed through them. In this work it is a well-known fact that the "Cariboo Mine" alone produced $120,000 in gold during the past season.

In Cariboo also some of the deep workings are about to be drained by bed-rock tunnels, and virgin ground opened by this means. The gravels of the famous "Williams' Creek" ore will be raised and washed before long by the hydraulic lift system, and there is little doubt that large yields will be obtained there.

Quartz, also, in the Cariboo is receiving attention, and as the Cariboo schists are simply interlaced with irregular masses of quartz and quartz ledges, there is little doubt that some large quartz developments may there be looked for, especially when a railroad is built into the country.

On the Lower Frazer promises of renumerative dredging operations for gold on a large scale exist. On the coast and Texada Island excellent prospects for copper and gold are abundant. On Vancouver Island placer washings and refractory gold ores are said to be paying. And lastly, those developing the prospects in the East Kootenay say that the splendid silver-lead mine owned by Mann & Holt will be equalled by others of the same character, and by mines of free milling gold, copper and copper-gold ores, all found there.

With regard to the future it does not require a prophet nor the son of a prophet to forecast the inevitable.

Take a map, see the trend of the mountains from Mexico through New Mexico, California, Colorado, Nevada, Utah, Wyoming, Idaho and Montana into British Columbia where we have a length of the same mountain ranges equal to or greater than that already alluded to. Then turn to the statistics of the outputs of the above mentioned states, leaving out Mexico, and we will find that the silver, gold and copper output has been from a hundred and a quarter millions to a hundred and a half millions of dollars per annum. Look again at the geological map of the two countries, such as the Hitchcock map issued by the American Institution of Mining Engineers, and it will be seen that there is almost perfect geological similarity between the mountain areas in question.

The mineral development in British Columbia, in these mountain ranges, very naturally commenced in the south where it left off in Montana, a state producing from 30 to 50 million dollars a year from her gold, silver and copper alone. The whole output of the Dominion of Canada has been from 10 to 20 millions of dollars a year, and arithmetic is hardly needed to see that an enormous gap exists which should legitimately be filled, when it is considered that the United States has been producing upwards of six hundred millions of dollars per annum from her minerals, and when the one adjacent state mentioned almost trebles our whole output.

To develop mines takes time and money: a very few of the located claims turn into a mine, and investors cannot use too much caution.

The experience in the United States, with their enormous production, has been great, not only in Montana but in northern Michigan and Minnesota, and when we begin to see Americans "sacrificing" their good things in Canada we can with good reason consider that these good things are worthy of the most careful investigation.

The aggregate of the development will be immense in the long run, but the losses of those who make investments on the recommendation of the vendors, will be very considerable. It is the very riskiest kind of "mining" that exists.

HURONIAN GOLD DISTRICTS.

By John Galt, C.E., M.E.

ALTHOUGH British Columbia has decidedly set the pace for Canadian mining, Ontario is coming to the front rapidly, as her gold fields are now being practically demonstrated to be of great value and of immense proportions, extending throughout central Canada, and easily accessible, in many cases, by boat and rail. The discoveries made, and the work of development which have been done have raised great expectations as to the mineral resources of Ontario. Although Canada can boast of a few prosperous and dividend-paying mines, the New Ontario will in a few years' time add many more to the list of productive gold properties.

The Lake of the Woods and Seine River district has largely monopolized public attention of late, because of the rapid progress of active prospecting, coupled with substantial and proper development work, while in addition stamp mills have been pounding away and producing gold bullion with exceptional regularity, as is the case, by way of example, at the Sultana mine near Rat Portage.

There are now many fully developed properties, and the conclusion reached by practical experts is that there are vast ore bodies of good grade gold bearing quartz of a free milling character in the Huronian rock sections of Ontario. The quartz veins in this Huronian strata differ somewhat in each section For example, in the western section of Ontario the veins are easily determined at or near the surface as well defined and true fissures running through the volcanic rock formation, as also in contact with protrusions of eruptive rock. The result of the glacial period has been to expose these fissure veins, and we find their dip not deviating far from the vertical. It is quite a common thing in the Lake of the Woods district to trace mineralized gold bearing fissure veins for several miles in a straight course. One striking instance of this is Bath Island which has numerous true fissure veins running through and across the formation the entire length of the island and into the lake over two miles, and traceable beyond to the other islands lying a considerable distance to the west.

In other districts equally promising, the veins on the surface are more numerous and are interstratified in the Huronian rock formation, dipping and converging together into main fissures.

The most notable example of this is to be found in some portions of the northern extension of the great Huronian belt, north of and beyond Lake Wahnapitæ, a district lately visted by the writer, and which, although still unexplored, gives the greatest promise.

The fine character of the ore at the Crystal mine, immediately north of Wahnapitæ Lake, and the showing from partially developed properties on Lake Kokogaming, near by, prove the ore to be very high grade and likely to yield a large percentage of gold by the simple and inexpensive process of free milling.

There has been little or no deep mining done in this region, and consequently, no very large ore bodies have been yet developed, although every indication points to the existence of valuable fissures when the proper depth is attained, which of course, means an expenditure of considerable time and money.

As part of this region is still covered with valuable pine timber, the problem of harmonizing the two interests of lumbering and mining has still to be solved in a way satisfactory to the general interests of the people. When this is done no doubt prospecting and mining will proceed. In the meantime the Provincial Government refuses to grant titles to mining claims.

The region east and north of Wahnapitæ when opened up will be central and most convenient for mining, as the roads from the main line of the C.P.R. to the navigable lakes and waterways are in fair condition and not long, but although the country is favorable in this and other respects for mining, the difficulty of penetrating and extending operations far into the interior of a forest reserved by government as timber limits has yet to be solved.

THE NEW-OLD BOTHWELL OIL FIELD.

A LITTLE more than thirty years ago the town of Bothwell in Kent county was known far and wide as the centre of a rich oil field. The existence of petroleum springs along the banks of the Thames river, which separates the townships of Orford and Zone, was well-known to the settlers of fifty years ago, who gave to it the name of River Oil. But in those days it does not seem to have occurred to any one that it was present in large quantity, or that it possessed an economic value. The Indians gathered it with their blankets and used it as a healing nostrum, and by some white people it was regarded as a specific for many ailments. Not until the great petroleum fields of Pennsylvania began to be explored, and a process was discovered for refining the crude oil and producing a light-giving oil, did any one regard with favor the show on the Thames; and then when one or two lucky strikes had been made, there was a rush to the district such as is only paralleled when a new gold field has been discovered. In those days, however, little was known as to how petroleum occurs in the rocks, and although some things are yet to be learned, it is certain that the pioneers in Bothwell made grave mistakes.

Careful study of boring records in Pennsylvania and Ohio has demonstrated at least two things. One is that the reservoir of petroleum is a porous rock of some kind, either a sandstone or conglomerate or a dolomitic limestone, which holds the oil as a sponge holds water. The other is that gas and a salt or bitter water are invariably present with the oil, and that the three substances are arranged in the order of their specific gravity—gas uppermost, and oil between the gas and the water—and when the reservoir is tapped with a drill there is an up-