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THE CANADIAN ILLUSTRATED MONTHLY

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Vol. 7

MONTREAL, OCTOBER, 1922

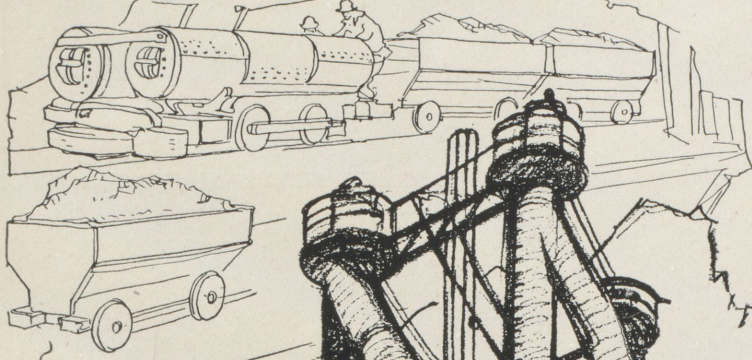
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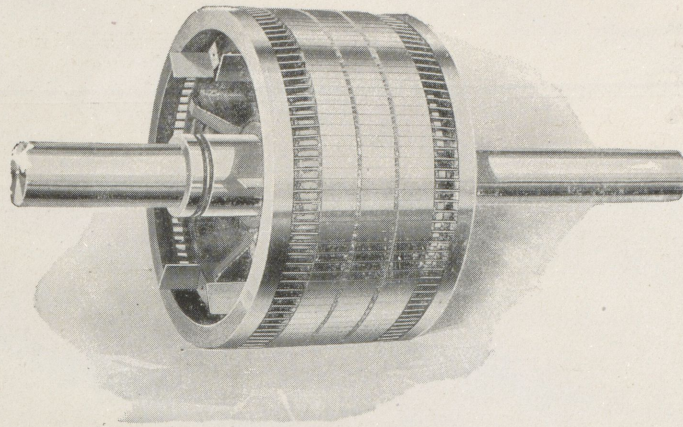
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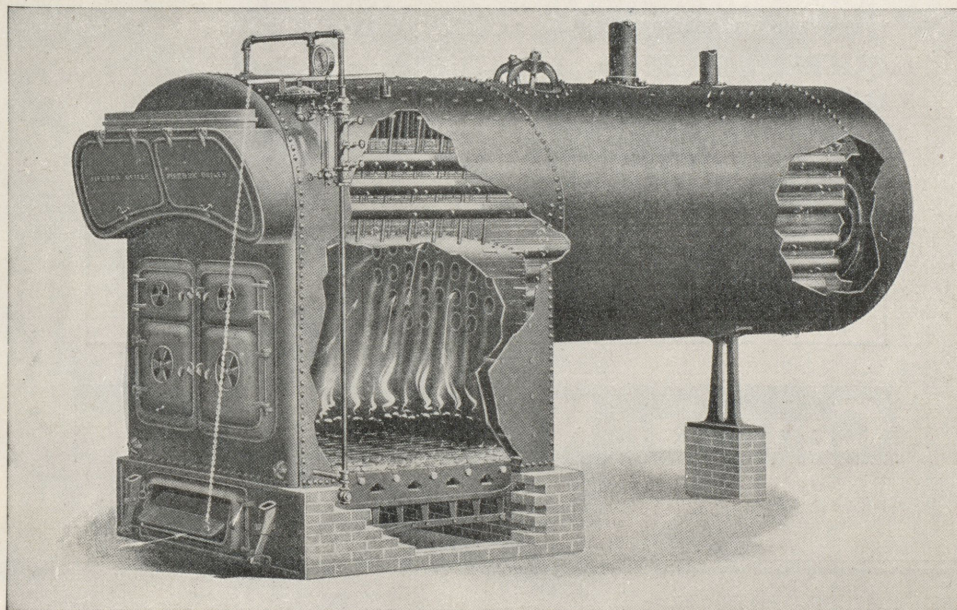
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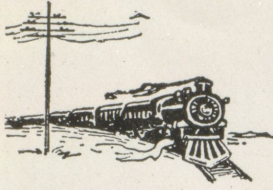
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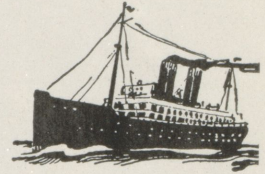
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THE CANADIAN ILLUSTRATED MONTHLY



VOL. VII.

MONTREAL, OCTOBER, 1922

No. 3

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HON. CHARLES STEWART

Minister of the Interior, Minister of Mines, Superintendent of Indian Affairs, and head of the Department of Colonization and Immigration, who is expected to inaugurate policies in the various departments he administers, that will redound greatly to the national advantage. A former Premier of Alberta, Mr. Stewart is one of the outstanding figures of Western Canada.

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VOL. VII.

MONTREAL, OCTOBER, 1922

No. 3

The Mineral Resources of Canada

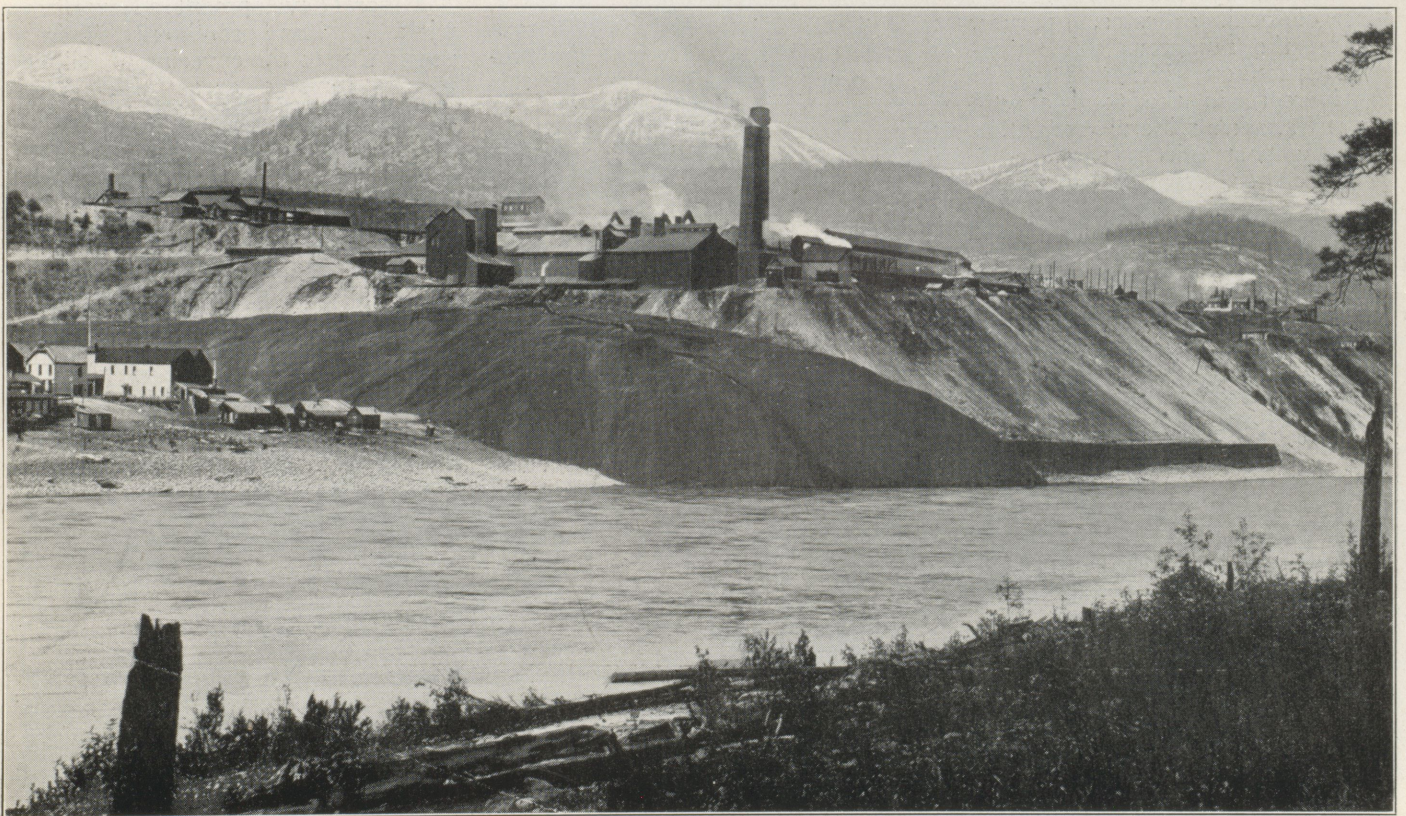
THE IMPORTANCE of mineral resources in the economic structure of a nation has been vastly magnified in modern times and has given rise to the axiom that coal and iron are the basis of industrial strength and progress. Certain it is that the great industrial development of England and of Germany, France and Belgium, in Europe, has been founded in large measure upon these resources. To coal and iron must now be added petroleum. In the possession of these three essentials of modern civilization the continent of North America stands pre-eminent amongst the world's geo-

By FRANKLIN WILLIAMS

graphical areas. Canada, occupying the northern half of North America, shares in the possession of enormous resources of coal, in large resources of low grade iron ores which are already on the verge of successful commercial exploitation, and, it is confidently hoped, in great potential resources in oil.

It is, however, in respect to other products that Canada has hitherto contributed most heavily to the world's markets. Long before the exceptional production stimulated by the war the Dominion had become

the world's principal source of nickel, asbestos and cobalt, and an important producer of gold, silver, copper, lead, zinc, and a number of rare metals. Few countries possess greater coal resources, and the Canadian production of arsenic, chromite, feldspar, graphite, gypsum, mica, magnesite, pyrites, and talc, stand high in records of the world's production. The mining areas of Cariboo, Klondike, Rossland, Anyox, Britannia Bay, Salmon River, Alice Arm, Sudbury, Cobalt, Porcupine, Kirkland Lake, and more recently the newer gold areas in Ontario, and the copper-gold-silver camps in Northern Manitoba have



A copper, lead, and zinc smelter, Trail, B. C.

PRINCIPAL ITEMS OF MINERAL PRODUCTION FOR THE YEAR 1920:

Product	Quantity	Value	Per cent of total
<i>Metallic</i>			
Nickel . . . lbs.	61,335,706	\$24,534,282	10.77
Gold oz.	765,007	15,814,098	6.94
Copper . . . lbs.	81,600,691	14,244,217	6.25
Silver oz.	13,330,357	13,450,330	5.90
Lead lbs.	35,953,717	3,214,262	1.41
Zinc lbs.	39,863,912	3,057,961	1.34
Others . . . .	.....	3,624,480	1.59
Total . . . . .	.....	\$77,939,630	34.20
<i>Non-metallic</i>			
Coal tons	16,631,954	80,693,723	35.41
Asbestos	178,617	14,734,599	6.47
Natural gas (m. cu. ft.)	16,845,518	4,232,642	1.86
Others . . . . .	.....	8,366,983	3.67
Total . . . . .	.....	\$108,027,947	47.41
<i>Structural materials, etc.</i>			
Cement . . Brl.	6,651,980	14,798,070	6.49
Clay products . . . . .	.....	10,564,929	4.68
Lime . . . Bus.	9,427,334	3,818,553	1.68
Stone . . . . .	.....	7,580,351	3.33
Miscellaneous . . . . .	.....	5,030,185	2.21
Total . . . . .	.....	\$41,892,088	18.39
Grand Total	.....	\$227,859,665	100.00

become familiar in the world's mineral markets.

The discovery of each new mineral district has been followed by great stimulation in mining activity, which, supplemented by the more prosaic mining of coal, asbestos, gypsum, salt, and the numerous other non-metallic products, has resulted in rapid increase in the total annual value of Canada's mineral production during the past thirty years.

The close of the war was naturally followed by a period of re-adjustment involving semi-stagnation in the production of such metals as nickel, copper, lead and zinc, as well as in other minerals. This depression was immediately reflected in the lessened output recorded for 1919. The year 1920 showed a quick reaction to increased output, particularly of non-metallics and structural products,

resulting in a total value of production greater than that of any previous year. This high level was not maintained in 1921, and a further depression in metal output, especially copper and nickel, with lower prices for silver, reduced the total value for 1921 to a figure below that of any of the previous five years. In view of this recent depression the diversity of Canada's mineral products is more adequately suggested by the output of the principal minerals in 1920 than by the production statistics for 1921.

The value of the mining industry to the Dominion is reflected only in a very general manner by the monetary sum of the total output, and by the variety of mineral products which contribute to the aggregate. Perhaps the best indication of its importance as a national asset and as a source of economic strength is furnished by the

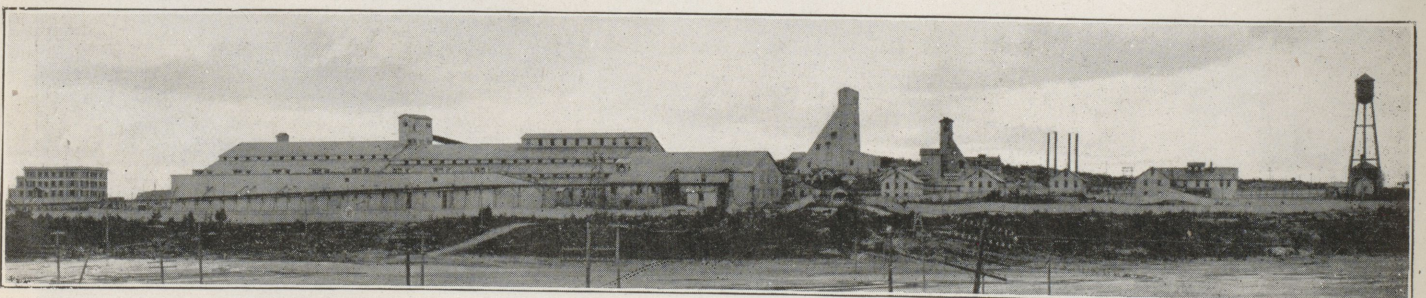
fact that the mining industry is credited with over 35 per cent of the total tonnage carried by Canadian railways. It is significant to note also that, as a result of the wide distribution of mineral resources, five of the nine provinces of the Dominion share substantially in mining activity, although Ontario leads her sister provinces by a considerable margin.

Important deposits of coal, iron, gold and gypsum are mined or quarried in the Atlantic coast province of Nova Scotia. There is a considerable production of clay products, limestone for furnace flux, sandstone for building purposes and for grindstones. Granite and manganese, antimony, tripolite, barite and salt are also mined, while some attention has been paid to copper and lead ores.

The most important mining development in Nova Scotia is in coal, and upon this is based the large iron and steel industries of Sydney and New Glasgow. The iron ores are brought from the Wabana mines in Newfoundland. The close association here of one of the largest iron ore deposits in the world with enormous coal resources and necessary fluxes all conveniently situated on the Atlantic seaboard, may well become in future a controlling factor in a large portion of the world's iron and steel trade.

Mineral development in New Brunswick is less prominent. This is partly due to the covering of soil, and to the forested areas which make prospecting difficult. The principal mineral products are iron, gypsum, natural gas, lime, coal, building material, grindstones, clays and mineral water. Antimony, manganese and albertite have been important, while copper, lead, silver, nickel, gold and other minerals have been found. Shales rich in oils and ammonium salts occur in large quantity.

The main asbestos mines of the world are found in the southeastern portion of Quebec, and other important industries are carried on in chrome



The Timmins-Hollinger Mine, which has returned more wealth to its owners, perhaps, than any other gold, mining property in Canada

Photograph, courtesy Canadian Pacific Railway

iron ore, copper, pyrites and the quarrying of granite. Iron ores and gold also occur.

The southern portion of Ontario and the valley of the St. Lawrence, designated as the St. Lawrence Lowlands, are covered mainly by flat-lying Palæozoic rocks. The mineral products include clay, cement, slate, lime, limestone and sandstone, petroleum, natural gas, salt, gypsum and other non-metallic products.

The country extending from Labrador on the east, enclosing the Hudson Bay basin, and referred to as the Laurentian Plateau region, consists of a huge U-shaped area of pre-Cambrian rocks, estimated to cover 2,000,000 square miles, or over one-half of Canada. This region occupies nearly all but the most southern portions of the provinces of Quebec, Ontario and Manitoba. The rocks of the Pre-Cambrian are remarkable for the variety of their useful and valuable mineral deposits. Iron, copper, nickel, cobalt, silver, gold, platinum and palladium, molybdenum, lead, zinc, arsenic, pyrites, mica, apatite, graphite, feldspar, fluor spar, quartz, talc, actinolite, the rare earths, ornamental stones and gems, building materials, etc., are all

found, and are, or have been, profitably mined. Most of the other materials—both common and rare—that are used in the arts, have been found, and the mineral output of the province of Ontario is unusually diversified.

Along the southern edge of the Laurentian Plateau region in Canada there are known the gold ranges of the Lake of the Woods, the silver of Thunder Bay, a succession of iron ranges extending from Minnesota for hundreds of miles to Quebec, copper rocks of Michipicoten and Bruce mines; the Sudbury copper-nickel deposits, the Montreal River and Cobalt silver areas, the Porcupine, Larder Lake and Kirkland Lake gold fields, the corundum deposits of eastern Ontario, the magnetites of eastern Ontario and Quebec, and their large apatite-mica deposits.

The western end of the Pre-Cambrian region extends across the northern portion of Manitoba and Saskatchewan. Prospecting in these provinces has already been rewarded by a number of important discoveries. Large numbers of claims have been staked for gold, and several mines are under development, but the most important discoveries have been the

copper-zinc sulphide deposits at Flin-Flon Lake and Schist Lake. The Mandy mine at Schist Lake has already shipped a considerable tonnage of high grade copper ore, and the Flin-Flon property has been extensively drilled, proving an ore body of about 16,000,000 tons. With transportation and smelting facilities provided, a large mineral area may be actively developed, but as yet Manitoba and Saskatchewan do not possess extensive mining activity.

It is a safe assumption that this great northern area, still almost entirely unexplored and but slightly prospected, contains vast stores of mineral wealth which will become available as the country is opened up.

This area includes the greater portions of Manitoba and Saskatchewan, which lie outside of the Pre-Cambrian, and the province of Alberta. It is pre-eminently agricultural, but in addition to furnishing an important market for the product of the mine, will have a large output of non-metallic minerals. It is underlain for the greater part by sedimentary rocks, chiefly of Cretaceous age, containing coal, building stones, clays and cement materials. The lignite

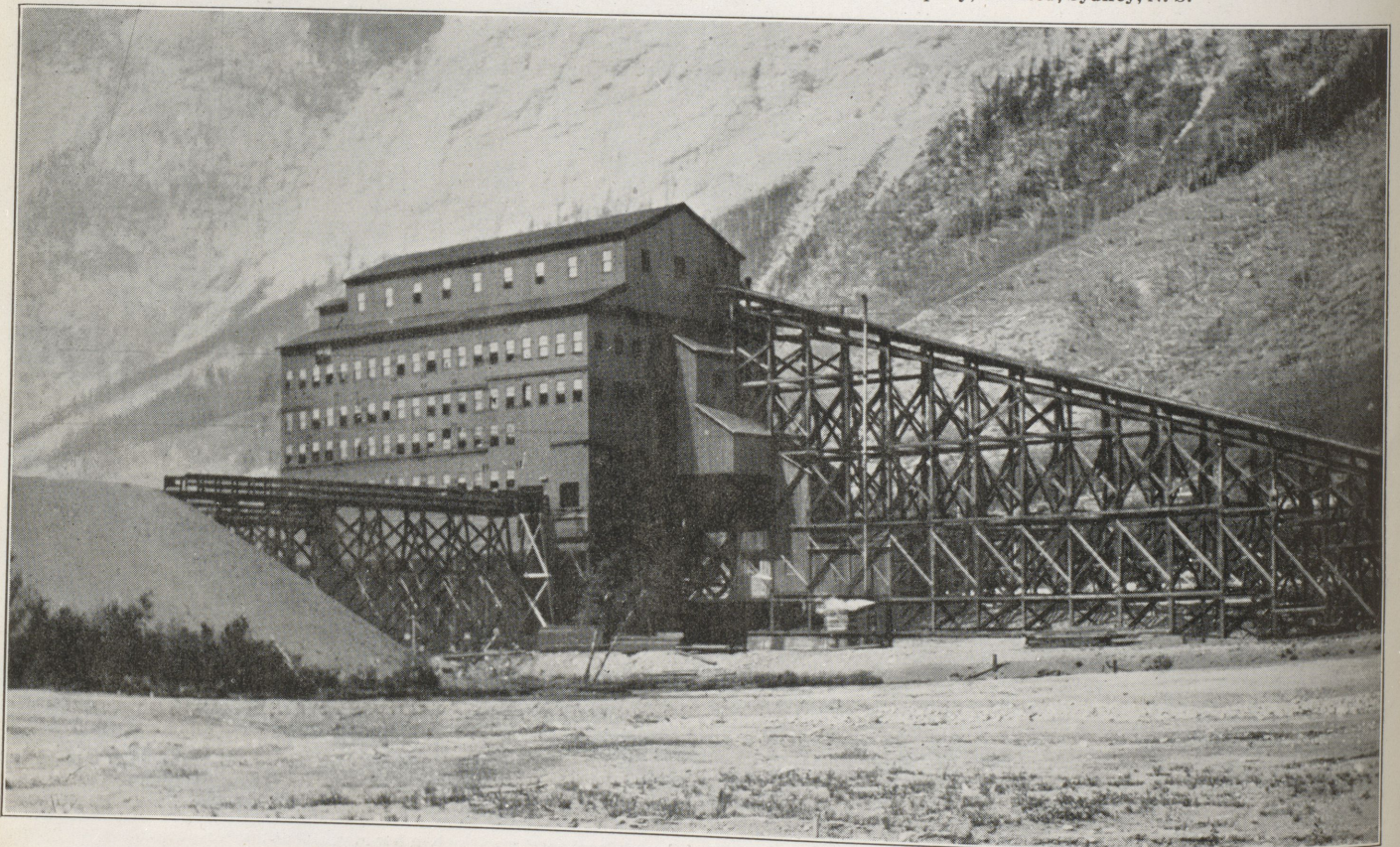


Photograph, courtesy Canadian Pacific Railway

Nothing will contribute more effectively to the development of Canada's mineral wealth than her magnificent water-powers



A view of the ore-discharging docks of the Dominion Iron & Steel Company, Limited, Sydney, N. S. *Photograph by S. J. Hayward, Montreal*



A view of coal breaker, Bankhead Collieries, Bankhead, Alta.

NON-METALLIC

Year	Metallic	Fuels and other non-metallics	Clay products and other structural cement, lime, stone, etc.	Total	Value per capita
1890	\$ 3,614,000	\$ 9,137,000	\$ 3,761,000	\$16,762,000 (a)	\$ 3.50
1900	40,521,000	17,226,000	6,372,000	64,419,000 (b)	12.00
1910	49,438,000	37,757,000	19,627,000	106,822,000	14.64
1914	59,386,000	43,467,000	26,009,000	128,862,000	16.75
1918	114,549,000	77,621,000	19,130,000	211,300,000	25.37
1919	73,262,000	76,002,000	27,421,000	176,685,000	20.84
1920	77,939,000	108,027,000	41,892,000	227,858,000	26.40
1921 (c)	52,580,000	89,405,000	30,342,000	172,327,000	19.61

- (a) Includes \$250,000 credited to products not reported
- (b) " " \$300,000 " " " " "
- (c) Preliminary estimate Dominion Bureau of Statistics, Feb. 23, 1922.

of the more eastern plains, useful for local purposes, becomes more highly bituminous as the mountains are approached. The known coal reserves in Alberta are greater than in any other province, being estimated at 1,072,627,000,000 metric tons. Natural gas occurs over wide areas, and there is every indication of the existence of oil fields. Intensive prospecting for oil is now being carried on by large Canadian and British corporations. Enormous deposits of tar sands have been found in northern Alberta, gold in a number of the rivers coming from the mountains, and clay ironstone occurs in many parts of the Northwest.

Coal has been the principal product in Alberta and Saskatchewan, and natural gas has been extensively used for many years in the former province. Gypsum has long been quarried in Manitoba, and salt was also formerly recovered from brines. Drilling for salt is now in progress in Alberta. Natural deposits of sodium sulphate in Saskatchewan and Alberta are attracting considerable attention, and a beginning has been made in marketing the product. The white clays of southern Saskatchewan are being used for the manufacture of more or less refractory products, and will eventually be the basis of large ceramic industries.

As we all know, British Columbia and the Yukon owe a large measure of their prosperity to mining. The Cordilleran belt, in South America, in Mexico and in the Western States is recognized as one of the greatest mining regions of the world, noted principally for its wealth in gold, silver, copper and lead.

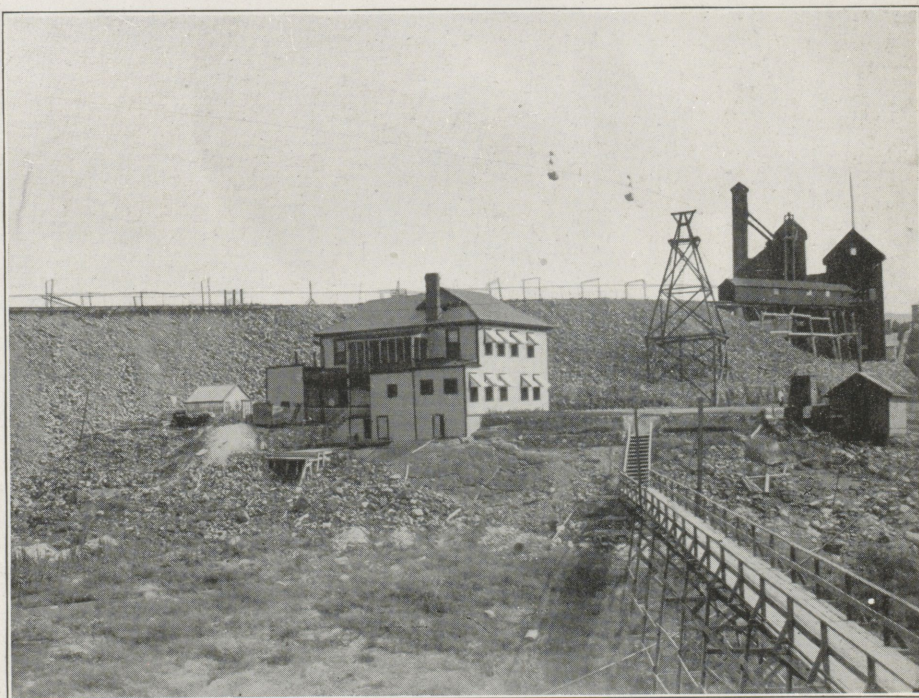
In Canada this belt has a length of

1,300 miles and a width of 400 miles, and its rocks range from the oldest formations to the youngest. It is not only rich in gold, silver, copper, lead and zinc, but has enormous resources of coal of excellent quality, varying from lignites to anthracite. Though mostly unprospected, it has already been proved to possess the greatest coal fields, several of the greatest copper and silver-lead mines, one of the greatest zinc mines, and two of the greatest placer camps in western America.

The coal fields of the Crowsnest Pass district, and the coking ovens at Fernie and Michel have supplied fuel

for the smelting industries of southern British Columbia, and of the adjacent states to the south. The Vancouver Island coal mines have supplied metallurgical fuel and domestic and steam coal for home consumption and for export.

The metalliferous ores of British Columbia are highly complex. Hitherto the production of silver-lead-zinc ores has predominated in the Kootenay districts, gold-copper ores at Rossland, low-grade copper ores in the "Boundary District," and copper ores on the coast. In the Sullivan mine at Kimberley upwards of 6,000,000 tons of lead and zinc ore are claimed to have been developed, from which a large tonnage is shipped annually. At Trail a series of smelting and refining plants produce refined gold and silver, electrolytic lead, copper and zinc. The Rossland camp has had a varied history. Its ores are primarily gold ores, supplemented with a small copper content. Recent improvements in ore concentration methods and extensive ore development seem to ensure many years of further successful operation. At the Copper Mountain properties, near Princeton, a large mill has been erected, the concentrates being sent to Trail for smelting. On the coast enormous bodies of copper ores have been developed at Britannia Bay and at Anyox. At the latter point a large smelting plant, in operation since 1914, is now producing upwards of 30,000,000 pounds of copper per

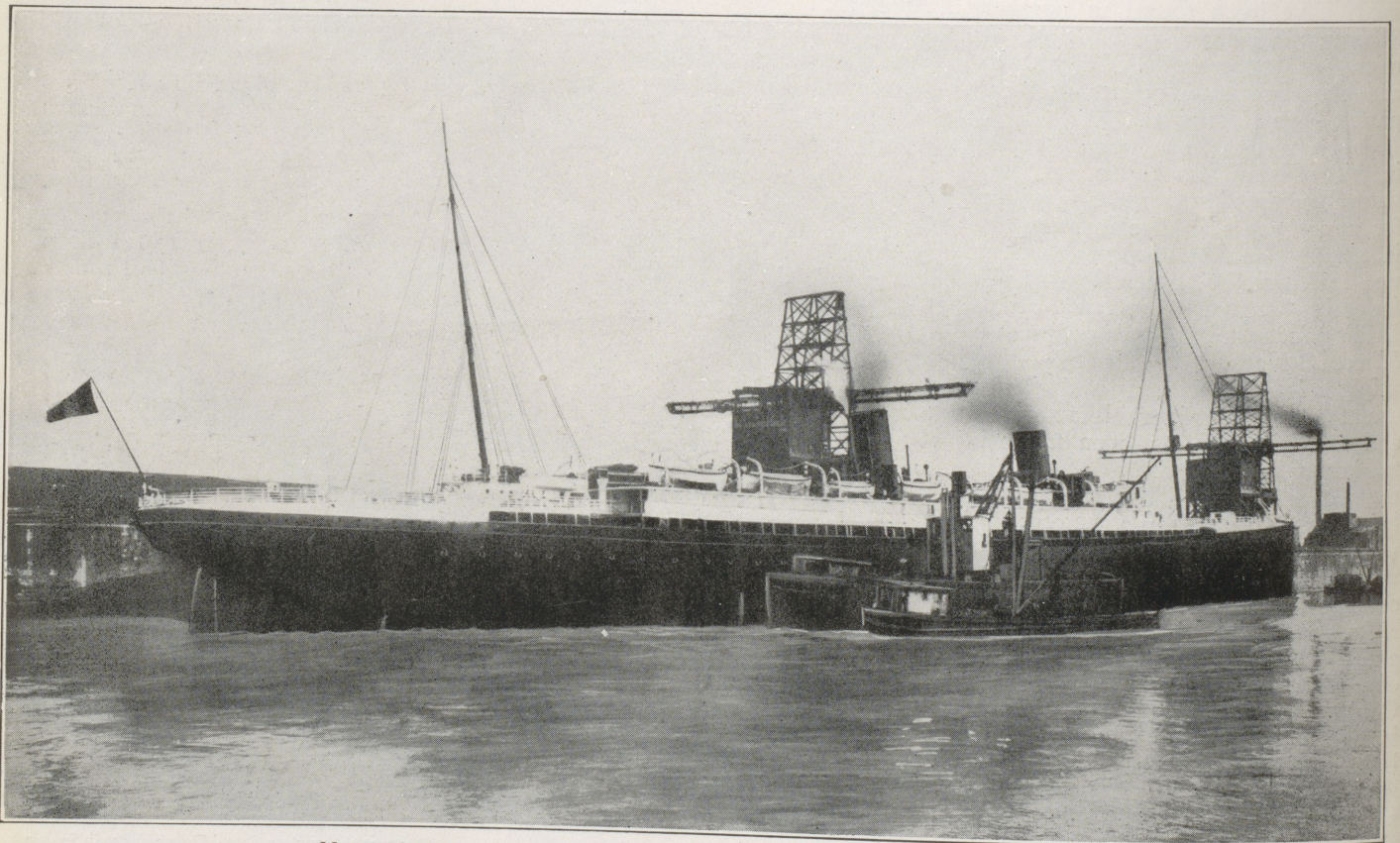


Photograph, courtesy Grand Trunk Railway System
A general view of the Kerr Lake Mine, Cobalt, showing ore conveyors



A scene in the Crow's Nest District, British Columbia

Photograph, courtesy Canadian Pacific Railway



Montreal Discharging Plant of the British Empire Steel Corporation Limited



An unusually good specimen of crystallized asbestos

annum. A complete by-product coking plant has been erected, the operating company having acquired its own coal areas on Vancouver Island. Various properties on the coast give promise of large silver and gold production while iron ores have been found at different points on the coast and in the interior.

The Yukon district has held attention in the past chiefly because of its rich gold placers. Copper, silver and lead ores have been mined, however, and many other metals have been found. Coal has been found both in the southern and northern areas. At present attention is being centred on phenomenally rich silver-lead ores near Mayo.

The Northwest Territories are believed to possess great latent mineral resources. Those to which attention has already been directed include the native copper of the Copper-mine River country, the iron ores of Belcher Island, gold and zinc near Great Slave Lake and petroleum in the Mackenzie River basin below Fort Norman.

A very large portion of the mineral production of Canada is exported for consumption or refining outside of Canada. On the other hand, considerable quantities of mine products are imported, chiefly those which have been refined or subjected to partial treatment, or in the form of manufactured goods ready for consumption. For economic or geographic reasons Canada is also a heavy importer of coal and iron. Suf-

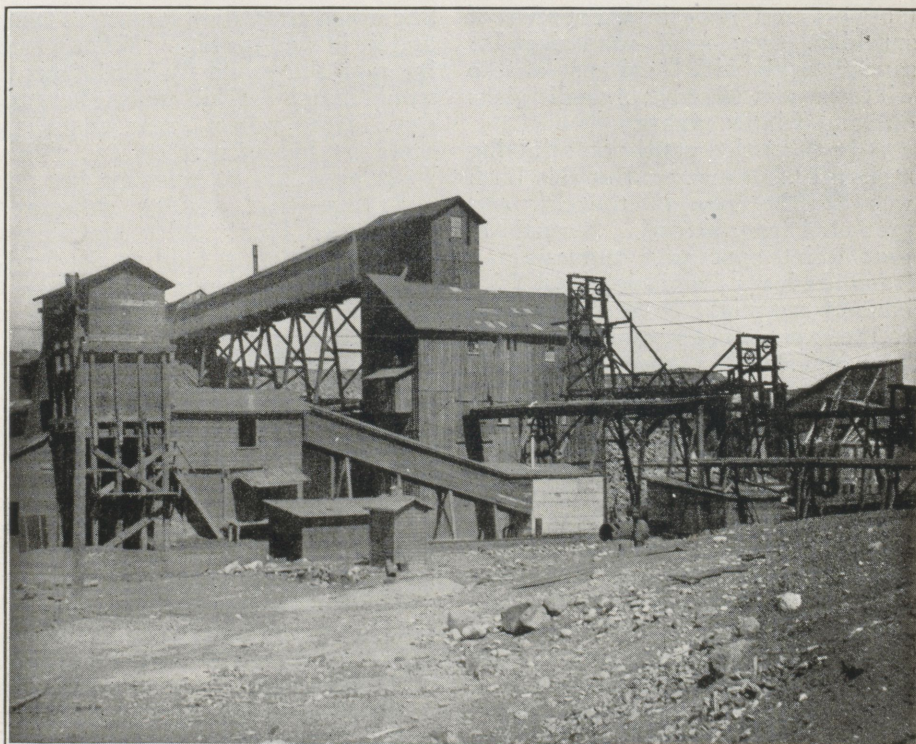
cient domestic resources of petroleum have not yet been developed and tin is obtained entirely abroad.

Of the total exports in 1920 about \$60,000,000 can be attributed to metals either in crude or refined metallic form or contained in ores or some form of metallurgical product exported for further refining. These include pig iron, ferro-alloys, steel

billets and ingots, aluminium, cobalt, copper, lead, nickel, zinc and gold and silver. About \$38,000,000 is attributed to asbestos, coal, mica, and various other non-metallic minerals and approximately \$12,000,000 represents chemical products, such as cyanamid, calcium carbide, ammonium sulphate, etc. The balance of over \$83,000,000 is made up largely of manufactured products, chiefly manufactures of iron and steel, such as agricultural implements, machinery, boilers and locomotives, automobiles, steel rolling mill products and wire.

The imports of the Dominion annually include a great variety of mineral products. The value of mineral imports increased rapidly during the ten years preceding 1913. The next two years, however, witnessed a falling off, but in 1916 imports again increased to a value almost equal to that of 1913. It is significant to note that of the total mineral imports during 1920, amounting to over \$482,000,000, about \$250,000,000, or more than half, was accounted for by iron and steel goods, and over \$151,000,000, or approximately 31 per cent, by coal, coke and petroleum.

The future development of the mineral industry will undoubtedly go hand in hand with the growth of population, the opening up of new districts for settlement, and the building of railways or the provision of other means of transportation.



A mine head, Copper Cliff, Ontario
British & Colonial Press Photograph

The Feud of the Lone Pine Range

By William Byron Mowery

THE hot August sun threw a round patch of yellow on the moss-covered rock before the lynx den. It trickled down in drops and splashes in many places in the dark woods; but only the mossy rock was covered with the golden flood. The old lynx that spring had glanced upward at the rift in the trees. She had noted the round hole through which the sun would shine; and had fashioned herself a home at the base of the cliff, awaiting such time as the "gods of the wilderness" would bring her those creatures whose feeble, tottering steps and helpless, furry bodies would need the life-giving, mellow sunlight to bask in and grow large and strong.

Now on the rock, two little, tawny, slit-eyed kittens were rolling about, purring on the soft carpet and playing with one another. Their play was like the play of all childhood—a preparation for the future struggles of real life. As they boxed one another, sprang forward and jumped backward, and fell over helpless in order to seize the unwary adversary as he came up to finish his foe—as they played at real fighting there on the moss-covered rock in the patch of sunshine, they were preparing for savage fights with denizens of the wild down in silvered, moonlit glens on long winter nights.

A bush rustled gently on a jutting rock, fifty feet away. But this bush was at the base of the cliff and protected from breezes. A rustle in that quiet spot was ominous and fraught with possibilities. A faint haze of red might have been visible to the experienced eye of the mother lynx, had she been there on the rock. But she was down by the stream fishing for juicy young trout; and the kittens were engaged heart and soul in a stirring play of ham-stringing one another.

The faint haze of red faded from view. A minute later, from another direction, a fox drew warily near the rock, keeping a laurel bush between himself and the kittens. He stopped and sniffed the air, glancing sharply around him into the bushes and down across the hillside. She, his enemy, his competitor in the hunting of the Lone Pine Range, was not about. Had he not seen her himself, half an

hour before, lying on a log by the water, flipping trout out of the water? She was down there yet. Perhaps she was finished with her fishing, and was rolling in the beds of delicious catnip that grew by the creek bank.

The fox drew nearer and eyed the mossy rock closely. It was not the first time that he had watched the kittens at play; but never so near as he was now. He had always kept a safe distance away, for never before had he seen the kittens unguarded. The father lynx had relieved the mother at watching them during the first three months of their lives; but he had gone back now to his range across the hills to Bald Rock; and the mother was forced to leave them for quite long stretches while she hunted to supply herself and their voracious appetites that were now demanding an incessant stream of small game and fish.

The old fox deliberated a moment. Was the sport worth the risk? The old lynx would fly into a terrible rage. She would track him, hound his steps, and lie in wait for him. What a fuming rage she would fly into! But he would match his skill against hers any day. Here was a great chance to score on his ancient enemy. What sport he would have letting her pursue him—that stubby tuft-eared, green-eyed lynx! With him it was not a question of food at all; for he was full from a nest of young rabbits he had found down in the creek bottom that morning. It might be a question of food the next winter, when snow would cover the range and starving wolves would sweep down from the Alaskan woods and clean the valley out of game. The Range might not then comfortably support three lynxes and a fox. But that was not the point; the point was the huge prank he would be playing.

The kittens had got tired of their play, and were lying quiet in the sunlight. A red flash darted out of a bush and seized one of them by the neck. The kitten struggled valiantly, like the young fighter he was, until a sharp snap, a peculiar twist of the gleaming jaws, ended his kitten life.

The other, warned of danger, spat viciously at the red marauder and struck at him with bared claws as he dropped the body of the playmate and turned to complete the work. The wizened old killer deftly avoided the tiny claws. His gleaming sharp teeth cut short the brief life of this lynx kitten as they had done that of its playmate.

The mother returning along the cliff felt strangely uneasy. There was a peculiar something in the air that she did not like. She sniffed anxiously, and at last broke into a run as she neared the rock and came across the warm scent of the crafty enemy. As she sprang around the corner of the ledge, the fox dropped the warm body of the second kitten and leaped to the cover of a laurel bush.

With a screech she darted after him, in her rage forgetting that the red fox is the swiftest thing that runs, and that she could not hope to catch him. But only after an hour of idle chasing did her mother instinct lead her to return and bemoan the desolation the red killer had wrought.

From that afternoon there was a deadly feud on between the fox and the lynx. The fox was first made to realize the bitter hate of the lonely, morose mother lynx when, one afternoon as he was leisurely sauntering along, a tawny form launched itself from a tree at him; and only a sharp twist and a great leap took him clear. Thereafter he watched all trees, looking above him as carefully as he had formerly looked on all sides whenever he slipped through the dim woods.

He had to stop going into holes. One night, chasing a snowshoe rabbit into a den, he went in, killed the rabbit, and was feasting hugely when the evil scent near at hand came to his nostrils. He sprang a clear thirty feet out of the hole over the back of a tuft-eared, tawny form that snarled malevolently and disappointedly at him as he darted away. Hunting or sleeping, playing or plotting, he kept out of the clutches of his foe by eternal watchfulness alone.

When the October frosts killed the weeds, the hounds and hunters came into the hills, as they always came up from the city in the fall. The feud of the fox and the lynx was stopped for

a while. The hunters had been told that there was a large lynx hunting over the Lone Pine Range; and day after day they set the hounds after her. The hunt grew so hot that one night she slipped away, crossed the ridge, and took up her range in a large ravine near the Bald Rock territory of her mate. The fox, slipping unwatched and undisturbed through the woods of the old range, concluded that his enemy had either fallen before the smoking sticks of the hunting party or had been frightened away. He exulted, thinking the range was all his own now.

But with the first fall of snow and the retreat of the hunters into the lower valley and back to the city, the lynx crept back over the divide, and took up the trail of the murderer in dread, secret earnest. From hidden rocks she watched him, carefully noting his ways and his wiles. For a whole week she trailed him trying to find his hidden den. When at last she did find it, and lay in wait long hours to catch him inside, he wined her on his return. He changed his abode and the hunt began again.

The heavy snows fell all through November; December blizzards raced down from the North; the many-colored lights played in the cold heavens but still the feud went on, with the cunning and fleetness of the killer matched against the persistency and bitter hate of the lynx.

She knew that be the red slayer ever so fleet and cunning, there would come a time when for a second he would relax vigilance. That would be her second, her chance to avenge the wanton killing on the mossy rock that August morning.

As the snows piled deeper and deeper in the forest and over the Range, seeming to bury all the wood life save that of the great snow-shoe rabbit and of the partridges, the lynx adopted another method of harassing her foe. The rabbits had been the sole means of subsistence of the fox. He could not stalk the wary partridges in the daytime; and at night they slept in trees beyond his reach. In her dim way, the lynx, coming across him time and again as he was feasting on a rabbit, connected the rabbits with the welfare of the marauder; and waged against them a war of extermination.

Up and down the snowy pathways of the woods where the rabbits came on cold, moonlit nights to scamper and to browse on sprouts above the snow, the lynx prowled vengefully, slaying, frightening, driving away. A whisper went up and down the

glades that evil spirits were abroad in the forests and that safety was to be had only in other woods and ranges. In a few weeks game became scarce on the Lone Pine Range.

Many a night the fox roamed up and down the ravines and around the cliffs without getting a scent of meat. Many a rabbit he would trail patiently only to find that his hated pursuer had cut in on the trail and had caught the prey he was hungering for.

He was constantly on the hunt to get a bare subsistence. He dared not open his caches yet, for the long winter had just fairly begun; and there would come times of much greater want before the long frozen stretch was done. Had it not been for these caches of game, he would have left the old Range, and put miles of forest between him and the evil shadow of his enemy.

A pack of wolves swept through the Range one night; and finding it a good place sheltered from the northern blasts, remained there a week hunting. When they left, the fox ranged up and down the whole valley without finding one single rabbit. Only towards morning, as he drew near his hidden den at the end of a ravine, he started one out of a laurel clump. It darted away in the gloom like a soft shadow.

With half a dozen great leaps the fox seized it. As he lay lapping up the warm blood that trickled down and stained the white snow crimson, he heard a bough gently brushed aside behind him. He sprang twenty feet over a snow drift just in time to avoid the vicious swing of a springing lynx. As he darted away in the twilight and knew that his foe behind him was enjoying the meal he had won, he just then realized the price—part of the price—he was paying for the murderous deed that August morning on the sunny rock.

The caches were opened one after another. But always the green-eyed pursuer would trail him up, and scatter or destroy them. All the wiles and cunning that are the inheritance of the Reynard clan were useless against the constant, inexorable pursuit of the tawny, hated form.

Of rabbits there were no more on the Range. The fox had to begin hunting partridges, a thing he had never done before except in idle sport. In the daytime he could not get within springing distance of them; but at night when they went to roost in a low-hanging tree he could jump into the lower branches, frighten them out, and pursue them through the woods

until they plunged down into the snow. A partridge, he well knew would dart six or eight feet into a drift; but a patient search could always find it.

One bright, cold midnight the fox stepped down a centre aisle in a pine grove. He stopped and sniffed the air, licking his chops anxiously. The wind bore the scent of warm-feathered partridges, and the fox was desperately hungry. He crept down the wind after the scent. It came from a low crab-tree at the edge of the pine grove.

He looked up through the tree silhouetted against the bright sky, and saw the birds huddled up against the bowl of the tree, only a foot or two above his reach. But on a lower limb well within jumping distance he spied a lone bird.

As the jaws of the springing fox closed over the bird, it seemed to wriggle out of his mouth. It fluttered a moment in the branches, escaped from the tree, and whirred toward a snow-bank down the aisle. The fox followed swiftly and softly. He knew these tactics—he had followed many a partridge in the last few weeks, had plunged into the snow-bank and caught it.

He looked at the small round hole in the drift with hungry eyes. The drift was deep, the bank wide; but his keen nose could follow the bird however deep it had shot down into the fluffy depths. He dived down into the snow-bank, following the course of the partridge.

A pair of small green eyes peered banefully out from a shadow in the pine-woods. A tawny form glided on its belly over the snow toward the drift. It crept nearer and nearer until it crouched at the very edge of the opening where the fox had dived down.

Then with a screech that split the cold air and set the snow-birds in the pine-trees twittering in alarm, the lynx plunged down into the snow and closed with the trapped fox.

For a moment there was a fierce struggle in the darkness of the snow depths. The snow heaved and boiled.

Then, as a brilliant flash of red flared down from the North, painting the sky with blood; and as a lone wolf up under the great Lone Pine at the top of the ridge howled in mournful cadence with other wolves up and down the valley, a tuft-eared form sprang out of the drift, clawed a wisp of red fur from her teeth, snarled down into the hole for a last time, and then merged silently into the soft shadow of the forest twilight.

The Mining Industry and Our Great Railway Problem

By CHAS. CAMSELL
B. Sc., F. R. S. C.

Deputy Minister of Mines for Canada

FROM THE ATLANTIC TO the Pacific, there is not an intelligent person in this country today who does not fully appreciate the fact that the great problem confronting us as a people is that of our National Railways. Not that railway problems are a new thing to Canada, for we have had one with us ever since the days of Confederation. It is, however, more acutely realized by the mass of the people today, since we have taken over, and are operating as a National undertaking, one of the greatest railway systems of the world, with a mileage of over 20,000 miles. The problem is appreciated more fully at the present time because the burden is borne in taxation by every individual in the country, and when this burden is added to that forced upon us as a consequence of the war, it becomes no light one to carry.

In administering the affairs of a government department designed to assist in the development of the min-

ing industry of our country, an appreciation of this problem has led me to consider the relationship of the mining industry to railways generally, and to enquire what bearing this industry might have on the solution of the problem.

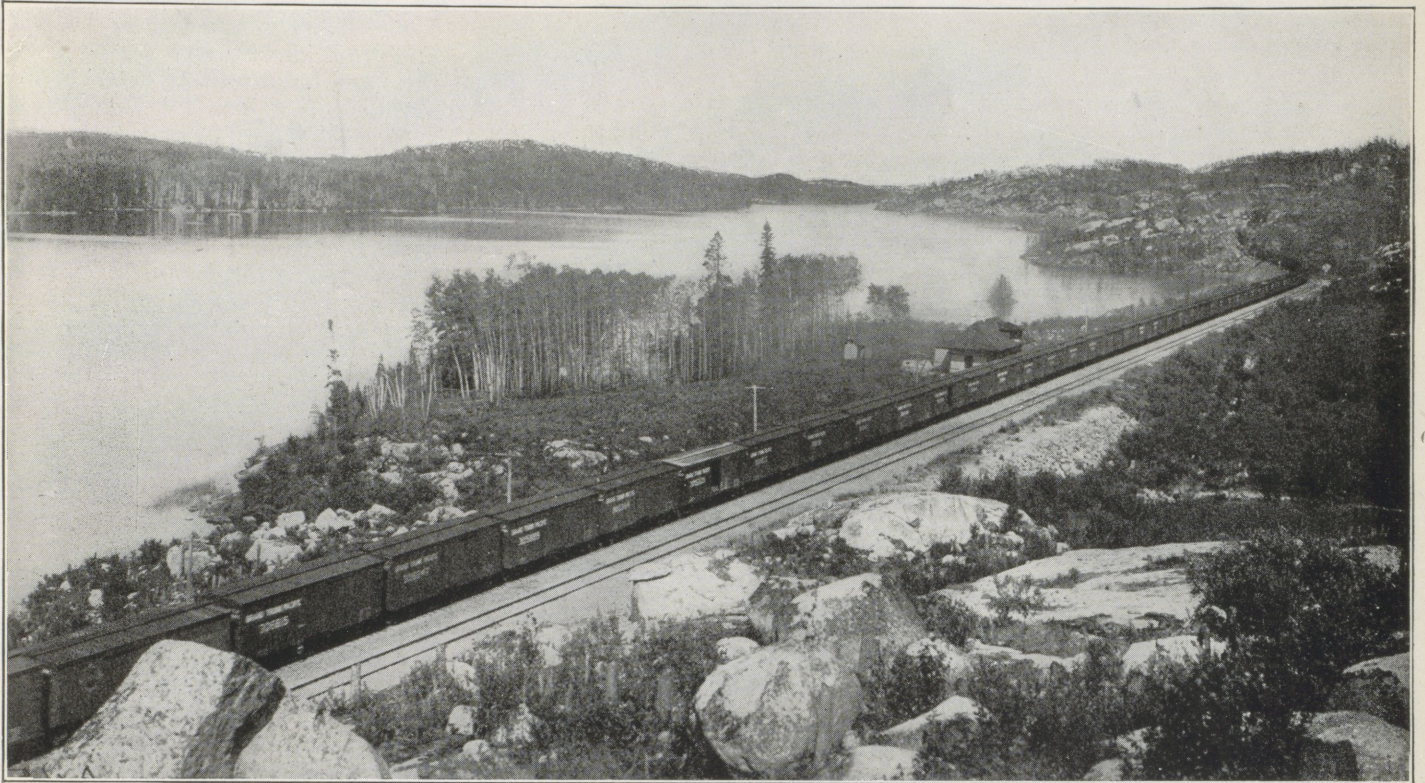
Those of us who have been more or less closely connected with the mining industry have always recognized the importance of railways, or other transportation facilities, to that industry. The railway companies, on the other hand, do not yet appear to appreciate the full importance of the mining industry to the railways. The fact that in nearly every country in the world the mines furnish far more freight than any other industry, in addition to providing the power by which all freight is carried, is proof of the importance of the mining industry to the railways. It is time, therefore, that there was a more thorough appre-

ciation of the inter-relationship of the two industries, of the mutual character of their interests, and of the necessity for the closest co-operation between them.

The Federal Department of Mines has long recognized the close relationship that must exist between the mining industry and the railways before the former can be developed to its fullest extent; and, recognizing this relationship, geological surveys have been carried on for years back along the various lines of the Canadian Pacific, what are now the Canadian National Lines, the Pacific Great Eastern, and other railways, as well as along the shore line of the Pacific coast, where, if any mineral discoveries were made, advantage could be taken of the steamship service between Vancouver and north Pacific points. The policy of the Department in this direction is still being carried out, though it will be some years yet before all the railway routes are covered.



The Princess Colliery of the British Empire Steel Corporation, Sydney Mines, N. S. The movement of coal is one of our railroad's chief sources of revenue



It is from this character of country that the railroads derive a large portion of their mine traffic

In Canada, coal represented in 1919, about 24 per cent of the total tonnage carried by the railways, but apart from, and in addition to, this, the mining industry furnished in that year, in raw materials and in partly manufactured products about 20 per cent of the total freight, an amount greater than that furnished by the industries of agriculture, or forests, or animals. Mine products, therefore, constitute a very important part of the total Canadian railway freight. Even a layman knows that freight traffic is more profitable to railway companies than is passenger traffic, and, since the mining industry furnishes such a large percentage of the total tonnage carried, it follows that the more highly developed the mining industry of this country becomes, the more will our railways benefit by it. No argument therefore, should be necessary to convince the railway companies of the necessity of encouraging mining development in the territory tributary to their lines.

The United States has probably the most highly developed and diversified mining industry of any country in the world, and in the year 1919 this industry furnished in raw mineral products, over 50 per cent of the total tonnage carried by the railways of the country. Moreover, the relative contribution from the mines appears to have been particularly low in 1919.

About ten years ago the late E. H. Harriman made the statement that the mining industry furnished 58 per cent of the railroad tonnage of the United States. Since that time the Interstate Commerce Commission has found the same percentage, and quoted it in its reports. The last available United States statistics that I have seen are those for the last three months of 1920, in which period the figures for mine freight stood at approximately 58 per cent, and if to this is added the partly manufactured mine products mentioned above, the total tonnage furnished by the mining industry of that country is brought up to 69 per cent. Not only did the mines, for that period, furnish more than twice as much tonnage as all other industries combined, but what is of greater importance, they utilized, in carrying this tonnage, only 53 per cent of all cars employed in carrying revenue freight in carload lots, thereby providing to the railways the most economically transportable tonnage.

Thus it can be seen readily that not only are railways necessary to the mining industry, but that a highly developed mining industry is of vital importance to the railways. It is evident, therefore, that far more consideration should be given in the future by the people of this country to the bearing of the mining industry on our railway problems than has been

given in the past. In fact, except by a very few mining men, and that privately, I have not observed that much consideration has been given publicly to this relationship. To my mind the development of the mining industry, as a partial solution, at least, to our railway difficulties, is exceedingly important. Consequently, one of the questions that should be considered in this connection is, what steps should be taken to develop the mining industry in order that such development may accrue to the benefit of our railways?

The numerous doctors who have prescribed for our railway ailments have given little or no weight to the bearing that the mining industry might have upon it. In recent years, plans have been discussed by mining men, and governments have been approached, to train returned soldiers as prospectors and to outfit them for the exploration of certain promising fields along the lines of railway; but, so far, British Columbia is the only province that has done anything in this direction. This action, however, was not prompted by any desire to assist the railways, but partly as a re-establishment scheme for returned men, and partly to re-establish the mining industry by developing a type of individual that had almost become extinct, namely, the prospector.

Increased population is no doubt



Photograph, courtesy Grand Trunk Railway System
The shaft of the famous Kerr Lake Mine, Cobalt, Ont.

the fundamental solution of our railway problem, but it is well to draw attention to the fact that increased agricultural population will not fully solve this problem. We have to remember that our National railways traverse vast tracts of country that cannot support any very appreciable population by agriculture alone. Even a very superficial knowledge of the country through which our railways run will convince anyone that the most important industry, and in some parts of the country the only

industry, that can be developed along a great portion of these lines is the mining industry. Yet the railways, in seeking to attract settlers, generally limit their efforts to the encouragement of the farmer, and quite overlook or ignore the at least equally necessary prospector.

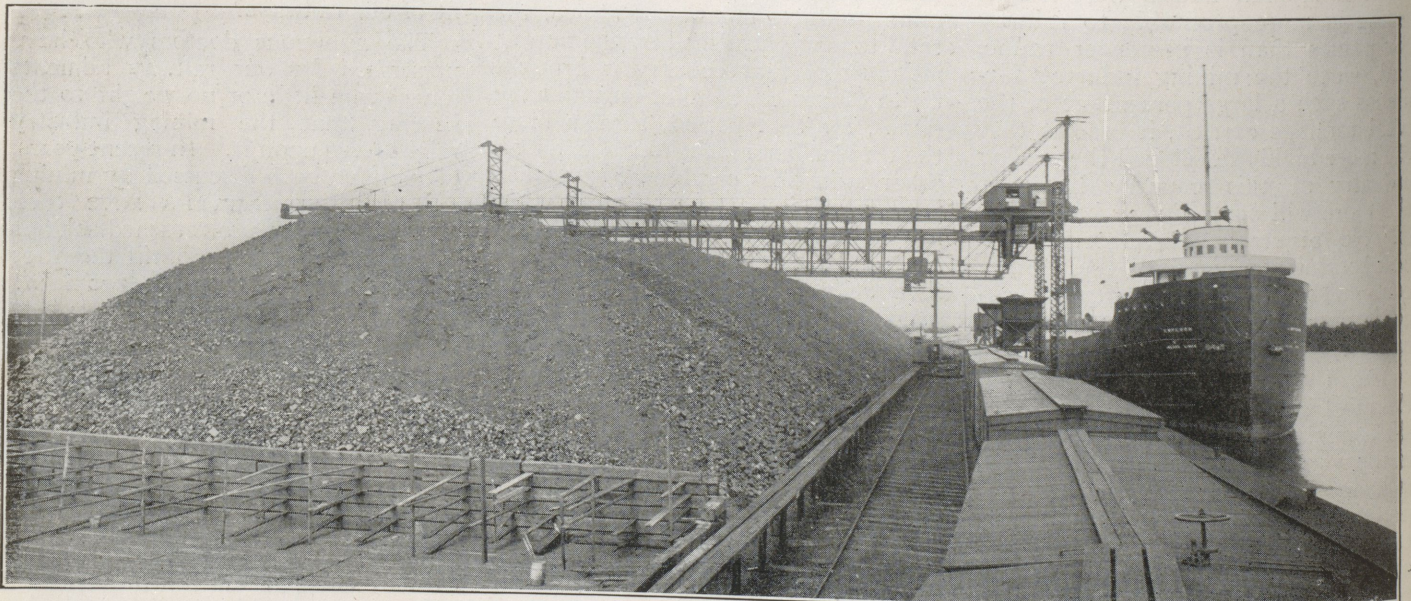
It has been stated, and with good grounds, that not more than one-fifth of all Canada is suitable for the profitable pursuit of agriculture. The remaining four-fifths can only be utilized for such industries as fishing,

lumbering, fur farming, and mining, and from the railway point of view the most important of these is mining.

Between the St. Lawrence River and the Pacific coast, the National railways run through three distinct types of country, namely, from the St. Lawrence River to Winnipeg is what is known to geologists as the Laurentian plateau, from Winnipeg to Calgary and Edmonton are the great plains, and west of these are the mountains.

The great plains are essentially an agricultural region, and this portion constitutes the most profitable section of our railway systems. The railway lines in the mountains are less profitable, while those in the Laurentian plateau are today decidedly unprofitable. The sections of the railways in the mountains and in the Laurentian plateau, then, are those that badly need assistance, and fortunately these are the areas in which mineral deposits are most likely to occur. These are the areas that today are producing over two-thirds of the total mineral production of Canada, and they constitute the areas in which mineral production is most likely to expand. Each of them is remarkable for the great variety of valuable minerals and metals they contain. Deposits of the metals—iron, copper, gold, silver, lead, zinc, etc.—are found in both regions, while, in addition, the mountains contain vast coal-fields, and the Laurentian plateau deposits of nickel, cobalt, and such non-metallic minerals as feldspar, talc, magnesite, asbestos, etc.

The history of railway development



The S. S. "Empress," of the Canada Steamship Lines' fleet, unloading coal at the modern Grand Trunk Pacific terminal, Fort William, Ont.
Photograph, courtesy Grand Trunk Railway System

in Canada shows that in nearly all cases the promoters of these railways had in mind only the development of the agricultural resources of the country they were to serve. Experience, however, has shown in many cases that it was the mining industry that ultimately furnished the bulk of the traffic of these railways, and as a matter of fact, discoveries of some of our most important mineral deposits were actually made as a result of clearing the right-of-way and laying the steel. For example, the blasting of the grade for the Quebec Central Railway opened up the greatest asbestos deposits of the world; the Canadian Pacific Railway was responsible for the discovery of the Sudbury nickel deposits; and a rock-cut for the T. & N.O. Railway exposed the first silver veins of the Cobalt district. As an instance of a railway built primarily for agricultural development and afterwards supported mainly by the mining industry, the T. & N. O. Railway is an outstanding example.

It seems to me that as a people we have not shown the faith in the future of our mining industry that the conditions warrant. We have become accustomed to talk rather glibly about our "unlimited natural resources", but our actions in connection with

our mining industry seem to belie our faith in the extent of these resources. I have been personally more or less closely associated with the mining industry for the past 25 years and in all parts of Canada: first as a prospector who started out to seek his fortune in the gold fields of the Klondike in 1897; and later as an explorer and geologist for the Geological Survey of Canada and other organizations, in the course of which work I have traversed a great part of the unoccupied and unexplored region lying north of our railway zone, with the object of investigating its mineral resources. As a result of this experience I have come to appreciate, perhaps more than most men, the future that the mining industry has in this country, and to believe firmly in it. With such country as Canada has, mining must occupy a very large place in her industrial life relative to the other fundamental industries. Our curve of mineral production is a steadily mounting one, but what is of more significance as an index of the increasing importance of mining in the life and industries of the country, is the steady increase in the production per capita of population, which has more than doubled in the last twenty years. The accompanying curves will bring

out these points more clearly. The per capita curve indicates that the increase in mineral production is progressing at a more rapid rate than the increase in population; in other words, Canada is becoming more and more a mining country, and in this respect she is fulfilling what I believe to be her destiny—to become one of the most important mining countries of the world. In the United States, the per capita value of the annual mineral production has reached \$63. With such vast areas in Canada still unexplored and unexploited, some of them already served by railways, there is every reason to expect that our per capita curve will continue to rise, and even attain the same value as in the United States; and its rise is bound to be reflected in benefit to our National railways.

A study of this question has fully convinced me of the great value of the mining industry to railways, and has led to the consideration of some plans whereby the the Department of Mines might co-operate with the National Railways to bring about a development of the mineral resources tributary to these railways; and I trust that this co-operation will bear some fruit in assisting to solve our great problem.



Photograph, courtesy Grand Trunk Railway System

Canada has millions of acres of country like this that is but awaiting the coming of the prospector

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Canada's Mineral Resources

CANADA'S FUTURE GREATNESS will depend in no small measure on the development of her mineral resources, for more than half of her entire area consists of pre-Cambrian rocks, in which the majority of the more valuable economic minerals are found.

This great pre-Cambrian area, known as the Laurentian Plateau Region stretches in the shape of a huge elongated horse-shoe, sheer across the Continent from Labrador on the East, to the Arctic in the far Northwest, embracing in its entirety the larger portions of the Provinces of Ontario and Quebec, the northernly portions of the Provinces of Manitoba, Saskatchewan, and Alberta, and practically all of the huge and as yet hardly explored MacKenzie River Basin District. In all the world there are said to be only three million square miles of pre-Cambrian rocks, which means that fully one-third of them are to be found in Northern Canada.

Much of the future prosperity of Canada's mining industry will be due to the work of the man of science, both in the field and in the laboratory, and it behooves Canada therefore to lend generous support to the various Federal and Provincial agencies engaged in this work. In our opinion, the Department of Mines, should be far more generously treated in the matter of appropriations than at present, and that applies to every provincial service of similar character.



Canada's Greatest Need—A Progressive Immigration Policy

OF THE MANY economic problems now confronting Canada the most important and most complex is the formulation of a progressive immigration policy. Canada, profiting by the experience of the United States, is determined that her national life shall not be polluted by a stream of unrestricted immigration, emanating in part from the cesspools of the Old World, for she realizes only too well that many of the indigent and illiterate emigrants from the industrial centres of Europe have no appreciation

of Canadian institutions or ideals, and seek our shores only in the hope of bettering their material condition.

Thus, fundamentally, it is essential that the utmost caution be exercised in differentiating between the worthy and the unworthy would-be citizen, but Canada cannot lose sight of the fact that her future prosperity will be largely predicated on population.

How, then, can this problem be intelligently solved? A literary test is all very well in its way, but we must not forget that the elements responsible for so much of the present industrial unrest of Europe are those who have had the opportunity to acquire knowledge. Nor, on the other hand, is the mere possession of a few hundred dollars sufficient guarantee that the emigrant is deserving, for the acquisition of temporary wealth is an inherent prerogative to the denizens of the underworld.

So, it would seem that the question will have to be approached from an entirely neutral angle. In the opinion of the writer, Canada might inaugurate with profit some system of voluntary agricultural service, wherein a physically capable emigrant, male or female, who could not meet the literary and financial exactions, would be permitted to enlist in a government-controlled agricultural organization for, say, two or three years, during which time the immigrant's wages, beyond the amount essential to provide clothes and other necessary creature-comforts, would be placed in escrow in the post office savings banks of the country. At the end of his probation period, the emigrant would be free to follow his own ambitions. What would be the result? Many of the newcomers, no doubt, would hurry to the cities, but many others would take up land of their own or remain with their employers, and of those who gravitated to the cities it is only reasonable to suppose that many would soon return to the land, for it is inconceivable that men and women reared in the congested slums of the Old World would be able to reaccustom themselves to those conditions after having spent three years in the Canadian outdoors.

To many, no doubt, an idea of this character will savor of feudalism, but it must be remembered that these immigrants would enter this service of their own free will and would receive the prevailing Canadian wage, and why should there be any difference between the soldier who joins the military forces of the country and lives within the restrictions he voluntarily accepts and the volunteer in an agricultural army organized along the same general lines of government beneficence? —Reproduced by request from our May, 1921 issue.

The Pacific Salmon

Is the Salmon Threatened with Extinction? It Looks So Unless by International Agreement It Is Protected

By ROBERT PAGE LINCOLN

THE GREAT SALMON runs that annually have their inception in the month of September every year, have this year proved a failure. This, say the fishermen along the Pacific, means the practical end of the salmon. It is a pessimistic view indeed; but the facts of the case do everything possible to uphold the prediction. The reports of the canneries show a dwindling of twenty-five per cent. in the pack in the last two years, which is not very promising and can point to but one thing: that the salmon are growing less in numbers every year, and that if measures for their immediate protection are not taken, we will see the time when the red salmon of the Pacific becomes as scarce as the Atlantic salmon on our east coast; and as one recent writer has it: "When one recalls that the salmon once flourished on the Atlantic seaboard in as large numbers as on the Pacific, and that New England's chief recommendation to immigration

in Colonial days was the salmon trade that thrived on such streams as the Connecticut River, it is easy to see what is in store for the Pacific Coast fisheries unless international action is speedily taken to protect and preserve them during the spawning season."

It is a matter for international attention. Both Canada and the United States must take up the matter, for it is quite impossible for one country to do anything and the other country stay out. We have seen how international protection was given the seal in the year 1892. There is no reason other than greed and pressure brought to bear in various quarters (that do not bear discussion) that has prevented the same sort of a protection being accorded the valuable salmon in very nearly the same waters. Unless protection comes soon, it is highly possible that the

salmon is on its way to extinction. When one considers that the salmon use the great freshwater rivers that flow into the Pacific as spawning grounds, and when one considers the nets, seines, weirs, pounds, and a hundred and one other contrivances with which the salmon are prevented from getting up those streams to fulfill their duties of reproduction, one begins to realize why it is that the red salmon is passing and passing fast.

No living thing has occupied such a strange position in the world of nature and as a food in the commercial world, as has the salmon. It is true as Hornaday says: "The salmon were made for the millions. The Siwash Indian eats them fresh in the summer, dries them, and later on freezes them for himself and his dogs in the winter. The epicure pays for having the fresh fish shipped in ice to his table, wherever that table may happen to be. In mid-ocean the great canned salmon is often the best



The sorting and cleaning department of a British Columbia salmon packery

Photograph, courtesy Canadian Pacific Railway



One of the many "mosquito" fleets that fish for salmon off the British Columbia Coast

and only fish afloat. In the jungles of the far East, in the frontier bazaar of the enterprising Chinese trader, it bobs up serenely to greet and cheer the lonesome white man who is far from home and meat-markets. Even in the wilds of Borneo its name is known and respected; and he who goes beyond the last empty salmon tin truly goes beyond the pale of civilization. The diffusion of knowledge among men is not much greater than the diffusion of canned salmon; and the farther one travels from home, the more one rejoices that it follows the flag." With salmon in such intense demand the world over, among all classes of people and all colors, the remarkable fact is that the specie has been able to hold its own. But so tremendous was this finny army that annually swept in from the ocean that it seemed impossible to more than tap the supply. The great bulk of the spawning host went up the rivers, left their spawn behind them, and then gave up their lives, for such is one of the queer pranks of nature that the salmon is doomed to death after spawning; and none survive. The growth in the canning business was exceedingly great. Today we find it so intensely followed up both on a large and a small scale that it seems impossible for the remarkable fish to hold its own.

Salmon canning saw its inception on the Columbia River in the year 1866. In the years that followed plants were established in California, and from then on up to 1880 along the Puget Sound and the Fraser River. Later on the industry was established

in Alaska where some enormous packs have been made. In the year 1914 one of the greatest salmon packs in the history of the business was made in the Bristol Bay District of Alaska. Every canning factory was worked to the limit and a scarcity of cans made further packing out of the question. The Nushagak River canneries rounded out their season in that year with 546,200 cases of one-pound tins, of forty-eight to the case—a most phenomenal pack. The above is given as an example of the intensity of the struggle to wrest dollars from the

harvest of the sea. With canneries working from the far northern reaches of the Pacific to California and all of them trying to outdo his fellow it can easily be seen that one of the greatest industries in North America is due for a "powerful" slump. William Temple Hornaday, the noted naturalist and conservationist, was one of the first to sound the warning that the salmon was due to be destroyed. In 1913 he wrote:

"The destruction of salmon comes about through the competition between the various canneries. Their greed is so great that each strives to catch all the fish there are, and all at one time, in order that its rivals may secure as few as possible. Not only are salmon taken by the steamer load, but in addition millions of other food fish are captured, killed and thrown away. At times also it happens that far greater number of salmon are caught than can be used before they spoil. A friend of mine told me of the throwing away of sixty thousand salmon at one time near a cannery in Prince William Sound in 1900; and again the similar throwing away of ten thousand fish. So something like 700,000 pounds of valuable fish were, in that way alone, wasted. In the Kadiak and Chignik districts the catch of salmon decreased from 360,000 cases in 1896 to 90,000 cases in 1898, and in 1899 it was almost a failure. In many of the small Alaskan streams the canning companies built dams or barricades to prevent the fish from ascending to their



The Inverness Cannery, Skeena River, B. C.

spawning beds, and to catch all of them. In some of the small lakes the fishermen actually haul their seines on the spawning grounds. In 1903 I recorded a warning of the impending destruction of the Alaskan salmon industry and demanded strict governmental regulation."

The circumstances brought up by the war, however, let the bars down on fishing and the ill effects have not been passed over. Now, unless regulations are present at an early date the passing of this fish from commercial importance is about due.

Of the five varieties of salmon that make up the great family of the genus *Oncorhynchus* the Chicook salmon (*Oncorhynchus tshawytscho*) is the foremost in importance and is the leader of them all. It leads by far in value as a commercial fish and has been sought with unsparing diligence by the canning interests. The Chinook salmon which is also known as the Quinnot salmon, the Tyee salmon, the Spring and the Columbia River salmon reaches a great weight, some specimens taken from Pacific waters having gone 100 pounds in weight. The great salmon of the Pacific waters however, are passing. During the spawning runs they stand little show and are caught out in any one of many ways.

Second to the Chinook salmon in importance in the canning industry is the Blueback salmon (*Oncorhynchus nerka*) which is also known as the Sockeye, Red Salmon, Sukkegh, Redfish and Nerka. The Blueback salmon is widely scattered in the Pacific

waters and is second only to the Chinook; it is a fine-flavored, palatable fish. The Blueback is plump and well-rounded, blue above and silvery on breast and belly.

Third on the list of salmon is the Silver salmon (*Oncorhynchus kisutch*) which is also known as the Hoopid, Coho salmon, Skowitz, and Whiteface. This salmon weighs somewhat more on the average than the Blueback, some specimens going to eight and ten pounds. The flesh of this salmon is lacking in the rich red of the Chinook and has not the palatable oils in it that are present in the former fish. It is, however, canned in great quantities.

A fourth member of the salmon family is the Humpback salmon (*Oncorhynchus gorbuscha*), also known as the Pink salmon, Holia, Haddah, and Hone. This salmon is very widely distributed, being found along the Pacific in America from California to the far North, and thence down the Asian coast to Japan. It is one of the smallest of the salmon group, weighing on the average four to five pounds. It is also bluish in back coloration and silvery on its lower parts. At the time of the spawning season it acquires a pronounced hump on its back from which is derived the name "humpback." This salmon is also much lacking in oils and the fine flavor of the Blueback and the Chinook but has been canned in enormous quantities nevertheless. Some seasons have seen from ten to fifteen million pounds of this salmon canned at one point on the Pacific alone.

A fifth member of the salmon group here given is the Dog-salmon, scientifically known as (*Oncorhynchus keta*). This fish is also known as the Calico salmon, Lekai, Qualoh, Heyo and Sake, after the Japanese. Its range of distribution is also great reaching, as does the range of the Humpback salmon, from California to Bering Sea, and thence southward along the Asian coast, being found in many of the rivers of Japan. In weight it is heavier than the last two named fish, some being taken in weight from twelve to fifteen pounds though average specimens would go far below that. As a food it is vastly inferior to any of the other salmon but has been canned with great diligence now that the better grades of salmon are vanishing. Prepared for the table when fresh the Dog-salmon has an agreeable taste but when canned it is flavorless, often muddy to the taste and mushy in texture. In Japan it is salted and is very highly regarded as a food.

David Starr Jordan has stated that, "there is no positive evidence that any salmon of the Pacific survives the spawning season." Some investigations that have been conducted have tended to put a doubt in this assertion which is, by the way, the general belief of all who have studied the fish. It is held that it is possible that many of these salmon do not ascend the rivers but spawn in salt water and probably survive. It has been held that the salmon ascend the streams a matter of a thousand miles before they let their spawn but it is



British Columbia fishing fleet leaving for the grounds

more reasonable to say that they ascend the stream of their birth until they can go no further and there spawn. The young fish remain in the fresh water until they are of a size to care for themselves when they go down to the sea and enter the salt water. Where they keep themselves in the ocean is more or less of a mystery but they are found around St. Lawrence Island, Alaska, the year round. It was thought for a long time, before experiments were made, that it was impossible to propagate this remarkable fish (the Chinook) by artificially taking the spawn and impregnating them in the modern scientific system of hatching and incubation, but this salmon is now raised in many of our inland lakes; successful attempts have been made in Lake Sunapee, New Hampshire; and in Lake Quinsigamond, Massachusetts, ten thousand of these fish six inches

in length were planted in 1912. In 1914 anglers caught over six hundred salmon in the lake weighing from one to five pounds. In the year 1915 some 100,000 Chinook salmon eggs were hatched and planted in that lake with the best of success. Large specimens are now caught in eastern lakes. Mr. George H. Graham has mentioned about this fish and its introduction into eastern waters:

"Since 1873 the Government has been experimenting with these fish, but not until they were introduced into Lake Sunapee was the work successful. Millions of them have been planted with very little success. It is possible that the many years of failure by the Government were due principally to two causes: *First*, the fish were planted in lakes and ponds that were not properly screened, and, *Second*, most of these fish were planted when very small. Year after year the

results were the same and instead of going to the bottom of the trouble the same plan was carried out by the Government. Small fish were planted in the streams without screens and the fish allowed to run down stream, never to return. After these salmon were well established in Lake Sunapee the Government made a faint attempt to study their habits when raised in fresh water but their efforts were never finished."

Numerous hatcheries on the Pacific coast have been doing their best to keep the waters stocked. Two to four million eggs have been stripped annually from the salmon as they go up to spawn but even this will not help it appears.

The Quinnet, or Chinook salmon runs up the Yukon River as far as Caribou Crossing and Lake Bennett, a distance of approximately 2,250 miles. The Blueback salmon run up



Photograph, courtesy Exhibits & Publicity Bureau, Department of Trade & Commerce
A scow-load of salmon at an Inverness, British Columbia, packing house

as far as Forty Mile or thereabouts, a distance of about 1,800 miles. Both the Blueback and the Chinook go to the headwaters of the Columbia, the Frazer, the Nass, the Skeena, the Stikeen and the Taku Rivers. There are two spawning runs of the salmon. The first run occurs in the Spring and the second run in the Autumn; the Chinooks and the Bluebacks go the farthest up. The last run of the salmon is in the early fall and they swim then with a greater speed and some of them are found with spawn running ere they have half completed their race for the spawning grounds. A peculiarity with the salmon is the fact, better or less well substantiated, that it will always return to the river in which it was born to spawn. Although it is a fact that little or nothing is known of the salmon after it enters salt water, whether it swims away hundreds of miles from the mouth of the parent stream, or but a few miles, it is highly probable that they will remain within fifteen or twenty miles of the mouth of the stream and will of course always be in more or less contact with the cold fresh water. Hence it is natural that when the time to spawn will come it will easily find its way to the river of its birth. Indeed, through investigations, it has been found that a young salmon reared in a parent stream has been brought to a stream far from the parent stream and it has found its way back to the parent stream. However, it is Jordan's belief that the salmon when they are ready to spawn will enter any fresh water stream they may find, and if it is the parent stream or not, will ascend to go through the duty of procreation—and die as a result.

While mention is given of the Chinook salmon it should be noted that some few years ago a vast number of salmon fry and fingerlings were introduced into Lake Ontario. The number in question amounted to millions. From the time the planting was made until just recently, nothing was ever heard or seen of the fish, and it was taken for granted that they had gone the way of so many others. Last summer, however, a true Chinook salmon of mature age and filled with spawn, indeed almost ready to spawn, was caught in the Bay of Quinte. Not anything in many years has been so startling as this discovery. Is it possible that the Pacific salmon will survive in our great freshwater lakes, indeed become a factor in the eastern fisheries? There has been much speculation. If one fish has been found there must be others since such

an immense number were originally introduced. However they have not been found going down or up any of the rivers, which brings up the question: Does this salmon under changed conditions spawn directly in the lakes, off the shoals, like so many other fish, notably the lake trout?

In regard to the runs of the salmon, Jordan notes:

"The great majority of the Quinnet salmon, and probably all of the Blueback salmon, enter the rivers in the Spring. The run of the Quinnet begins generally the last of March; it lasts, with various modifications and interruptions, until the actual spawning season in November, the greatest run being in early June in Alaska, in July, in the Columbia. The run begins earliest in the northernmost rivers and in the longest streams, the time of running and the proportionate amount in each of the subordinate runs varying with each different river. In general, the runs are slack in the summer and increase with the first high water of Fall. By the last of August only straggling Bluebacks can be found in the lower course of any stream; but both in the Columbia and in the Sacramento the Quinnet runs in considerable numbers at least till October. The Spring Quinnet salmon ascends only those rivers which are fed by the melting snows from the mountains and which have sufficient volume to send their waters well out to sea. Those salmon which run in the Spring are chiefly adults which are supposed to be at least three years old. Their milt and spawn are no more developed than at the same time in others of the same specie which have not yet entered the rivers. It would appear that the contact with the cold waters, when in the ocean, in some ways causes them to run toward it, and to run before there is any special influence to that end exerted by the development of the organs of generation. High water on any of these rivers in the Spring is always followed by an increased run of salmon. The salmon-canners think, and this is probably true, that salmon which would not have run till later are brought up by the contact with the cold water. The cause of this effect of cold water is not understood. We may call it an instinct of the salmon, which is another way of expressing our ignorance. In general it seems to be true that in these rivers, and during those years when the Spring run is greatest, the Fall run is the least depended upon."

During a run the salmon pour in steadily from the ocean in an apparently never-ending stream. Nor alone are the big fish represented, but myriads of smaller ones, some six inches in length with organs fully matured, the males capable of impregnating the eggs of the females. The females are sleek and well rounded. The males are distinguished by their beauty, the olive-green vying with the immaculate silver of the belly; the head is of a polished appearance, of a metallic color. When they first enter the fresh water the salmon are clean, but shortly the effects of the fresh water begins to tell. The flesh changes to a sickly whitish-gray color and a slime covers the body; the scales become imbedded in the skin and later fall off when decay sets in. As the time of spawning approaches the jaws of the male become hooked so that the closing of them is impossible. The fore teeth grow and take on a canine-like appearance. The object of both the hooked jaws and the teeth may be as an aid when the final fight is to be made amongst the males in the dispute for the spawning grounds. No food is taken after the river is entered and the swim up begins. So set is the rule that these fish shall die after spawning, that the stomach practically shrivels up and the throat contracts. The fish has lost about one-fifth of his weight. He is, as the spawning season nears, blotchy red; some times blackish; slab-sided and grotesque. But while the whole rest of the body is in more or less a state of degeneration the growth and development of the reproductive organs is hindered not in the least.

The upstream swim of the salmon is one undertaken under conditions often the worst one could think of.

Sharp stones gash the body; they are banged about and bruised; but such is the dogged determination of this singular fish that he is able to leap the most seemingly insurmountable obstacles. Twelve-foot falls are cleared time and again, and some even higher than that are successfully scaled. Reaching such a falls they swim back and putting an immense power into being they flash forward; reaching the bottom of the falls they veritably rise from the water with an immense slap of the tail, giving two or three almost instantaneous flips of it as they ascend. As the waters grow shallower they increase their speed. Some of them make long distances, others will average from three to four miles a day.

(Continued on page 42)

Neighbors of the Snows

By Archie Joscelyn

THE MAIN WINTER CABIN of Brandon was unlike any other trapper's cabin which might have been found, had all the coasts of Hudson's Bay been skirted in the search. In the respect of its oddity it might well have been said to resemble Brandon himself—a man never understood, little known, and less liked. He had come to the fur country three years before—from where, no one knew. Powerful of frame, and quiet of voice and manner, there was still in his eyes a look, in his manner a something not to be defined, that had set him apart from other men, and unpleasantly. He had built the cabin, one of a string of three on his long trap line. Then he had stocked it up; and therein lay much of the strangeness of it all.

For the food which had gone into his cabin was not the usual assortment of food found in trappers' cabins. Rather were there many boat loads of food such as might well have graced the table of some rich man's house—fine food of the like read about in the colored advertisements in the few magazines which circulated in the land of the snows; much food, more than several men should desire.

At first, there had been much speculation about this, as there had been about the man himself. He must have a wife coming, or at least some friends. But none ever came. And the first distant neighbor who came to call, found Brandon absent on his trap line, and his main cabin, unlike all other cabins of the north, where the keyword and the code is hospitality, was barred and locked, and across the two windows were iron bars. Yet, looking within, vast stores of the fine food was to be seen, enough and to spare to any chance hungry guest.

The years had passed; Brandon had continued to live on at the one cabin, alone with his choice foods, the stock of which was occasionally replenished. He had been a neighbor to no one, and the closest of his neighbors was Metsellavalettee, a little French-Canadian, who lived two days' journey to the northward. The word had gone forth that Brandon desired to be left alone, and that neighbors, especially those who would call with the idea of tasting of Brandon's choice foods, were

unwelcome. The one further

mystery was that Brandon and Metsellavalettee had never met since the former had come to the country. Both seemed to avoid the presence of the other, as something sinister. Yet neither would speak a word concerning the other, save as of a stranger.

It was the third winter, that came afterward to be known as the winter of the deep snows, as distinguished from ordinary winters. Before the coming of the first snow there had been no indication that this was to be one of the winters of famine. The birds and the rabbits were plump and more numerous than usual. Deer, moose and elk there were in plenty in the forests. They had not taken warning, for nature in its mood was both deceptive and gentle. Few men of the country had stocked their cabins with food when the first storm broke, two weeks earlier than usual, and with a sweeping, blasting fury. The one man in the north who was well prepared to meet it was Brandon, who was always ready.

The first storm was the beginning of the winter of deep snows, for the first storm never melted until the following spring, and it was followed early and often by more storms. Trapping soon became difficult. The travelling was hard for all inhabitants of the forest; their food was gradually buried, gradually but with a grim and terrible sureness.

The White Terror began early that year to stalk in the howling snowstorms. The winter, mild in its beginning, fast became a winter of famine, the more terrible because it had not been expected.

The rabbits and the birds disappeared. The cloven-footed animals were trapped in their yards, terribly trapped as the snows grew deeper, trapped and held, a not-difficult prey for the wolves, which sunk like shadows among the whirling storms, to appear treacherously out of the mists and rend and tear; and scarce would they have seized their feast than the tell-tale crimson would be buried by a new-falling, terrible blanket.

But Brandon, he of the powerful frame, well fed and equipped with his snowshoes, laughed at the might of winter, laughed with a kind of grim joyousness and continued to run his long trap lines, spending one night in three at his main cabin where the most of the food was stored. And he laughed at the evidences of famine; it held no terrors for those who were ready, and he was always ready, whatever the emergency. A crouching fox, tearing at the bait by a trap, yet cleverly avoiding the jaws, sprang up as he approached, and in its first leap was caught by the speeding bullet of his rifle, brought to the hip and fired from there on the instant.

It was in January that, coming to the most distant portion of his trap line, that portion leading farthest into the north, that Brandon found the like of which he had never found before. Beside a trap, rudely stretched on a bent sapling, was the hide of a raccoon, one of the few which Brandon had caught that year. It had been carefully skinned, and the carcass taken. Here was the work of no common thief. The snows had blanketed all evidences of the trail of the man.

That line led then, in a day's journey, to Brandon's cabin. As he followed it now, there were occasional evidences that the other man had passed along it some time before, making likewise for the cabin. A marten and a lynx Brandon found undisturbed in his sets, save that the lynx had a merciful bullet through its head. But what angered him was the finding again, of where a grouse had been taken from a cubby into which it had stumbled. All that was food had been taken, and Brandon liked the choicest in the food of the north as well as in that of the south. As he followed the trail, an old light began to blaze again in his eyes, a mocking light of anger and desire.

But it was at his cabin itself that his dull anger became blazing wrath, and this seemed curiously mixed with triumph, as though he had long waited for it to happen, knowing that it must come. Here the intruder had come boldly up to the door, and with an iron rod had broken the lock, and had entered the cabin. Inside

was the mute evidence of his depredations. All of Brandon's stocks of food had been examined, and some had been taken from the choicest of each. A little of most was left—sufficient food in all to last a month, perhaps more, by frugal care. With the food in the other cabins, it made a plenty for the year. But the most of it at the locked cabin, the finest of all, was gone. A hand sled which Brandon had left behind was also gone, and the load of food on it would have been a heavy one. It was this especially which angered Brandon, for the thief had not been content with even a half of it all. He had taken four-fifths at the least. Of Brandon's stock of fine furs, not one had been touched.

But Brandon was furious. There was no doubt in his mind as to the identity of his visitor—it was Metsellavalettee who, shiftless loafer that he was, had neglected to provide for winter, and who, now that famine was upon the land, had chosen to steal rather than to starve, or to honestly beg or borrow. But he should pay. And other men of the country, who might at some time be tempted to do likewise, hearing the story, would hesitate long before they would steal from him—aye, would hesitate and, mayhap, starve, as being the most preferable course of the two!

Brandon started the pursuit at once, a small lunch and his rifle his only pack. Though darkness was falling, and though he had been on the trail since before the dawn, the fierce anger spurred him on, tireless and senseless of fatigue. Almost without stop he travelled, and the dull dawn of another day found him, following the now fresher trail of the sled, but a day's journey from the cabin of Metsellavalettee. The thief had not had so long a start of him as he had at first imagined, and Brandon, uncumbered by a weary load, was gaining. The knowledge but spurred him to great efforts. If he could overtake and catch the man with the goods still on the sled—that would be better.

But he knew that he had failed in this when he came within sight of the cabin, late that afternoon. The trail was very fresh now, and the man had not been more than an hour ahead of him, but the cabin was only half a mile distant, a thin streamer of smoke rising above it. Another storm, that had been threatening since the dawn, was beginning to fall, sifting down as gently and softly as though it was not but an additional blanket of death to the life of the

north. Under cover of this Brandon approached the cabin.

Without hesitation he strode straight up to the door and flung it open, jerking the mitten from his right hand and half-raising his rifle as he entered. Metsellavalettee stood in the middle of the room, bending over the sled, still piled high with food, though a little had been unloaded and was sizzling in a pan on the stove. He straightened as Brandon raised the rifle, gazing over it with a light of passion in his eyes, noting not the bareness of the room, nothing but the man who stared back, the light of recognition in his eyes. But Brandon did not fire. Instead he spoke, in a voice hoarse, yet triumphant.

"So we meet again, Metsellavalettee—again, and this time I am not helpless in a desert. You remember the time that you took the food, all the food, and left me to starve—you thought I would do it. And so I did.

I starved to the point where food came to be the one desirable thing in all the world to me, food of the finest. But I did not die—instead, I lived to find the wherewithal of that by which I might have such food as you had taught me to desire. Having it, one thing remained—vengeance! I swore to have it, and followed you here. Then I waited to catch you again, red-handed, baiting my trap with food, and knowing that in time you must come to it. And I swore that never until then should we meet, but that then we should surely meet, and that when we did, one of us two should die. And, Metsellavalettee, we have met again!"

Slowly he leveled the rifle, while Metsellavalettee stared back. And then, in that moment, Brandon's gaze wandered, came to rest upon the other occupant of the room, whom he had not noticed before. A woman, hollow-cheeked by famine, yet beautiful, who looked from his rifle to her man with her heart in her eyes, and waited, as if ready to spring and wrest the rifle from Brandon's hands. For a moment Brandon looked at her, and his rifle sank. His gaze wandered to the pile of food, the only food in the barren cabin, rested upon it a minute, then on to Metsellavalettee. In his eyes was surprise, and a change, but the look hardened swiftly again to relentless decision.

"Metsellavalettee," he said, "it seems you win, for you have what I knew not of, a wife. So you win again. But I am a man of my word, and I swore that when we met again, that one of us should die!"

Swiftly he raised the rifle to his temple and fired; then stood staring, half-stupidly, at the hole in the ceiling. But now it was Metsellavalettee who laughed, and he laid the gun on the table.

"Brandon," he said, "the evidence was against me, but I did not take the food that time. This time I took it, that she might live. And, though you are hasty and stern, as now, you are nevertheless a man, as now—and it is fitting that you should live, rather than die for the sake of an oath."

It was his wife who stepped to a pile of furs and came back with the skin of a black fox, which she placed in Brandon's hands.

"This," she said, "is payment for the food, which he was going to take to you."

But now Brandon laughed, and tossed the skin back to the pile. "I want it not," he declared. "I learned a bigger truth this hour than I ever knew before; the code: that people in the north are neighbors. I hope that I may call you that. And the food is yours."

Picking up his rifle, he stepped back to the door and disappeared on the back trail.

To the S.S. "Hamonik"

LAKE QUEEN, and best beloved
of the ships,
So gently wooed by every
summer wind;
Still, unforgetting of your troth
behind,
You flout grey Huron harbors' lips,
And scarcely deign to touch the
half-way slips;
For, though caressing northern days
you find,
You know how wind can fret and
ice can bind.
And keep your freedom where the
teased wave ships.

Brave boat, twice loved, for
strength and home-like grace,
The dream of night and glory of the
day—
Secure, beneath the stars' high
galaxy,
And fearless, when upon the water's
face,
The mists hide past and future of
thy way;
Speed on, O Ship of Golden Memory.

—Clare Shipman.

The Department of Mines and the Upbuilding of Canada

By GARNAULT AGASSIZ

AS Canada's future greatness will depend in no small measure on the development of her latent mineral resources, a paramount need will be the adequate recognition of all scientific agencies that contribute to the discovery and development of our economic minerals.

Especially, is this true of the Department of Mines, the activities of which are nation-wide.

The Department of Mines is a distinct branch of the public service, concerned chiefly in the discovery, investigation, and development of the mineral resources of the country.

The first, and, for that matter, the oldest branch of the Department of Mines is the Geological Survey, made famous by such eminent geologists as Sir William Logan, its founder, and George Dawson, the son of Sir William Dawson, the famous geologist.

The Geological Survey undertakes

exploration work in every part of Canada, last year having maintained no less than forty distinct parties in the field. These parties, which are equipped with everything required in a geological expedition, undertake original explorations and investigations entirely, reporting on the mineral and biological aspects of the territory covered. All of the parties also do a very great deal of important work in the field of map making; in fact, the present map of Canada must be attributed very largely to the work of the members of the Geological Survey who have toiled so unceasingly for the country's good.

The services of the Geological Survey can be requisitioned at all times in the work of proving any mineral field whose development promises to be of national benefit. When oil was first reported in the Mackenzie River Basin District some two years ago,

for instance, the Geological Survey despatched four distinct parties to the field with the object of determining the geological structure and thus minimize the preliminary work of the developing companies. The individual prospector is also materially assisted by the Survey, for without the aid of the Government geologists in determining the origin of ores and in giving other scientific aid the road of the non-technical man would be infinitely harder than it is.

Another of the important activities of the Geological Survey is in the sphere of artesian water discovery, so important to the economic life of large sections of the West. Not many years ago, Dr. D. B. Dowling, the great authority on Alberta coal formations, advocated the sinking of artesian wells in the arid regions of Southern Alberta, his knowledge of the rock structure of the country to the North leading him to believe that a certain sandstone stratum,



A geologists' camp in the Canadian wilds

Photograph, courtesy Grand Trunk Railway System



Examining a discovery of silver in Northern Ontario

which occurred in regular sequence through the areas he had investigated, would extend under the Prairies at a depth of from 600 to 800 feet. Private interests ridiculed the idea, and the Department of Mines ordered the Geological Survey to undertake the work as a national obligation. Wells were sunk at various locations suggested by Dr. Dowling, large flows being brought in in every instance, with the result that more than a million acres of worthless land has been rendered arable. Thus once more did science triumph over mere brawn.

The next major branch of the Department of Mines is the Mines Branch itself. This branch is concerned chiefly with the solution of the varied economic problems of mining, to the end of bringing about the most practical utilization of the mineral resources of the country. The Department of Mines recognizes that Canada has no greater present internal problem to solve than that involved in the production and distribution of fuel.

Canada's principal developed coal resources are confined to the Maritime provinces, British Columbia, and Alberta, which means that a very large part of the settled area of Canada has to depend for fuel on American sources. The absence of any known commercial deposits of anthracite has also forced Canada to import practically all her requirements of this commodity from the fields of Pennsylvania. The present position

of Canada in the matter of petroleum is also one of almost complete dependence on the United States, the total oil production of Canada last year being only about 200,000 barrels, compared with a consumption of over 25,000,000 barrels. There is no doubt in the opinion of the best informed geologists that Canada, one day will become one of the world's largest producers of petroleum, but before these oil resources can be de-

veloped it will be necessary to invest hundreds of millions of dollars in constructing the necessary pipe lines that will be required to market the product, for unfortunately the potential oil fields of Canada are remote from civilization.

The Department of Mines realizes that the future economic freedom of Canada will be predicated very largely on a solution of her fuel problems, and it intends to do everything possible to find practical solutions for them.

Just at present the mining interests of the country are greatly concerned as to the possible effects of the Fordney Tariff on the mining industry as a whole. Canada, it must be understood, is facing the situation calmly. She realizes that the United States has a perfect right to enact its own laws, and that it devolves on Canada to find other markets for the products that may be adversely affected by this legislation. To this end, the Minister of Mines, the Honourable Charles Stewart, recently sent Dr. Charles Camsell, the Deputy Minister of Mines, overseas, with instructions to make a thorough investigation of the markets of Great Britain and of Western Europe, particularly, with regard to such non-metallic minerals as kaolin, feldspar, and graphite, for the Department is determined to do everything in its power to maintain the prosperity of the Mining Industry of Canada.



A general view of the Mother Lode Mine, near Greenwood, B.C.



A view of Windermere, the western terminus of the Banff-Windermere Highway which has just been officially opened to the motorist



The Highway between Banff and Lake Louise affords many glorious vistas, such as these

Side-Lights on the Banff-Windermere Motor Road

By S. L. CULLEN

IT WOULD BE difficult for one to take his or her little "flivver" into confidence regarding the Banff-Windermere motor road, without going a bit into the origin of its existence. It would be still more difficult to put your feet on the accelerator and slide into any part of that ribbon-like lane, where creeks and canyons vie with each other in beauty, and forget the name of David Thompson.

David Thompson was the greatest land geographer who ever lived; and, therefore, one of the greatest scientists. He came to Fort Churchill a 14-year-old boy from a London charity school, in 1784. While his greatest work was being done during twenty-eight years, he was never within a thousand miles of any civilized community of five hundred souls. He died in obscure poverty sixty-five years ago and lies in a nameless grave in Montreal. The opening of the memorial

museum and hall at Lake Windermere, B.C., is the first public recognition of the debt that civilization owes him, for, though the Thompson is called after him, a few years ago not one geographical student in a thousand knew anything about him.

Thompson toiled in the wilderness without thought of the public distinctions that usually incite scientific men. He never learned to advertise. With a noble humility, he exemplified the Christian virtues during nearly thirty years in the wilderness, where not a single missionary had ever been. For what he did and what he was, he deserves to be held in everlasting homage.

When the little three-cylinder (missing one), or that seven passenger touring has been made aware of the fact that its energy was not the first to conquer mountains, rivers and a thousand other obstacles, you may glide on from Banff to Windermere, or from Windermere to Banff on a perfect motor road where there is an ever-changing panorama of wonderment.

Extraordinary and thrilling happenings have been so much the part and parcel of everyday life, during the past few years, that it now takes an almost super sensation to hold the public attention for even a few minutes.

This is possibly the reason why some citizens of America may still be ignorant of the fact that thousands of their countrymen discovered their own country for the first time during this summer.

So long as the possibility of spending a vacation overseas was on the



Lake O'Hara is one of the many picturesque spots on this charming highway



Wild life is much in evidence along the road

horizon, these self-same Americans rushed to Europe each summer and left their country to tourists, who came from far ends of the earth. The revelations of this year will make it sure that the same thing will never happen again. The men, women and children, who spent their holiday touring from one end of the continent of America to the other, will see to that. From New York to Seattle, from Seattle to Vancouver, from Vancouver right on through the Canadian Rockies they went, with almost the religious fervor of the pilgrim of old. No pilgrim ever poured out more devotion of a shrine than was expended by the tourists this summer, as they beheld for the first time, the wonders of the Canadian Rockies. Their rhapsodies resounded throughout the land. The songs of praise they chanted were full of melodious appreciation.

Perhaps the greatest surprise that came to these Americans, who for the first time really learnt to know how beautiful America really is, was the fact that they could pass through much of the most thrilling of the scenic wonders in their motor cars. Most of them knew that California boasted roads of luxury, as far as motors were concerned, but they somehow failed to realize that at the base of gigantic snow-capped Rockies were roads of equal splendour all ready for their cars.

Somehow or other, when tales have been told of the Canadian Rockies and the multitudinous scenic glories in their midst, these tales have conveyed a sense of gigantic splendour, a something connected with primitive conveyances, steep ways only to be covered by the sure hoof of the moun-

tain pony beloved by the Indian, narrow trails only possible on foot with an old and true guide in lead. In the future when tales of these Rockies are told by the tourists, who pioneered as late as 1922, this illusion will be forever banished.

In making the descent from Lake Olive, one is attracted by the rugged high mountain peaks of the Brisco range, on the north side. They are frequently of a reddish-pink color. There is little else of interest in the immediate vicinity of this part of the road until the first six miles of the road are passed by, at which place on the southern side of the road, just where it crosses the Sinclair Creek by twin bridges, low set on a high overhanging ledge of rock, may be seen by a good specimen of the work of Indian picture drawing. One mile further on and the traveller reaches the Sinclair Hot Springs. Here the hot water rises, as clear as crystals from out of a huge mountain of rock and after entering a large concrete swimming basin, it passes out into the clear cold water of the Sinclair Creek. The good quantities of these springs have for many years been known, but up until the time of the construction of this part of the Banff-Windermere road they were hard to approach over the trail.

Leaving Sinclair Canyon there opens to the eye the widened expanse of the valley of Sinclair Creek and from here is also to be seen the Columbia River and the Kootenay Central Rail-



The Lake of the Hanging Glacier is another of the road's attractions

way line. Away across to the west is the range of the Selkirk Mountains, with Mount Farnham, 11,342 feet in height, over to the southwest. This mountain is readily distinguished by its huge thumb, or chimney, sticking out prominently from the end of the ridge. Possibly, however, the most absorbing point of view, as the car moves into range is the long line on the opposite side of the Sinclair valley which marks the road of ascent out of the low part to continue its way to the north.

Upon rising out of the dip which forms the valley of Stoddart Creek, named after the late James Stoddart, of Windermere, one sees a small cluster of log dwellings, which forms the nucleus of the Shuswap Indian settlement. In the midst of them is the white, neat little Roman Catholic Church, with its red steeple. Shortly

after this Windermere Lake comes into view lying to the south.

Within three miles of this point, being mile post 79, the junction is made with the roads leading to Athalmer, Invermere and Wilmer. The turn is very pronounced, being almost a right angle, and leads right away to the west, but those who wish to, may continue straight along for another three. The townsite of Windermere is the goal.

In the vicinity of Marble Creek, a mile or so from the main road, on the mountain side, are the Vermilion, paint pots.

These are three holessome seven or eight feet deep, filled with water of three colors, ochre, red (Vermilion) and green, the coloring being due, probably, to deposits of the soluble oxides of iron and copper. These combinations have formed natural

pigments that are equal to the finest commercial paints. It is known that the Kootenays, long before the advent of the white man, used these colorings to decorate their tepees with weird designs and adorn their bodies with "war paint" before attacking their enemies. The Indians, too, were the first to commercialize these valuable deposits, and bartered these pigments with Southern tribes for corn and even for the shells of Mexico.

Maybe the golfer takes his sticks with him in his car. He will certainly find links whereon he can play to his heart's content. Maybe the fisherman will carry his rods with him. From his car he can go straight to the waterside and angle with assured success. Maybe an ardent photographer takes along his camera. It is mighty certain that in no other part of the world will he find such a variety of subjects for his film.



Another view of the Highway, showing in the distance Castle Mountain

Salmon Canning on the Skeena River

By H. GLYNN-WARD

OF ALL the great rivers in British Columbia that flow out into the Pacific, the Skeena is one of the mightiest, swift and green and treacherous, murmuring many tales of the half-known lands through which it has come; fertile valleys with none to till them, deep canyons and miles of forest.

Here in the Spring, come multitudes of salmon, returning from far seas, with a strange and infallible instinct for home, to spawn in the self-same waters that gave them origin. Coming countless miles, leaping impossible rapids and falls, fighting a desperate struggle for existence every yard of the way, not only against their natural enemies, but chiefly against man with his many weapons of destruction.

At the mouth of the Skeena there are no less than fifteen canneries that shipped last year a total pack of 234,765 cases of canned salmon.

No more cosmopolitan place exists than a salmon cannery. Though managed by white men, it is operated largely by Indian women packers and the ubiquitous Chinaman. The fishermen are Japanese, Indians, Norwegians, Swedes, Danes, Scotchmen, a few English, Canadians from all over, and Americans.

The Indians come from far and near to put in their summers at work, and make enough to carry them at leisure through the winters. There are the Hyders, who come in little gas-boats all the way from the Queen Charlotte Islands, a once mighty tribe in the bygone days when they were known as "The Terrors of the Pacific." There are those from Matlakatla, opposite Prince Rupert, and the Tsimpsean and Gitupsan tribes.

They have their own quarters and are entirely and haughtily exclusive, the squaws especially; they utterly

refuse to be photographed for fear of being smitten by the Evil Eye.

For the canneries on the north side, the whole population of every cannery, each a little town in itself, turns out



A sixty-pound "Spring"

to watch the daily Grand Trunk Pacific train go by from Prince Rupert, with its freight of fish, rushing eastward via Edmonton, Saskatoon and Winnipeg, where the bulk of the freight is distributed for the big markets East and South.

Just about one quarter of an hour elapses from the time the salmon are picked up off the float, where a man stands knee-deep in a floor of fish, sorting them out and sending them up the shute, to the time they are packed in cans ready for cooking.

By methodical and mechanical procedure, they are beheaded, tailed, cleaned, cut up into even pieces by the great "iron chink," and sent along by overhead rails to the tables where the Indian squaws, gloved in rubber, are pressing and packing them into "talls" and "flats."

Nothing else but salt is put in the cans, and they are then thoroughly and scientifically sterilized, and cook-

ed for an hour and fifteen minutes before being finally soldered down and turned out to be lacquered and labeled. All grades of salmon are packed and cooked in the same way, in 1 lb. "talls" or "flats" and $\frac{1}{2}$ lb. "flats."

Each cannery turns out anything from 26,000 cases upwards, each case containing 96 $\frac{1}{2}$ -lb. or 48 1-lb. cans.

Early in June, as soon as the "sockeye" run begins, the canneries start operations, and continue at top speed till mid-August, when the last and latest of the species, the "hump-backs," have escaped up the rivers.

The "sockeye" is the most sought after of all, being of a delicate flavour and tender flesh, clear pale blue above and bright silver beneath, when first taken out of the water. Then comes the "coho," green and silver with black spots; then the great "spring" or "tyee" salmon, coarser than the others and weighing anything up to a hundred pounds.

The Indians nearly always troll for their salmon and use various sorts of spoons; for "sockeye," the only kind of net that is permitted is a gill-net.

By October, the canneries have closed down, put away their equipment for the following year, and all is quiet again, leaving the very few to await the coming of the great ice-floes on the river. The green, swift Skeena freezes up and becomes a still, white road of ice for long months until the Spring suns come again.

Mending The Clock

By J. M. BARRIE

IT is a little American clock, which I got as a present about two years ago. The donor told me it cost half a guinea, but on inquiry at the shop where it was bought (this is what I always do when I get a present), I learned that the real price was four-and-sixpence. Up to this time I had been hesitating about buying a stand for it, but after that, I determined not to do so. Since I got it, it has stood on my study mantel-piece, except once or twice at first, when its loud tick compelled me to wrap it up in flannel and bury it in the bottom of the drawer. Until a fortnight ago my clock went beautifully, and I have a feeling that had we treated it a little less hardly, it would have continued to go well. One night, a fortnight ago, it stopped, as if under the impression that I had forgotten to wind it up. I wound it up as far as it was possible, but, after going an hour, it stopped again. Then I shook it, and it went for five minutes. I strode into another room to ask who had been meddling with my clock, but no one had touched it. When I came back it was going again, but as soon as I sat down it stopped. I shook my fist at it, which terrified it into going for half a minute, and then it went creak, creak, like a clock in pain. The last thing it did before stopping finally was to strike nineteen.

For two days I left my clock severely alone, nor would I ever have annoyed myself with the thing had it not been for my visitors. I have a soul above mechanics, but when these visitors saw that my clock had stopped, they expressed surprise at my not mending it. How different I must be, they said, from my brother, who had a passion for making himself generally useful. If the clock had been his, he would have had it to pieces and put it right within the hour. I pointed out that my mind was so full of weightier matters that I could not condescend to clocks, but they had not

the brains to see that what prevented my mending the clock was not incapacity, but want of desire to do so. This has ever been the worry of my life, that, because I don't do certain things, people take it for granted that I can't do them. I took no prizes at school or college, but you entirely misunderstand me if you think that that was because I could not take them. The fact is, that I had always a contempt for prizes and prizemen, and I have ever been one of the men who gather statistics to prove that it is the boy who sat at the foot of the class that makes his name in after life. I was that boy, and though I have not made my mark in life as yet, I would have done it had I wanted to do so as easily as I could mend a clock. My visitors, judging me by themselves, would not follow this argument, though I have given expression to it in their presence many times, and they were so ridiculous as to say it was a pity that my brother did not happen to be at home.

"Why, what do I need him for?" I asked irritably.

"To mend the clock," they replied, and all the answer I made to them was that if I wanted the clock mended I would mend it myself.

"But you don't know the way," they said.

"Do you really think," I asked them, "that I am the kind of a man to be beaten by a little American clock?"

They replied that that was their belief, at which I coldly changed the subject.

"Are you really going to attempt it?" they asked, as they departed.

"Not I," I said. "I have other things to do."

Nevertheless, the way they flung my brother at me annoyed me, and I returned straight from the door to the study to mend the clock. It amused me to picture their chagrin when they dropped in the next night and found my clock going beauti-

fully. "Who mended it?" I fancied them asking, and I could not help practising the careless reply, "Oh, I mended it myself."

Then I took my clock in my hands to examine it.

The annoying thing, to begin with, was that there seemed to be no way in. The clock was practically hermetically sealed, for though the back shook a little when I thumped it on my knee, I could see quite well that the back would not come off unless I broke the mainspring. I examined the clock carefully round and round, but to open the thing was as impossible as to get into an egg without clipping the shell. I twisted and twirled it, but nothing would move. Then I raged at the idiots who made clocks that would not open. My mother came in about that time to ask how I was getting on.

"Getting on with what?" I asked.

"With the clock," she said.

"The clock," I growled, "is nothing to me," for it irritated me to hear her insinuating that I had been foiled.

"But I thought you were trying to mend it," she said.

"Not at all," I replied. "I have something else to do."

"What a pity," she said, "that Andrew is not here."

Andrew is the brother they are always flinging at me.

"He could have done nothing," I retorted, "for the asses made this clock not to open."

"I'm sure it opens," my mother said.

"Why should you be sure?" I asked, fiercely.

"Because," she explained, "I never saw or heard of a clock that doesn't open."

"Then," I snarled, "you can both see and hear of it now," and I pointed contemptuously at my clock.

She shook her head as she went out, and as soon as the door shut I hit the clock with my clenched fist, stunning my fourth finger. I had a

(Continued on page 41)

The Summer Days Are Fading

O THE summer days are fading
and the summer sun declines,
There's a murmur in the wood-
land and a sighing in the pines;
There's a whisper by the wayside that
recalls something that seems,
That part of life that's left us to our
silent store of dreams!

Now in the low-hung orchards, the
apples mark their time,
With here the Wealthies ripening,
and here the Whitney's prime,
Or here the rare Sweet Briars fast
are mellowing to the core,
And the last red plums are dropping
for the bees to fill their store.

And over all the uplands and o'er all
the pastures broad,
The dreaming days of silence are
the days of gun and rod;
What if the chill rain falleth—what
though the chill winds blow,
The season is the heart of one, and
all the good we know.

So still the lake lies musing, like a
mirror bright and clear,
O peace, thy name be on it, and the
things we hold so dear,—
Has ever a wave, O lake, disturbed
your breast so soft and deep?
Has ever a surging whitecap come,
to break your quiet sleep?

*O, the summer days are fading and the
summer sun declines,
There's a murmur in the woodland and
a sighing in the pines;
There's a whisper by the wayside that
recalls something that seems,
That part of life that's left us to our
silent store of dreams!*

—Robert Page Lincoln.

F. Stone.



Late Fall Fishing For Bass

By ROBERT PAGE LINCOLN

FISHING for the black bass under any conditions is a mighty big sensation, but if a time of the year, better than any other time, were to be selected in which to make a try for them, then the autumn season scores high indeed. Autumn finds the bass in better physical trim than at any other time of the year. In the spring they are busy with their spawning operations, and many make the mistake of fishing for them then, catching them, indeed, when they are heavy with spawn. This is, at best, a destructive practice, for it indirectly kills millions of possible future fish by killing the mother that bears the eggs, or killing the parent that is guarding the spawn. Great catches have been accounted for in the first part of the fishing season. Examination will almost always show that those caught are late-spawning fish, hence the destruction is manifest. Not until about the 20th of June, in most

Canadian waters, is it possible to catch bass that have spawned out. If the season is a backward one, and the chill holds to the water, the bass wait until it reaches the right temperature. The water temperature governs the spawning activities of the fish in question.

Most of the bass fishing in the North is done during the months of July and August. In August the bass seek the deep places owing to the heat. Good fishing again becomes the case, however, in the month of September, when most of the preying fishes commence their feeding activities, to regain the flesh they lost during the fasting days of August. With this revival of feasting and stocking up, looking forward to the inactivity of the winter season (the bass going into hibernation, by the way), they spend a great deal of time in the inshore

waters, assembling the daily items of their bill of fare. Should you cut open a large bass in the autumn, you are liable to find a vast collection of food, of all sorts and varieties, but principally minnows, crabs and frogs. And these are the days when some of the choicest fishing is to be had, for it is now that the bass has his full vigor. The cold water has given him additional vim and animation. Summer, during the season of great heat, he may have been very sluggish, but now he is alive, alert, and will, upon capture, leap time and again out of the water to display his goodly length, depth and breadth. Trust it to an autumn bass in northern waters,—he will give a good account of himself. This fine fishing for the bass commences about the middle of September, and goes on until freeze-up. Often the brief season of warmth that comes in November finds them active, and many good catches are made.

The impulse of the bass to seek



Noon-day lunch on Sand Lake, Metagama, Ont.

Photograph, by F. V. Williams, London, Ont.



Photograph, courtesy Grand Trunk Railway System
A scene in the Algonquin Provincial Park of Northern Ontario, where the bass bites savagely

the inshore waters, the shallows, is, of course, a natural one, for it is there that the food they are after is found. In this season, the minnows and small fish in general, are more sluggish and are easier for the bass to catch. The frogs are half inert and dull, seeking shelter under rocks, logs and masses of drift and leaves. Aware of this, the bass go inshore and pull them out, pushing the leaves, etc., away with their noses. The right lure, placed before them at a time such as this, is sure to receive attention, but also, it should be remembered that, with his return of vigor, and with the intense feeding that is gone about, which, of course, improves the eyesight greatly, he looks and listens not in vain. At no season of the year must the angler use more caution when going after this fish than in the autumn. Lakes, in the autumn, are often deathly still; like as not glassy; more a mirror than an expanse of water. Sounds carry far through them. It is well to drift into a bay that it is desired to fish, with as little disturbing of the water as possible. An autumnal bass, feeding inshore, must be stalked almost as carefully as the mountain

sheep, and when the cast is made it should be carefully judged, and it should drop to the water with as little sound as possible. This throws the chances of luck more than ever to the expert man with the rod, for the amateur will fling his bait to water with a mighty splash, and every bass will be out of the way in a moment. With a heavy spoon-hook and an artificial minnow it is very hard to fish in the inshore waters in the autumn. Their size and weight make it impossible to fish without disturbing, or alarming, the fish that are feeding. It should be remembered that the closer a fish works inshore, into shallow water, the more risks does he feel he is taking, for he exposes himself more and more to danger and his enemies. But these risks he will take to acquire the food that is to be found, often in abundance, in the waters. The frogs have come into the water from the land; the minnows have schooled. He has everything within reach if he dares go in!

Obviously, a heavy lure is not the right lure to use in the autumn when after these bass. The right lure must be light in weight, that it may fall to

the water as soundlessly as possible, and yet, at the same time, not be too small, so that it will escape attention. What lure, for bass, will answer these demands? One lure that has proved never-failing is the bass fly that is connected up to a wire shaft, which has a small spinner, gold or silver in hue, attached to it. A spinner such as this, a trifle less than an inch in length, and three-eighths of an inch wide, makes for an ideal spoon, which should not be too deeply cupped, and should give off a fair degree of radiance when it whirls around.

Now, a lure such as the above, a combination of spinner and fly, is very tempting. It is light, drops hardly with any noise to water, whirls nicely, and is about the best lure for bass that can be found. It is cast with the regulation fly-fishing tackle, a bass fly rod, an enameled line and a six-foot leader, to which the spinner is connected. One may keep well out in the water, on the lake, and, depending upon how good a "shot" you are with the fly, you should be able to place it in every "pocket" near shore. One should cast over all places carefully, laying his casts no less than three

feet apart, and often twice near the same place, if in tempting territory. This scheme of action is suggested, not only for autumn fishing, but for general, all-around bass fishing, any season of the year when the fly and spinner is used. I place this lure at the head of the list as the best, cleanest, most appealing lure to be had, and, on the other hand, *one of the most scientific of the lot.*

Now although the fly, in the sense of the word, is dressed on the hook that is used, in that it has so-called "wings" and a body, still it is not taken by the bass to be a fly. When the fly is reeled through the water the feathers fold in close to the body, the radiance of the whirling spinner fills in the space between, and, looked at through the medium of the water, it shows up more like a glittering minnow than anything. And that is what the fish, obviously, thinks the lure to be.

If you are so fortunate as to strike a late autumn day when the bass are feeding, you will have the time of your life, as the expression goes. True, there are certain days that are far better than others. It is well to know when these days are

to be had. Usually after two or three days of chilly, even brisk, weather, the wind will die down, the sun will come out in a cloudless sky, and there will be a warmth in the air. All life in field, wood and in the water is responsive to this change in the temperature. The bass are quick to move in on the shallows. The time to be out is in the early morning, or just when the warmth is beginning to be felt in the secluded bays. The eagerness of the bass to take the lure is only augmented by the fact that they have not been feeding for two or three or more days, and are "hungry as bears." It is fun to take them with a lure of this sort, which has only one hook. Quite different from the artificial minnows, which are fairly bristling with gangs. With the one hook the fish is not all "hung up," but may fight, and, possibly, get away. It is impossible for a bass striking one of our modern artificial minnows to get away.

When the fishing for the bass in the inshore waters draws to a close, it is possible to fish for them in deep water. Bass hibernate among

rocks, sunken ledges, etc. If such places are located, the chances of a catch are greatly increased. Here the way to fish for them is by means of a long line, still-fishing. The lure that is the very best for such fishing is the fresh-water crab or crayfish, as it is also called. By winding a pair of rubber binders on a long-shanked hook, the bands may then be snapped about the crab, and it can thus be let down without hurting it by driving in the hook. Also, a crab thus painlessly attached to the hook can be used time and again without harm to it.

Fishing in the deep places for bass, off the sandbars and the ledges, starts about the 10th or 15th of November, and for some fifteen or twenty days is very good. Then, as the cold becomes more intense, they seem to retire within themselves, draw the blanket over their heads, and go to sleep. Often bass are caught deep fishing in the winter, but it is rarely so. Only during the short time in the autumn preparatory to their "denning up" for the winter, is it possible to catch them in their deep retreats.



To the bass lover this scene will suggest much

Photograph, by F. V. Williams, London, Ont.

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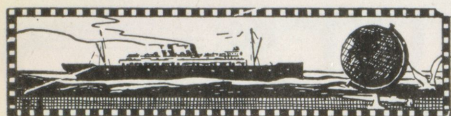
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Mending The Clock

(Continued from page 35)

presentiment that my mother was right about the clock's opening, and I feared she still labored under the delusion that I had been trying to mend the exasperating thing.

On the following day we had a visit from my friend Summer, and he had scarcely sat down in my study when he jumped up, exclaiming, "Hullo, is that the right time?"

I said to him that the clock had stopped, and he immediately took it on his knees. I looked at him sideways, and saw at once that he was the kind of man who knows about clocks. After shaking it he asked me what was wrong.

"It needs cleaning," I said, at a venture, for if I had told him the whole story he might have thought that I did not know how to mend a clock.

"Then you have opened it and examined the works?" he asked, and, not to disappoint him, I said, "Yes."

"If it needs cleaning, why did you not clean it?" was his next question.

I hate inquisitiveness in a man, but I replied that I had not had time to clean it. He turned it round in his hands, and I knew what he was looking for before he said:

"I have never taken an American clock to pieces. Does it open in the ordinary way?"

This took me somewhat aback, but Summer, being my guest, had to be answered.

"Well," I said, cautiously, "it does and it doesn't."

He looked at it again, and then held it out to me, saying: "You had better open it yourself, seeing that you know the way."

There was a clock in the next room, and such a silence was there in my study after that remark that I could distinctly hear it ticking. "Curiously unsettled weather," I said.

"Very," he answered. "But let me see how you get at the works of the clock."

"The fact is," I said, "that I don't want this clock mended; it ticks so loudly it disturbs me."

"Never mind," Summer said, "about that. I should like to have

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a look at its internals, and then we can stop it if you want to do so."

Summer talked in a light way, and I was by no means certain whether, once it was set going, the clock could be stopped so easily as he thought, but he was evidently determined to get inside.

"It is a curious little clock," I said to him, "a sort of puzzle, indeed, and it took me ten minutes to discover how to open it myself. Suppose you try to find out the way?"

"All right," Summer said, and then he tried to remove the glass.

"The glass doesn't come off, does it?" he said.

"I'm not going to tell you," I replied.

"Stop a bit," said Summer, speaking to himself, "is it the feet that screw out?"

It had never struck me to try the feet, but I said, "Find out for yourself."

I sat watching with more interest than he gave me credit for, and very soon he had both feet out; then he unscrewed the ring at the top, and then the clock came to pieces.

"I've done it," said Summer.

"Yes," I said, "but you have been a long time about it."

He examined the clock with a practised eye, and then—

"It doesn't seem to me," he said, "to be requiring cleaning."

A less cautious man than myself would have weakly yielded to the confidence of this assertion, and so have shown that he did not know about clocks.

"Oh, yes, it does," I said, in a decisive tone.

"Well," he said, "we had better clean it."

"I can't be bothered cleaning it," I replied, "but, if you like, you may clean it."

"Are they cleaned in the ordinary way, these American clocks?" he asked.

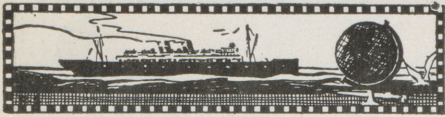
"Well," I said, "they are and they aren't."

"How should I clean it, then?" he asked.

"Oh, in the ordinary way," I replied.

Summer proceeded to clean it by blowing at the wheels, and, after a time, he said: "We'll try it now."





He put it together again and then wound it up, but it would not go.

"There is something else wrong with it," he said.

"We have not cleaned it properly," I explained.

"Clean it yourself," he replied, and flung out of the house.

After he had gone I took up the clock to see how he had opened it. To my surprise, it started to go. I laid it down triumphantly. At last I had mended it. When Summer came in an hour afterward, he exclaimed:

"Hullo, it's going!"

"Yes," I said, "I put it to rights after you went out."

"How did you do it?" he asked.

"I cleaned it properly," I replied.

As I spoke I was leaning against a mantel-piece, and I heard the clock beginning to make curious sounds. I gave the mantelpiece a shove with my elbow, and the clock went all right again.

Summer had not noticed. He remained in the room for half an hour and all that time I dared not sit down. Had I not gone on shaking the mantel-piece, the clock would have stopped at any moment. When he went at last, I fell thankfully in a chair, and the clock had stopped before he was half-way downstairs. I shook it and it went for five minutes, and then stopped. I shook it again, and it went for two minutes. I shook it, and it went for half a minute. I shook it, and it did not go at all.

The day was fine, and my study window stood open. In a passion, I seized hold of that clock and flung it fiercely out into the garden. It struck against a tree, and fell into a flower-bed.

Then I stood at a window sneering at it, when suddenly I started. I have mentioned that it has a very loud tick. Surely I heard it ticking. I ran into the garden.

The clock was going again! Concealing it beneath my coat, I brought it back to the study, and since then it has gone beautifully.

Everybody is delighted, except Summer, who is, naturally, a little annoyed.

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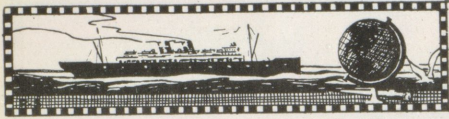
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The Pacific Salmon

(Continued from page 25)

With their destination reached, and if the water has the demanded temperature of fifty degrees, the spawning goes forward. By the aid of her fins the female brushes out a shallow nest or hollow in the sand and gravel

and there the eggs in a steady stream are vented and are directly fertilized by the male. Thereafter the female brushes some sand and gravel over them as a protection and the duty is completed. She now seems to feel the desire to return to the ocean, as does the male, so the trip down is begun. Mutilated, often with



streamers of skin hanging to them and buffeted and rolled over and over by the current, the salmon come down.

The shores are lined with rotting and decaying fish. None of them survive.

Wild animals gorge themselves on the spoils; bears grow fat; eagle and fur clash in a battle for the possession of the choicest of the expiring fish.

The period of incubation of the salmon eggs is about fifty days. For six weeks after hatching the fry live on the contents of the yolk-sac on the breast then start to feed on the tiny life of the waters. When the salmon enters the sea, at five or six inches of length he is known as a "parr." He speedily begins to gain weight as he feeds on the myriad food of the ocean.

Canadian Direction Finding Stations

By WILLIAM T. JOHNSTONE

SINCE THE DAY that Marconi discovered the possibility of telegraphic communication without wires, experimenters have worked in a field of tremendous scope, in which undreamed of things have been uncovered in the scientific world. In fact, so rapid has been the development of wireless in the last few years, that electrical books written on it have gone out of date in a few months after their publication. Even engineers find it hard to keep "up to date" in their profession, and operators are constantly drilling on the latest improved apparatus.

The late war was responsible for the erection and operation of several Direction Finding Stations along the Canadian Coast—they being a prodigy of wireless achievement.

Just how accurate these stations would pan out was a query. They had to be tested thoroughly under all weather conditions; numerous calibration tests were essential, and the best and most skilled operators procured to do the work. When this was accomplished, and reports superseded all expectations, the Government took advantage of the fact and made it the most perfect service of its kind in the world.

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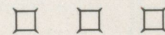
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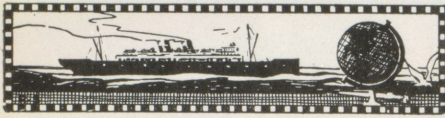
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it there is no doubt whatever. The cache is an historic fact.

Toward the autumn of 1758, and the menace of invasion by the British, the French brought into Quebec Citadel, which was taken to be impregnable, a vast amount of louis-d'or's, and other coins, together with family jewels, heirlooms, and other valuables of the seigneurs of the Province that is now. When it was certain the Citadel was to be attacked, Montcalm directed the treasures to be sewn up in hides and pigskins, placed in barrels and stout boxes, and to be taken by boat up the St. Charles River. There they were to be buried until the danger was over.

This was done. The accomplishment of it is proved by the fact that the strong rooms and treasury in the Citadel were empty when the victors took over the fort, and under their eyes nothing had been taken out.

In the spring of 1908, the owner of an old chateau not far from Quebec took it into his head to rebuild the great, old-fashioned fireplace in the main room. On removing one of the huge cut stones behind the back of the fireplace, he came across a little cavity, and there a small silver-bound box, with a tarnished key in the lock. When the box was opened, a small parchment, yellow with age and brittle with the heat of the fires, was found, and on it, written in the hand of a French scholar of the mid-eighteenth century, were certain directions. Translated into English, they read: "At the little bay on River Saint Charles, ten feet up the east bank and five feet deep in the earth, you shall find buried in plaster, burnt wood, plate and ingot of silver, and the skull of a sheep. Beneath is the secret of a great treasure."

The French-Canadian, who was aware of the tradition of the Quebec treasures, took counsel with the parish priest. The two went secretly to work next day, and, after much trouble in agreeing on the likely spot, and in the measurements, they began to dig. At a depth of some six feet, they found the items enumerated, and beneath them a little rusty, iron-bound box, which they burst open. It contained a very rough chart, and information written in French of the time of Mont-

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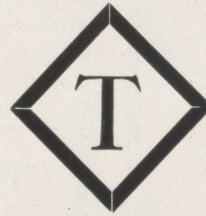
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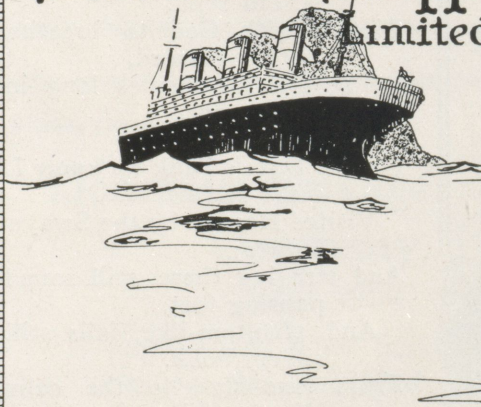
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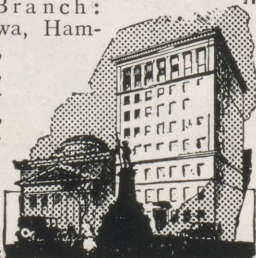
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calm. It read: "Across River Saint Charles to the wood near the small bay and peninsula. Twenty feet N.N.W. by N. toward the group of firs. Fifty feet as the sun sets. Five feet deep and set in plaster the great treasure from the Citadel. God save us all."

The habitant and his priest, after pondering over the chart and directions for some days, went energetically to work, and, after much groping around and calculation, they began to dig. As, however, the land is now the property of the Catholic Church in Canada, the work had to be done secretly and at night. They dug in vain. Others have dug, also in vain. For, though the documents are to be relied upon, that little peninsula of the Saint Charles has suffered from the floods and winters of more than one hundred and fifty years, and the face of it has become altered. So Nature, as in the case of the buried millions of Cocos Island, has meantime sealed up the whereabouts of the long-concealed treasures of Old Quebec.

I Think How Walton—

I THINK how Walton once, in quiet joy,
'Mid scenes esthetic plied the angler's art;
And far from base renown and hate's annoy,
Found comfort in the dictates of his heart.
By flower-lit mead heard the first summer bird,
And rippling rill o'er Stafford's bosom sent;
Plotted with God to breathe th' immortal word,
The fruitful themes long in his being pent.

On the Dove's bank he knew Life's inner sweet,
Visited Heaven by the Swaynham Brook;
And straying there, still sound his pausing feet,
And, phantom-like, falls still his silvery hook.
From Axe-edge to the calm of Weaver Hill,
His golden presence holds fore'er its thrill!

—Robert Page Lincoln.

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One Perfect Day

WHAT tho' the morrow bring
to us no song
Of birds that now are nest-
ing 'neath our eaves;
What tho' our hearts must hear the
whole day long
The dreary drip of rain upon the
leaves!

What tho' the violets we cull today,
Before the morrow's dawning droop
and die;
What tho' the roses, shaken from
the spray,
Within our garden bruis'd and
broken lie!

Grieve not, tho' we may lose each
precious thing,
For memories will ever with us stay,
Thro' all the gray tomorrows we
can sing:

"God granted us at least one
'Perfect Day.'"

—Constance I. Davies.

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THERE IS the small-mouth!
Blessed be the name!
The bronzen warrior of the
crystal deep;
He will not fail you. Ever
cunning keep,
The line well taut, and mark you
well the game.
If by your art his spirit you would
tame.

Be watchful! There he'll dash
and leap,
Tossing him high — up watery
steep;

Ascending like an arrow touched to
flame!

The Yellow Sally—that shall be the
fly,

The lure par excellence! Enter-
tain no doubt;

'Twill stir his fins, look good unto
his eye,

And set him to it for a finish bout.

Have care! He has it! Hold him!
Steady there!

And now the net. A fish beyond
compare!

—Robert Page Lincoln.

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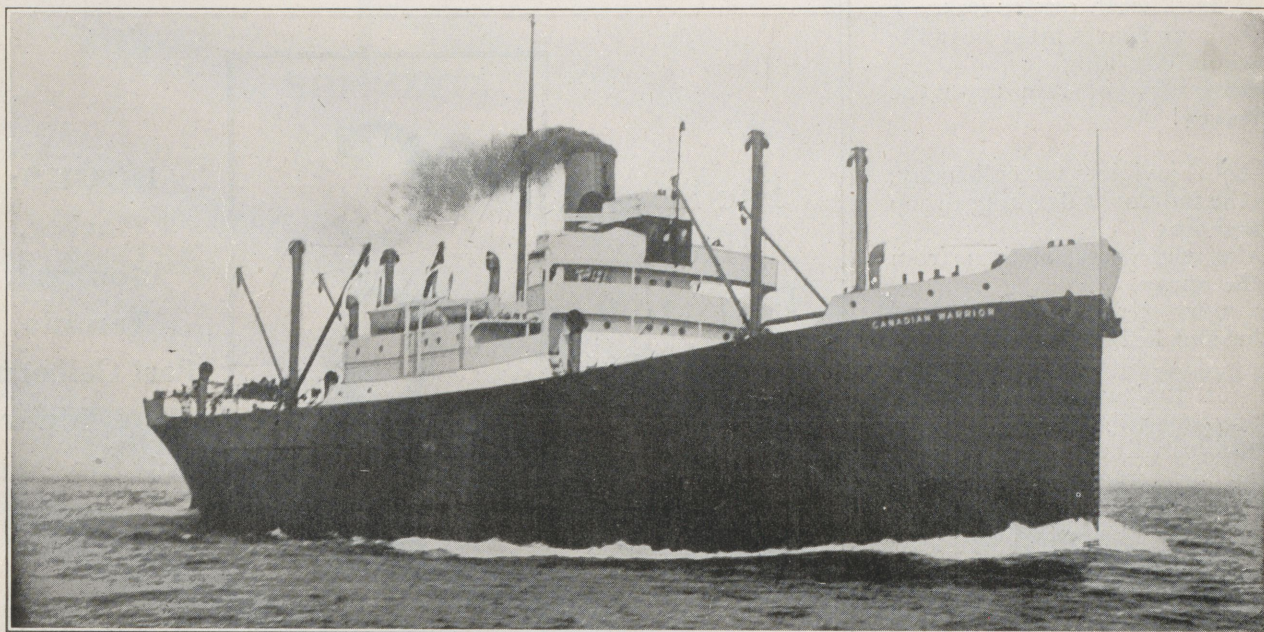
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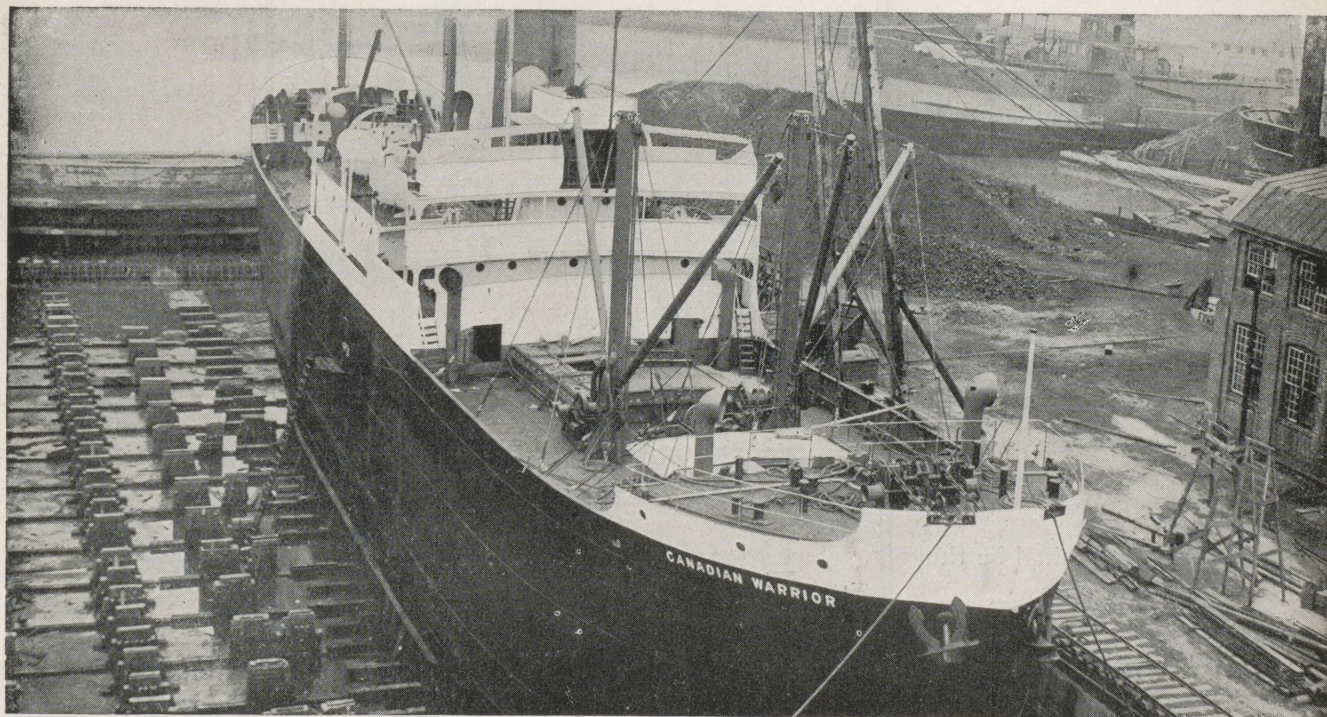
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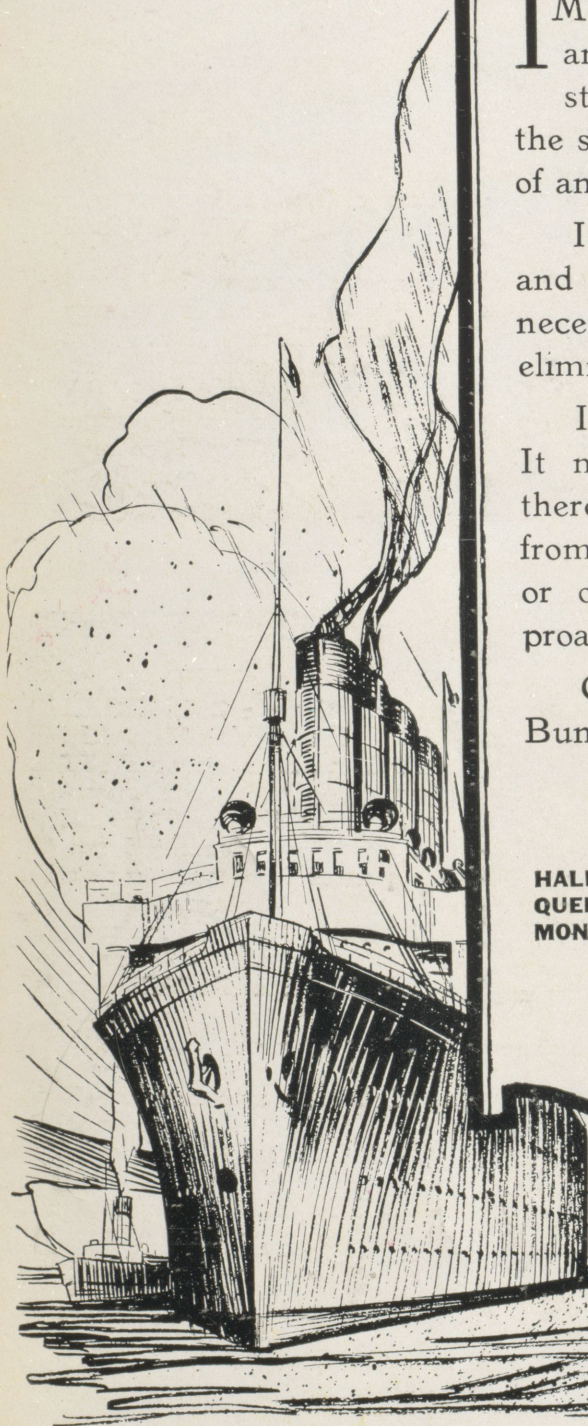
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