Our Mineral Resources.

The second lecture of the Somerville course was delivered at the hall of the Natural History Society society, Montreal, by Capt. Robt. C. Adams, the subject being, "The Useful Minerals of Canada."

The lecturer stated, in commencing, that he was not qualified to treat the subject from the point of view of the naturalist, and he should confine himself to the practical and economic side of the subject. Instead of describing "how the gold-bearing segregated quartose veins occur at the anticlinals of the Cambrian strata," he would merely speak of the regions where gold occured in paying quantities and some of the efforts that were being made to transfer it from mineral pockets to men's purses. He stated that the annual report for 1892 of the Geological survey of Canada, which was issued at the close of 1891, informed us that the mineral production of Canada consisted of seven metallic substances, nickel, gold, copper, silver, iron, lead and platinum, valued at $3,713,766, and 24 non-metallic substances, of which the most valuable were coal, petroleum, asbestos, gypsum, pyrites, salt and phosphate. There were also fifteen products, the materials of which were directly derived from the earth, such as bricks, building stone, lime, sewer pipe, pottery and tiles, the total value of the whole mineral production of Canada for 1892 being estimated at $18,000,000. Mr. Johnson, the *Dominion statistician*, valued the annual farms products of Canada at $500,000,000, and the manufactures at $176 000,000, whereas, according to the report of the Geological Survey, the value of the crude minerals produced in one year was only about $15,000.000, and yet Canada was one of the richest and most varied mineral countries in the world. Heading the list of mineral products was coal, which had not only the greatest value, being $7.181,510, nearly half of the whole mineral output of Canada, but it was also the prime mover of nearly all mechanical industry. The output, exclusive of colliery consumption, was 3,292,547, of which 823,733 tons were exported, leaving for home consumption 2,168,814 tons. There was imported of foreign coal, Bituminous, 1,615.220 tons; anthracite, 1,479,106 tons, and coal dust, 82,091 tons; making a total of 3,176,417 tons, thus showing that there was an excess of foreign coal used in Canada amounting to 707,603 tons, in spite of the duty of 60 cents a ton on bituminous coal, which amounted to nearly a million dollars. This was due to the fact that no anthracite coal was produced in Canada and that there were no mines in Ontario or Quebec. The production was as follows, Nova Scotia, 2,175,914 tons; New Brunswick, 6,708; Northwest Territories and Manitoba, 181,370, and British Columbia, 925,495. There were supposed to be 97,000 square miles of coal areas in the Dominion, of which 18,000 were in Nova Scotia and 50,000 in the Northwest territories, besides 15,000 square miles of lignite lands in the west. Next to coal, in value, was nickel, with an output of $1,399,956, according to one estimate, though it was intimated that, owing to the ore not being wholly treated in Canada, the value of the matte as shipped from the mines was only $581,318. A few years ago

THE DISCOVERY OF COPPER

was made at Sudbury, Ont. After the mines had been working for some time it was found that the ores were more valuable for nickel. The supply was equal to any possible demand. It was estimated that a hundred blast furnaces could be started that would produce 50,000 tons a year. At present the mines were often idle because the output of ore was larger than the smelting arrangements could handle. Petroleum ranked third in the list of mineral products, with an output valued at $982,489. The refining operations were confined to Petrolia and London, Ont.; $13,015 worth was exported, and $175,782 worth was imported from the United States, in spite of the high duty. *Five thousand wells were producing 779,753* barrels a year, or less than half a barrel each a day on the average. Prices were $1.20½ to 1.29. At Gaspe great operations had been carried on, boring having been made to considerable depth without material result so far. Gold came forth in the value of output. Nova Scotia from its quartz veins, and British Columbia from its alluvial deposits, furnished 85 per cent. of the whole, the remainder being got from washing on the Saskatchewan and Yukon rivers in the Northwest territories, from washing in the Chaudiere district of Quebec, and from quartz mining in Ontario. The proportions were. British Columbia, $399,525, Nova Scotia, $389,965: Northwest territories, $98,006; Quebec, $12 937; Ontario, $7,118; or a total of $907,601. The gold ores of Ontario contained arsenic in such quantities that it had been difficult to save the gold. When a process was found that would more effectively separate the gold, a large output might be expected. The alluvial deposits of the Chaudiere district were known to be rich; but operations were hindered by bad titles, owing to the old seigniory laws. British Columbia promised to be the great *gold-producer in the future. Hydraulic* mining on a large scale would win great treasure from gravels that could not be worked profitably by hand. The rivers and sea coasts would be dredged and pumped for the gold in the gravels and sands; the great masses of base ore at Trail Creek and Boundary Creek would be smelted, and the quartz veins of the Okanagan would yield their gold to the stamp mills. Instead of a yield of a million dollars a year, we might soon expect to see Canada rivalling the production of California in its bonanza days, provided capitalists would venture to take mining risks and Government would promote transportation and permit the free importation of mining machinery. In the Rainy Lake and Lake of the Woods districts, near Rat Portage, many quartz reefs were found carrying gold, and Montreal enterprise was now attempting promising operations there.

Copper came fifth in rank, with a production of 7,087,275 lbs., a value of $826,849. This output came mainly from the vicinity of Sherbrooke, in Quebec, and Sudbury in Ontario. The Eustis and the Nichols mines, at Capelton, were large producers, and at the Nichols mines the manufacturer of sulphuric acid and *superphosphates was an important* feature. Copper was widely distributed throughout Canada, though its occurrence in paying quantities was somewhat rare. The north shore of Lake Superior was likely to yield large supplies, and in British Columbia, near the town of Midway, which had lately been founded by Montreal enterprise, large masses of rock were found carrying copper and gold, and it was expected that a large production would take place there. Midway was located on the international boundary line, and smelters would probably soon be erected there to treat the ores of the Boundary Creek district.

ASBESTOS COMES NEXT IN VALUE.

and within a few years it had become a most *important article in Canada's production.* Owing to a great fall in prices, the output for 1892 was only valued at $390,462, whereas in 1891 it was $999,878, and had risen again in 1894 to 516,000. It was found in the Serpentine rocks, mainly in the neighborhood of Thetford and Black Lake, in the province of Quebec, thought it also occured at Templeton, P.Q. It occured in very small seams, zig-zaging through the rocks, and had to be separated by hand with hammers. But the Cyclone mill had recently been introduced at Danville for the work of grinding up the low grade rock, and it bid fair to greatly reduce the cost of production. Silver ranked *seventh with an output of $269,489. This* was obtained from the copper ores of Capelton, the Port Arthur district, in Ontario, and West Kootenay, B.C. In the latter district had been discovered, in the Slocan subdivision, what many thought would prove the greatest silver producing region in the world. The ore deposits were mainly of argentiferous galena, carrying from 50 to 70 per cent. of lead and from 100 to 1,000 ounces of silver to the ton. Even at the present low price of silver, many of these veins could be profitably worked. Masses of solid galena were found in continuous veins, measuring from two to seven feet in width, and other ledges gave great quantities of concentrating ores. Some of these locations seemed likely to repeat the history of Silver Islet, which yielded over $3,000,000, or of the Beaver, Badger, and Silver Mountain mines of Port Arthur, which had had occasional very rich bodies of ore. Dry ores were also found in Kootenay, carrying copper, silver and gold, and now that a smelter had been completed there and the railroads were providing cheaper transportation to the United States smelters, a large and profitable output might be expected. Iron ore came eighth in *the list of mineral productions, with an out*put of 103,248 tons, valued at $263,866. This was produced as follows: Nova Scotia, $194,581; Quebec, $62,385, and British Columbia, $6,900. No ore was imported. Iron ore exists in great quantities throughout Canada.

If the United States markets were available a very large production would take place. With the great resources of Ontario in nickel at Sudbury, and iron at Kingston, she might in the future supply the continent with nickel steel. The Canadian government gave a bounty for the production of pig iron from native ores, and in 1892 paid $93,896 for that purpose. Gypsum ranked ninth, with an output valued at $241,127, principally from Nova Scotia, and a little from New Brunswick and Ontario. Most of it was exported, but there was used in Canada $13,743 worth for land plaster and $51,244 worth for plaster of paris. Of pyrites, used mainly for the manufacture of sulphuric acid, $179,310 was produced. Phosphates, which formerly amounted to half a million dollars annually, fell to $157,424 in 1892, and to much less in 1894. The discovery of great deposits in Florida and again in Algeria had depressed foreign prices so as to make mining unprofitable. *But Canada and the western states* were destined to become great consumers of phosphate on impoverished lands, and facilities for cheap water transportation to the west would enable Canada to compete with the railway borne products of the South. Doubtless a great future awaited the phosphate industry of Canada in supplying the plant food for the northern part of the continent. Salt was produced in 1892 to the amount of 45,486 tons, valued at $162,011. There was exported $504 worth, while $380,958 worth was imported. It was obtained chiefly from Ontario, a little being produced in New Brunswick. By boring 900 to 1,600 feet, salt water had been struck, from which the salt was derived by evaporation. Building stone was

AN IMPORTANT PRODUCT,

amounting to $609,827, and lime was produced to the value of 411,270. Roofing slate was produced at Rockland and Danville, and at the latter quarries a fine article in school slates was manufactured. The products from clay amounted to nearly two million

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