

Montreal, and, with short reaches of canal connection, there is uninterrupted navigation from Ottawa to Montreal, and from the latter place to Lake Champlain. On the eastern boundary of the capital is the River "Rideau," a sluggish stream, which flows from south to north and empties itself over a precipice into the Ottawa. The "Rideau" is important only as giving a canal connection between the city of Ottawa and the city of Kingston, and thus with the great provinces of Ontario and Quebec, and the city is built on a bold limestone promontory overlooking the river, on the Ontario side. On the north side of the river, immediately opposite the city, there is the large, but sparsely populated, county of Ottawa, whose northern boundary has never been clearly defined, and which stretches far away to the Arctic Ocean. This county is immensely rich in undeveloped natural resources; its surface is dotted over with innumerable large and small lakes, and intersected by streams that abound with the finny tribes, and which will afford the most abundant water-power for manufacturing purposes, and to encourage such industrial operations nature has lavished upon the county boundless forests of oak, elm, beech, birch, maple, and other hard woods, remarkably well adapted for the cabinetmaker. But these vast sources of wealth are merely of secondary importance to the mineral riches which are now known to exist in all parts of the county. There are large deposits of variegated marble, of phosphate of lime, of barytes, galena, graphite and iron-ore, the latter of which must soon be of great commercial importance from its contiguity to the river point.

As all matters pertaining to iron and iron-ore possess peculiar interest for your readers, I will, with your permission, give you some particulars of the iron ore and its working in the county of Ottawa. So far as now known the iron bearing strata of the county of Ottawa is confined to the township of Hull, the township immediately opposite the city, but it is believed to follow a chain of small hills which run into an adjoining township. The presence of the ore in the township of Hull was discovered many years ago; and in, or about, 1857, operations were commenced by a Mr. Forsythe, of Pittsburgh, who sent ore to the furnaces there, but with what result I do not know. Mr. Forsythe disposed of his interest in the mining location, and about the year 1865 a number of local capitalists formed a company, acquired the property, and commenced operations of mining and smelting. The property comprised some 200 acres of mining land, 9,000 acres of hard wood land, distant from the mine about three miles, and land and wharf privileges on the "Gatineau," a tributary of the Ottawa. In 1866 the company erected a large blast furnace and the necessary complement of charcoal ovens near their wharf. They commenced operations with very favourable prospects before them, having abundance of ore of the richest kind, an unlimited supply of fuel in the shape of the best hard wood, with all other required material for smelting, together with the best facilities for working and for transportation of products to market; but, from causes to be explained, their working was profitless, and in two years they suspended operation. The following is a description of the furnace: height, 38 feet; diameter at the boshes, 10½ feet, and at the throat, 4 5-12 feet; the tuyeres are six in number.

When working under the company's management, the following was the charge: 19 bushels of hard wood charcoal, 450 pounds of mixed ore—black magnetic, and an ore known at the furnace as "red ore," from a slight admixture of hematite—previously calcined; 110 pounds of flux, consisting of white crystalline limestone, 65; clay, 27; and silicious sand, 18 pounds. The average yield of the furnace of gray pig iron was at the rate of 56 per cent. for the ore, while the consumption of charcoal for the ton of metal produced was 170 bush., or about 37 cwt. The cost of the iron thus produced was as follows:

For ore, fuel and wages of men.....	\$22.60
Salaries and general expenses.....	3.90
Cost of a ton of pig iron at Hull.....	\$26.50

The iron produced was used up in the manufacture of car wheels, and for the purpose it was declared to be an excellent quality; but at the prices, which then ruled, taken in connection with the high cost of production, there was no profit in working. The average yield of the furnace was about 6½ tons per day, and during the period of working some 2,500 tons were produced. It is obvious that the cost of production—\$26.50, gold—was, considering the richness of the ore, the cheapness of the fuel, and the great facilities for working, very much in excess of what it ought to have been. The quality of the ore may be understood from the following analysis of two samples, made in 1868, by Dr. T. Sterry Hunt, and embodied in his report to the chief of the Canadian Geological Survey. The first analysis was of a sample of the "red ore," which gave the following result:

Peroxide of iron.....	66.20
Protoxide of iron.....	17.78
(Equal to 58.78 Metallic Iron.)	
Oxide manganese.....	traces
Lime, as silicate.....	.76
Magnesia, as silicate.....	.45
Carbonate of lime.....	2.66
Silica.....	10.44
Graphite.....	.71
Phosphorus.....	.015
Sulphur.....	.280
	99.295

The second sample was black magnetic ore, and the analysis gave the following result:

Magnetic oxide of iron.....	73.90
(Equal to 53.20 Metallic Iron.)	
Magnesia.....	1.88
Alumina.....	.61
Silica.....	20.27
Water.....	3.27
Phosphorus.....	.027
Sulphur.....	.085
	100.042

The two kinds of ore are taken from the same mine, but that known as "red" is found only in small quantities. The analyst remarked, "It is clear that the rich ores of Hull, with proper management, should be smelted with 22 or 23 cwt. of charcoal, instead of from 35 to 38 cwt., the quantity actually consumed." This alone is sufficient to explain the failure to

produce iron profitably at Hull, where the supply of rich ore is abundant, and the quality of the iron made was excellent. I may add to this that the furnace was about two miles from the ore bed, and the wood was drawn several miles to the ovens, and the carriage of the raw material such distances must have needlessly added to the cost of production. After working two years, as I have before mentioned, the company suspended operations, and the mines rested for two years, changing hands several times. At present they are owned in great part, three-fourths, I believe, by Mr. A. H. Baldwin, an energetic gentleman, who has been largely engaged in pine lumbering operations on the Ottawa for the last eighteen years, and who has taken hold of the mining property with a determination to develop its great richness. Under Mr. Baldwin's management mining operations were resumed last spring, and before the close of navigation a fair season's work had been done. Beside a great amount of repairs and surface cleaning, 10,000 tons of fine black magnetic ore was got out and shipped to Cleveland. At Cleveland the ore was mixed with other kinds, Lake Superior, I believe, and the yield of iron was very good. Some of the iron so produced was purchased by the Car Wheel Company of Toronto, and I learn from the manager that it has given the utmost satisfaction. The Hull ore has found very great favour in Cleveland, and Mr. Baldwin has received orders for 20,000 tons at an advance of 50 cents per ton on the prices obtained this year. The work will be vigorously prosecuted this winter, and the ore drawn to the wharf in readiness for shipment on the opening of navigation. The old mine, known as the "Forsythe Mine," is situated on lot 11, in the 7th concession of the township of Hull, and the main vein of ore, where the workings are being carried on, commences at the southeast angle and runs out at the northwest angle. Recently the vein has been traced, by unmistakable surface indications, across three adjoining lots to lot 14, in the 6th concession, a distance of about one mile and a-half. Mr. Baldwin has acquired by purchase these additional lots. The main vein of ore appears to be about 40 feet in width, but there are radiating veins from this, and as the ore bearing strata is irregular and broken up, as if by some mighty convulsion of nature, it is impossible to judge, with any pretence to accuracy, what limit should be placed upon the abundance of the ore. At the farthest limit of the ore bearing strata, as far as traced, the surface is covered with large blocks and fragments of rich ore, as if they had been thrust through the crust of the earth by some violent volcanic effort. A small hill here rises from slightly swampy ground to a height of about 100 feet, exposing on the south side a wall-like face. From top to bottom of this hill the black ore is seen protruding in immense masses through the surface, and the ground all around is strewn with fragments. The base of the hill is about 130 feet in length, and it may be roughly estimated that the cubic contents are 150,000,000 feet. It is certain that the ore-bearing strata is continuous from the present working to the extreme limit of the new property, so that Mr. Baldwin has plenty of material on hand for extensive operations in mining, and smelting too, should he decide upon converting ore to iron. The prospects of making the mine a good paying concern are very encouraging. The ore is exceedingly abundant, and its richness is beyond doubt. The facilities for working are good, as the ore bed is approached from the face, or from below, and from the topography of the locality it is clear that the present working level can be followed from front to rear of the property. It is in contemplation to construct a short line of narrow gauge railway, about two miles in length, from the wharf to the mine, and the waggons may be taken into the workings and loaded from the heaps there. This will reduce the cost of handling and carriage. The facilities for reaching market with products are also good. If ore is the product, as now, it can be conveyed by boat from the wharf on the Gatineau through the Rideau Canal to Kingston, and from thence by Lake to Cleveland, at a cost of \$3 currency per ton. This leaves a fair margin of profit on the working at present prices. Considering the abundance and richness of the ore, and the facilities for working and access to market, I have no doubt but that the mine will, ere long, be a profitable property, and that the Hull ore will have very great influence upon the markets of the country.

F. C. S. R.

BURNING OF THE "HIGHLANDER" AND "HERCULES" AT GARDEN ISLAND, ONT.

Garden Island, a suburb of the city of Kingston, from which it is distant nearly two miles, derives its importance from the shipping and ship-building operations carried on there in connection with the port of Kingston. On the 8th of last month a serious fire occurred there which resulted in the destruction of two vessels representing a cash value of some seventy or seventy-five thousand dollars. Our illustration of the scene is from a sketch by Captain Dix, jr., and the particulars of the fire are gathered from the report of the Kingston Daily News of the 9th ult.:

Between half-past nine and ten o'clock on the night of Dec. 8th a fire was discovered to have broken out on the steamer "Highlander," one of Messrs. Calvin and Breck's Government Tug Line, stationed in winter quarters at the south-eastern extremity of Garden Island. The lateness of the hour favoured the destructive fire-fiend, and the wooden material composing the boat being well seasoned, and as dry as tinder, it was instantaneously enveloped in flames, which shot up in a lurid glare, from stem to stern, illuminating the whole village with a bright red light, and casting a reflection on the heavens, which was distinctly observed for miles around. The fire was quickly noticed, and exertion made to prevent its spread, as on all sides the "burning ship" was encompassed by substances of an inflammable nature which, if ignited, would in all probability have caused very serious loss. To prevent the spread of the fire, the barque "Bessie Barwick" was swung out a considerable distance from the wharf, and a safe distance from the fire. The wind, blowing a gale from the west, was fortunately in the desired direction to protect the property on land; but from a point that endangered the shipping to the port side of the "Highlander." The tug "Hercules," moored inside of the former and securely chained together, could not possibly escape the same fate, under the circumstances. With the consumption of the upper decks of the "Highlander," the fiery element was transmitted to the "Hercules," and in less time than it takes to pen the description, it was likewise a mass of flames, which at one time had assumed an intensity calculated to defeat the efforts of those who were actively engaged in endeavouring to suppress it. About eleven o'clock

several gentlemen of the city, including forwarders, captains, and sailors of vessels, and a number of others, proceeded to the ferry wharf (Kinghorn's), and procuring the attendance of Captain Hinckley, the Engineer, and hands on board, steamed across the channel by the steamer "Pierrepont." A stiff breeze and rolling sea prevailed on the lake, which caused the Pierrepont to lurch heavily, much to the discomfort of her passengers, and it was only after several ineffectual attempts to land that a line was fastened to the steamer "John A. Macdonald," which, on being slackened, permitted the "ferry" moving backward, until her stern came in close proximity to the partially destroyed craft, and allowed a steady stream of water to be poured on the wrecks. The machinery of the "Highlander" had been disjoined, and the support of the "walking beam" having burned, this immense piece of metal fell with a loud crash, and shortly afterwards the smoke stack toppled and fell against the paddle wheel of the "Hercules." At this juncture the steamer "Watertown" arrived, with a hose reel and No. 1 "Deluge" Fire Engine, from the Kingston brigade, and from this, and the donkey engines of the steamers "Hiram A. Calvin," "John A. Macdonald," "Watertown" and "Pierrepont," five volumes of water were directed upon the fire. The "Pierrepont" particularly did good service, not merely at the outset, but throughout the entire night, never once ceasing to assist in confining the flames, which occasionally threatened the destruction of the dock and buildings adjoining, until the ill-fated boat (the "Hercules" scuttled) had settled down in an apparently harmless condition. The horrors of the night were heightened by the melancholy circumstance that a young man named Charles Kelly, belonging to Cornwall, who was fireman on the "Highlander," was burned to death on board the ill-fated steamer. All the rest of the crew lived in the village of Garden Island and consequently slept on shore, leaving Kelly the only occupant of the vessel during the night. The News gives the following history of the burnt vessel:—"The tug 'Hercules' has, heretofore, had a somewhat untoward career, her boiler having blown up, while on the way from Montreal, in the 'St. Lawrence,' and killed Dexter Deline, eldest son of Mr. D. D. Calvin, M. P. P., one of her owners. Since then she was consigned to various missions—for a long period being under the direction of the Government Military Authorities as a gunboat during the Fenian excitement. She was one of the largest and most powerful tugs navigating the lake and river. Her engine, when burned, being all connected and in running order, still stands erect, and may, on that account, prove of more value than that of the 'Highlander.' The 'Hercules' was not insured. Value about \$30,000. The tug 'Highlander' has not been devoid of misfortunes. Repeatedly she had caught fire, but by promptness of action in every case, the fire had been extinguished ere it had partaken of a disastrous aspect, or accomplished much damage. Formerly she was a passenger steamer, one of the Royal Mail Line, and about nine or ten years ago she was rebuilt as a tug, running as such to the present time. There was no insurance on her (as in fact there is none on any of Messrs Calvin and Breck's shipping, they being their own insurers), and her value may be estimated at between \$30,000 and \$32,000.

GRAND DUKE ALEXIS UNDER THE FALLS.

Among the many varieties of Canadian scenery which the Grand Duke Alexis witnessed during his brief visit to this country, "under the Falls of Niagara" will probably be the most memorable. His Imperial Highness having visited Toronto, where a ball was given in his honour by the Hon. D. L. Macpherson, Senator, he left that city by special train for Clifton, where he arrived at half-past one o'clock on the 22nd ultimo. Here the Grand Duke was met by T. C. Street, Esq., M.P., and Col. Sidney Barnett. A guard of honour comprising one hundred men of the 44th battalion Canadian Volunteers, under command of Major Thomas Macklem, was drawn up to receive His Imperial Highness, who on alighting was duly saluted, the band playing the Russian national hymn. The Imperial party were immediately afterwards conducted to sleighs and driven to Barnett's Museum at the Canada side of the Falls. In one of the parlours they were enrobed in the usual India rubber dresses for the descent under the Horse Shoe Fall. On this journey they were piloted by the coloured guides in attendance, and many were the jokes cracked by his Imperial Highness and companions over their novel surroundings. The day was cold and clear, the Falls having on their best winter garb, which, as all know who have visited them in the cold season, is one of the prettiest they ever wear. The Grand Duke expressed himself highly pleased with the visit. He left Niagara for Buffalo, and thereafter went to Chicago, where he spent New Year's Day, and thence to the far North-West. He is bound to do America before leaving for home.

CLOUDED TIGER AND SATYR FOWL.

The illustration on page 45 is drawn from animal life in Nepal, a province lying to the south of Thibet. The two quadrupeds of the tiger kind are known as Clouded Tigers, a species first met with by Sir Stamford Raffles in Sumatra, to which was given the technical name of *Felis macroscelis*. In appearance the Clouded Tiger is not unlike the leopard, but it possesses one noticeable peculiarity in the fineness and length of its fur. The ground colour of the fur is a bright greyish-yellow with dark greyish-brown stripes and blotches. The throat, belly, and inside of the legs are white; head and neck striped like the tiger, and back and sides covered with large blotches, or clouds. The singular attitude of the animal in the background of the picture will at once be noticed. Such is invariably the position of the Clouded Tiger while in a state of rest. The animal chooses a convenient branch terminating in a fork. On this it lies, on its belly, with three legs hanging straight down, and the fourth curled round the fork. The Malay name for this animal is *Rime Dahau*, which being interpreted signifies the Cat of the Forked Branch, alluding to this strange predilection for forked branches.

The Satyr Bird, or horned Tragopan, (*Cerionis Satyra*) is a bird of the pheasant kind found in Northern India.

At a meeting of the Kenforth Memorial Committee held at Gateshead, England, on the 6th ult., the chairman stated that the total amount he had placed in the bank on behalf of the fund was £357 16s 3d. It was resolved to advertise for designs for the proposed monument.