

COPPER CLIFF.

Its History and Industry.

(From the Copper Cliff Courier.)

Back in the good old days when witches, goblins and gnomes were very real and the devil took an active interest in the most minute affairs of human life, there was trouble in one of the little mining towns in an out of the way corner of Germany. The trouble was beyond all explanation, here was the ore coming from the mine, apparently as good quality as any copper ore in the country, and yet, try as they might, the furnace men could get no copper out of it. Everything was unchanged; the same methods, the same furnaces, the same mines which had produced good copper ore for years and yet, everything was at a standstill. Clearly the ore was bewitched, the devil had a hand in it. This "Old Nicks Copper," or "Kupfer Nickel," as the Germans called the ore, was to blame for all the trouble.

So the mines were abandoned, but the name "Old Nick's Copper," or "Kupfer Nickel" stuck to the ore—a coppery-looking mineral—so bewitched that no copper could be smelted out of it. Another ore, very much like this, was apparently also bewitched. Kobold ore, the miners called it after the little kobolds or gnomes who could be heard driving their picks and pounding on their drills in the lowest levels of the mines.

Nearly a hundred years passed before the secret was discovered and these ores were found to contain not copper, but two new metals, to which the old names were given, namely, "Cobalt" and "Nickel."

It is a long cry from these mines in Helsingland to the forests of Northern Ontario in the year 1882, but the track of industry never follows the beaten road. In that year, a little cluster of log houses marked the junction of the main line of the Canadian Pacific with the branch line which ran to the harbor at Algoma Mills. Around the village were dense forests, barren rocks and wide beaver meadows; while its existence depended entirely upon the railway which was being built to the western coast.

Old Judge McNaughton, whom many of our readers will remember, was then acting as Stipendiary Magistrate in the village of Sudbury. The judge was lost one day, in one of his rambles in the woods, and the town turned out en masse to search for him. When at last Dr. Howie, who led the party, came across him, the old gentleman was resting on a rocky knoll, some three miles west of town, examining with great interest a peculiar speckled mineral he had broken out of the black stone. This was the first fragment of nickel ore mined in Ontario. In the mythology of Canada, the wanderings of Ulysses are replaced by the wanderings of Judge McNaughton and the discovery of the Murray Mine.

It was not long before the news of this find had aroused the interests of English and American capitalists. A group of Ohio men, Judge Stevenson, and Senator H. B. Payne, Mr. H. P. McIntosh, Mr. Thomas Cornell and others, after a thorough exploration of the ground, purchased a large block of land in the vicinity of Sudbury, and organized a Canadian Copper Company, with a capital of \$2,500,000. In '86 this company commenced work at the Copper Cliff Mine. The ground was then covered with a dense forest of underbrush which had to be cleared away to form a site for the shaft house and ore bins. The first building in Copper Cliff, a long log cabin, is still standing to the south of the road where it crosses the creek near the Copper Cliff Mine. In 1886 just one thousand and forty tons of ore were raised; a striking contrast to the present production of over a thousand tons a day. The difficulties of operation in this new country were enormous, and the first two or three years were occupied more with road making, building of houses, laying out trestles and hauling supplies than in the actual work of mining and shipping ore. In 1886, however, the Copper Cliff, Evans and Stobie Mines were opened up and the deposits at Clara Belle, Lady McDonald and at other outcrops had been uncovered.

In 1889 the first smelters of the Canadian Copper Company were built by Dr. Peters and the nickel industry of Canada was definitely established. During the thirteen years which have elapsed since that time, new uses have been found for the nickel produced, and with growth in consumption the production has increased until at the present time the Canadian Copper Company alone is producing over a million pounds of nickel every month, and some 1500 men find employment, where—but a few years ago—none but the Indian or the hunter could gather the bare necessities of life.

In order to understand the reason why the nickel industry has grown, we must touch lightly upon the uses which are made of that metal in commerce. Nickel, as we all know, is a silver white metal which does not rust or blacken with exposure, it is about as heavy as copper, as soft as iron and as tough as tempered steel. The first use to which nickel was found adapted was as a coating over articles of iron or brass, which coating is known as nickel plating. This coating is only a few thousandths of an inch in thickness, and while it performs its purpose of protecting the articles from corrosion, it is evi-

dent that it does not afford a market for any very large output of metallic nickel. While nickel plating was the chief use of the metal, the production was of necessity small.

The second application is in the manufacture of German Silver from which alloy most of our cheap tableware, knives, forks and spoons are made. The base of this is a mixture of about sixty parts copper, twenty parts zinc and twenty parts nickel. Articles fashioned of this alloy are then given a coating of silver and are ready for the market. This outlet helps the production but measured in proportion to the output of the mines, production for this is very small.

A third use to is in the manufacture of coins. The five cent pieces in use in the United States consist of three parts copper and one part nickel. A very few tons of nickel will supply a very large number of these pieces, and this market is like the two others, a very limited one.

Had the Sudbury mines no other outlet but these, the industry would never have become of national or even of local importance. It remained for an English steel maker, Mr. James Riley, to discover the great usefulness of nickel when mixed with steel. In 1889 this manufacturer showed that the addition of three per cent of nickel to soft steel produced a metal nearly twice the strength of common steel, while at the same time the metal attained an extraordinary toughness. His pamphlet, read before the Iron and Steel Institute in May 1889, the year the first smelters were started in Copper Cliff, opened the way for a large output of metal and proved the foundation of this great industry which means so much to the province of Ontario.

Almost at once the use of nickel steel was taken up by the steel makers of the world. Armour plate for war vessels was the first use to which the new alloy was turned, and in a few years the great navies of England, France, Russia and Japan were clad in this wonderful metal. Its use in guns and rifles followed, and gradually it has come to be used in all cases where great strength and toughness are required. The arts of war are, however, a precarious basis for a great industry. It remained for the last year to show the usefulness of nickel steel in a position independent of international strife and necessary to our world commerce, namely, as a material for railway iron. This use, so lately developed, promises to be the largest outlet for the product of the Sudbury mines.

To revert now to the company which has built up this industry. The Canadian Copper Company commenced in 1889 to smelt their ores and to ship matte to the American and English markets. For a few years the struggle was all uphill. In 1892, however, a contract was made with the Orford Copper Company, of New York, to supply nickel for the United States Government, which was then experimenting with nickel steel armor plate. Since that date these two firms have worked in harmony, the one mining the ore and making it into matte which contains about one-quarter of its weight of nickel, and the other refining this product into metallic nickel. The refining of nickel, separating it from copper, sulphur and iron is one of the most intricate problems of modern metallurgy. It requires comparatively little labor, but an immense amount of coal, coke and chemicals, none of which are produced in Ontario, and hence the best interests of the industry are served by bringing the matte to as high a percentage as possible in Canada and sending the material to a point where the coke and chemicals can be cheaply obtained. In order to do as much of this refining as possible in Canada, the Orford Copper Company built, in 1889, a factory known as the Ontario Smelting Works at Copper Cliff. Here the crude matte is ground and roasted to remove the sulphur, and then re-smelted into a high-grade matte carrying about 80 per cent. metal, in which shape it is shipped to New York.

There are at present four of the Canadian Copper Company's mines in operation. The ore is dug, as a rule, from immense quarries, open to the air. These quarries are in some cases two hundred feet in depth. Below these open pits a regular system of underground mining has been developed. The ore is broken by power drills and dynamite; hoisted to rock-houses; crushed to small size and sent to the roast yard by trains of flat cars.

A visit to one of these nickel mines is an entirely different thing from an adventure into the coal mines of Pennsylvania, of which we have lately heard so many revelations. Instead of half-starved children, slatternly women, drunken men, and miserable houses, we will find clean and comfortable homes; men working under safe and healthy conditions, for wages whose sufficiency is attested by the throngs of ruddy, well-clad children who pour from the school-houses and rush sliding down the snow-clad hills with the abandon of health and happiness. Could one of the reporters whose pen has this winter depicted the conditions of the coal miners of the States visit the nickel mines of the Sudbury region, the world would learn that the conditions of the two industries are not for a moment to be compared.

The Canadian Copper Company employs 500 men at its mines, 700 men at its smelters, and 300 men in its shops and other departments. There are paid out in wages sixty

thousand dollars per month, and in the various industries which depend upon the mining and smelting of the ores, some 2,000 people find means of support.

The town of Copper Cliff has 3,000 inhabitants. By supplying the necessary materials at cost the company has made it possible for its employees to own their own homes. Another policy, and one which has contributed much to the happiness of the town of Copper Cliff, is the prohibition of the sale of intoxicating liquors. A visitor from one of the western mining camps recently visited Copper Cliff. As he looked north from the office, "What," said he, "is that fine building on the top of the hill?" "That," said his informant, "is the Methodist church." "How many churches have you?" asked the westerner. "Five," was the reply. "And how many dance halls and saloons have you?" "None!" "Well," said the American, "in our camp we have five dance halls and no churches." There is no moral to this. It simply shows the conditions which explain the prosperity of the town of Copper Cliff.

Let us follow the ore from the mine to the finished product, and note the various steps of its progress. The ore, broken in the rockhouse to small fragments, is dropped into flat cars and hauled from the mines to roast yards at Copper Cliff. Here the ore is spread over beds of cordwood and made into piles, about 60 feet wide and 120 feet long by 6 or 8 feet high. When the cordwood is lit the ore catches fire, and, being smothered by the fine ore spread over the heap, it continues glowing and sending off clouds of sulphur smoke for about nine months if left untouched. As a rule it is allowed to burn three or four months, when the ore—now charred to the semblance of coal clinkers—is broken down and loaded on cars to be sent to the smelters.

These clouds of white smoke rolling over the country are to a stranger a source of wonder and mystery. How can the people live amid such fumes? is often asked. The prevailing winds, however, carry the smoke away to the north, and when an occasional breeze brings it across the town it is so diluted that but little discomfort is experienced. Moreover, as is well known, sulphur smoke is an excellent disinfectant, and to this in great part is due the excellent health which prevails.

From the roast heaps the ore passes to the furnaces. The east smelter, where the first furnaces were built, was soon outgrown, and in 1900 the west smelter, containing eight furnaces, was started.

The scene at the smelters is, particularly at night, a weird and attractive one. Above, the moving figures of the wheelers and shovellers show a ghastly yellow in the blue flame of the furnace into which the ore is thrown, while just below them the darkness is broken by the white, hot lines of slag falling hissing into the water jet and dying into blackness as it passes down the stream. Then a leather-aproned figure approaches, and you hear the tap of hammer on steel as he drives his bar into the furnace, and as he withdraws it a jet of red light flashes out as the matte pours sparkling into the pots. Across the yard the wheelers push the pots and pour the metal out upon the ground in a glowing pool of red. So the work goes on day after day, feeding in the ore and tapping out the metal a hundred tons a day month after month. No wonder the dwellers in this far north are interested in the prosperity of the Sudbury nickel industry.

The town of Copper Cliff spreads over more area than its population would seem to warrant. It is scattered in all directions, owing to the difficulty of finding good building sites among the rocky hills which press in on all sides. The business centre, or Front street, is situated just north of the Copper Cliff mine. Here at one end of the street stands the General Hospital, a magnificent structure erected in 1902 at a cost of \$30,000. This hospital, as shown in the engraving, is modelled in the Swiss style, and with its wide verandas and overhanging eaves forms a very agreeable contrast to the strictly utilitarian aspect of its surroundings. This hospital contains a large public ward, holding twelve beds, besides six private wards for those who wish to afford the luxury of separate accommodations. There is provided every necessity in the shape of dispensary, waiting-rooms, dining-rooms, laundry, disinfecting room, operating room, quarters for the nurses and resident physician—in short, every luxury which skill can devise and money can procure has been placed at the disposal of those whom accident or sickness has overtaken.

Fronting the hospital is the main street of Copper Cliff. Here are jewellery stores, clothing houses, tailors, grocers, milliners, meat markets, hardware stores, harbor shops, boarding-houses—every branch of trade except the saloon finds here its representatives.

In view of the spirit of consolidation which has become so prominent during the last few years, it was inevitable that the nickel business should undergo the same process of unification of interest. There have been for many years two great sources of nickel ore, the Sudbury mines and the mines of New Caledonia. This latter place, one of the great chain of islands which stretches from the Philippines toward New Zealand, has long been known to French metallurgists. There are on this island immense deposits of nickel of a soft clay-like ore, which can

be dug out by steam shovels, and which contains about 6 per cent. of nickel. The Sudbury ores carry about 3 per cent. nickel and 2 per cent. copper, which latter metal is entirely absent from the new Caledonia ores. Owing to the absence of copper the New Caledonia ores are much better adapted for the purpose of making steel, since copper is as harmful to the steel as nickel is beneficial. These ores have for the last forty years been worked by a French company, the Societe le Nickel, and as they employed French convicts, whose labor cost but a few cents a day, they were able to produce nickel at a price much below that at which it could be turned out at the Sudbury mines.

From the year 1886 to 1902, a period of sixteen years, the Canadian Copper Company was an independent organization. The market for its produce, had, however, changed, and during the last few years the steel manufacturers had come to consume the major portion of the nickel produced. In the spring of 1902 a group of capitalists, organizing in New York as "The International Nickel Company," purchased a controlling interest in the three concerns which produce nickel in the United States and Canada, viz., the Canadian Copper Company, the Orford Copper Company of New York and the American Nickel Works of Philadelphia. These capitalists who formed the International Nickel Company are also very largely interested in the manufacture of steel, and in forming their organization were careful to intrust the management of their interests to men who had shown remarkable ability in the manufacture of nickel steel. As the steel-maker is destined to be the largest consumer of nickel, it is very fortunate that the President of the International Nickel Company, Mr. Ambrose Monell, and its Vice-President, Mr. E. F. Wood, are men who by sheer force of ability and character have risen to the highest positions in the Carnegie Steel Company. Under their control the organization of the individual companies remains as before, but into each company is infused a new life and vigor, and into the processes of manufacture will be brought the courage and skill and application of modern methods and the inventive ingenuity which has made the Carnegie Steel Company what it is. The nickel industry, under such propitious auspices, is destined to a larger growth and a greater activity than it has ever before realized.

Besides the purchase of the controlling interest in the three American and Canadian organizations, the International Nickel Company has also obtained a large area of nickel lands in New Caledonia, near the property owned by the French Societe le Nickel. In so doing they have placed themselves on an equal footing with their competitors, and are now bringing from this island the soft copper-free ores which are best adapted for the manufacture of nickel steel. The organization is, therefore, in a position to carry on this manufacture of nickel, even if all the Sudbury deposits should be exhausted. Fortunately for Copper Cliff, we have reason to believe this period is yet far in the future.

Meanwhile the town is losing much of its pristine appearance as a mining camp, and assuming an air of greater dignity. To Mr. A. P. Turner, the president of the Canadian Copper Co., is due much of this noticeable change. Under his guidance the streets have been graded and provided with sidewalks; creeks which wandered at will in the lowlands have been confined between neat retaining walls, and by precept and example the house-owners have been encouraged to build neatly and to pay more attention to the fitness of surroundings than in the past. Too much cannot be said in praise of this effort. Paint is as good a preservative as it is an ornament, and we hope that in a few years we may be able to boast as much of our architecture as we now do of our industry.

Our population has of late been augmented by a foreign element. Many immigrants from Italy, Poland, Sweden and Finland, attracted by our opportunities, have settled here, and are becoming good citizens.

Of minor industries we have our share also. To the outer man, our tailors, our clothiers and milliners appeal with success and profit, and to our inner man our bakers and butchers cater with equal pleasure, while to our reading and advertising public The Copper Cliff Courier offers its services and its congratulations in this its anniversary edition.

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Market Report.

DURHAM, APRIL 15, 1903.

Fall Wheat.....	\$ 66 to \$ 66
Spring Wheat.....	65 to 66
Oats.....	28 to 28
Peas.....	66 to 66
Barley.....	40 to 45
Hay.....	6 00 to 7 00
Butter.....	14 to 16
Eggs.....	10 to 11
Apples.....	75 to 1 00
Potatoes per bag.....	90 to 1 00
Flour per cwt.....	1 90 to 2 20
Oatmeal per sack.....	2 40 to 2 40
Chop per cwt.....	1 10 to 1 10
Live Hogs.....	6 10 to 6 20
Dressed Hogs per cwt.....	7 75 to 7 75
Hides per lb.....	5 to 5
Sheepskins.....	40 to 50
Wool.....	14 to 14
Lamb.....	7 to 8
Tallow.....	5 to 5
Lard.....	10 to 12
Clover Seed.....	8 00 to 8 65
Timothy Seed.....	2 00 to 2 65

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