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Editor: REGINALD E. HORE, B.A. (Toronto).

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SIXTEEN MINERS KILLED AT NANAIMO.

Sixteen miners lost their lives on the morning of Tuesday, September 10th, when the cage in which they were descending the Protection Island Shaft of the Canadian Western Fuel Co.'s Mine, Nanaimo, B.C., became detached from its cable and fell a distance of approximately 300 feet. The cage had raised all the men of the night shift to the surface and carried six loads of sixteen down when the accident happened. It had scarcely left on its seventh trip when the cable parted, the miners still waiting their turn being informed of what had taken place by seeing the parted cable, released of its load, swinging loose in the shaft. Subsequently it developed that the safety locks had failed to act and that the cage had struck the loading landing, constructed of twelve-inch timbers, with such force that it went through, finally resting 50 feet lower on an abandoned level not used since the upper seam was opened some years ago.

This is the most serious coal mine disaster that has occurred in British Columbia since early in the month of April, 1917, when 34 miners lost their lives in an explosion at the Coal Creek Mines, Crows Nest Pass Colliery, Fernie. Hon. Wm. Sloan, Minister of Mines, has promised that the fullest investigation will be made in order that the responsibility may be fixed.

NO MORE CHEAP COAL

Having in mind the great need for increasing production of coal, it is distressing to learn that miners are idle in coal mining districts in Nova Scotia and British Columbia. In view of the high cost of living, it is natural to expect that high wages must be paid, and it is not surprising that some workers are ready to take advantage of the shortage of labor to demand higher wages than the conditions warrant. It is regrettable that in Pictou and Fernie valuable time has been lost by the men going on strike and showing an unwillingness to do their part towards keeping production of coal from falling below the already disappointing level. Coal miners, or any other men, who quit at this time, when so much depends on the maintaining of the output of munitions of war, need not be surprised if their actions bring public disfavor.

We are pleased to learn as we go to press that the Pictou miners have agreed to return to work, and we hope that the miners in the Fernie district will soon find it possible to do likewise. We have no doubt that the majority of miners on strike regret that they have given the public such a bad impression by their action.

There can be little doubt that coal miners have been justified in asking for higher wages than they received a few years ago. They are now, however, receiving much higher wages. We believe that coal miners deserve higher wages for their hard and dangerous work than workmen who have easier and safer occupations and we hope that the very low wages of pre-war days will never return. We have, however, little sympathy for the men who seek to take advantake of present conditions to force, by strikes, unreasonably high wages regardless of the effect of their action on the war effort.

The low wages that prevailed in coal mining regions in former years were largely due to the low prices at which coal has been sold. We believe that investigation will show that coal has for years been selling at too low a price in North America. The men who mine the coal deserve more than they have received for their labor, and the men who supplied the money for the industry deserve more than they have received for the use of the money. The capital invested in mines and plants is very large and the dividends small. Consequently, the industry has been unable to give high wages to miners. The whole matter needs adjustment and it looks as though adjustment may come soon. Undoubtedly the public will have to pay more for coal than in the pre-war days.

One natural result of higher price for coal will be higher wages to coal miners. Another good result will be more complete utilization of our water powers. Both are things much to be desired.

A Possible New Fuel Oil Industry for Canada

By James Ashworth.

For quite a number of years a small coalfield has been known to exist about fifty miles north of Kamloops. It was visited and reported on by Dr. Dawson, who stated that the seams were too thin for operation. The exposures so far discovered are all at Chu Chua in one creek called Coal Creek. Since Dr. Dawson's visit, another seam of coal of workable thickness has been discovered, and to some extent worked. The coal, when tested on the Canadian Pacific Railway, was reported as having given very satisfactory results. At that time, there was no railway transit to and from Chu Chua, but now the Canadian Northern Pacific Railway passes through the district and through the coalfield. A workable seam of cannel coal has also been discovered, but never opened up. Later still, another seam of coal has been disclosed by a freshet, and will doubtless receive attention from one of the syndicates which have been formed to test the possibilities of the coalfield. The coal previously worked proved to be of a hard bituminous and coking quality, though at present it is not known whether the coke will be sufficiently hard for metallurgical purposes.

Cannel coal is also known in the Crow's Nest Pass coalfields and oil shales will probably be found when they are systematically looked for.

As a consequence of the excessive demand for mineral oil for war purposes, the ordinary sources of supply have proved insufficient to meet the demands of the market, and, therefore, other sources must be energetically prospected. One other source, which is receiving close attention in Great Britain and the United States to-day, is to extract oil from cannels, bastard cannels, shales, torbanites, blackband ironstone, coal, lignites and peats. In Scotland, large tonnages of oil shale have been and are being converted into fuel oil and for other purposes. The fuel oil yield is not more than 60 per cent. of the total yield of, say, 20-30 gallons per ton. Very few cannels yield as much as 50 gallons of oil per ton, but many of them will produce 40, and some of the Utah shales as much as 80 gallons per ton. The yield of sulphate of ammonium is very considerable, and may, with high-temperature carbonization, reach 60 lbs. per ton of cannel. Paraffin wax may also be extracted.

Experiments made on coal for the Nitrogen Products and Carbide Co. in Lancashire, with the Glover-West vertical retorts, showed that if 4.2 tons per 24 hours were put through at a temperature of 1,411 degrees Cent., and 2.6 tons per 24 hours, at a temperature of 1,194 degrees Cent., that more tar oil was produced per ton at the lower temperature. Good cannels should, therefore, be treated for oil in low temperature retorts.

At a meeting of the Manchester Geological Society, on the 12th of March, a paper was read by Mr. J. Drummond Paton, on the recovery and use for oil and power purposes from wastes, shale and lower grades of coal. The process advocated was to carbonize the coal, cannel, shale, etc., in a short period of time, so that the lighter gaseous hydrocarbons (which condensed as tar oils) were not destroyed by a high temperature. The apparatus used was the Tozer concentric retort, working under a high vacuum of 20 inches of mercury. Carbonization was perfected in four hours. The crude oils (water free) varied from 16 to 80 gallons per ton of coal carbonized. The purified oils were of the paraffinoid series, and the light oils were excellent for motor spirit and resembled petrol in their efficacy.

Napthalene and anthracene were entirely absent. The tar acids were practically phenols and cresyllic acids, and were produced at temperatures of from 900 deg. to 1,200 deg. Fahr.

The yield of gas was from 5,000 to 6,000 cubic feet per ton, and its heating value about 800 B.T.U. per cubic foot. The cannel gave 6,000 to 8,000 cubic feet of gas per ton. The residual coke retained from 7 to 10 per cent. of a volatile inflammable non-smoking gas, which burned with a lambent, smokeless flame, yielding great heat, with an approximate calorific value of 13 500 B.T.U.'s per cubic foot.

Very inferior coals yielded good fuel results, but for a high yield of oil, cannels and shales were certainly preferrable.

It was found that a thickness of 2½ inches in the retorts was the best basis for carbonization. The same material which gave the low temperature distillates also gave the benzoid series.

The United States Department of Mines has made a practical search for oil shales, and their development and conversion into oil is now practically established.

It is important, therefore, to note the difference between coal and cannel coal and between these and oil shales—the first when of a bituminous quality will usually produce good coke as one of its residuals, but cannel and the oil shales do not produce a metallurgical coke, though the residue of some of them may be used to heat retorts and stoves. Cannel coal and oil shales were, before the discovery of petroleum, largely used as the source of mineral oil.

Cannel coal being the resultant of the oxidation of water-laid deposits consists mainly of plant spores, pollen and the remains of water plants, animals and fish. As a source of oil, the cannel which contains the least water and the highest percentage of hydro carbons is the most desirable.

It is recognizable by its velvety appearance and its peculiar conchoidal fracture, is jointy and hard, does not blacken the hands, and is almost immune from weather effects. In the best cannel, the fixed carbon is much less in percentage than the volatile content. Cannel deposits, having been collected and formed in basins or lagoons, are not so regular in formation as is coal, and yet cannel and coal may be found in close contact and as part of the same seam. The illuminating value of gas made from cannel is greater than that made from coal, and the yield of oil per ton is also very much greater. One high-class cannel in the Wigan Coalfield, England, is known as Curley or Birds-eye Cannel, from its peculiar fracture. In the shales overlying cannel it is often possible, when the shale weathers and splits into thin sheets, to find very interesting fish remains.

Cannel coal, when scratched, gives a brown streak and its specific gravity being lower than coal, it naturally results that the lighter it is, the more valuable it becomes.

When examined under the microscope, it shows that plant spore cases and waxy resinous matter are its main constituents. Where the seam has been changed

into coal, we may assume that originally a larger percentage of water-growing plants or bog had accumulated. Naturally, it results from this mode of deposition that basins of cannel coal are found to be very irregular in area and thickness, and also as frequently occurs, they are overlaid by bituminous coal of a more regular thickness.

In Great Britain, two official reports of committees appointed to deal with the question of home sources of fuel oil have recently been issued. These were (1) that of the committee appointed by the Ministry of Munitions of War on the "Production of Oil from Home Resources," and (2) that of the "Interim Report of the Committee on the Production of Oil from Cannel Coal and Allied Minerals," appointed by the Council of the Institution of Petroleum Technologists.

The summary of the conclusions of the first of the above committees was as follows:—

"(1) That the scheme for the carbonization of cannel coal and kindred substances recommended in the Petroleum Research Department's report was not a practicable one, and that the Ministry of Munitions were justified in declining to embark on it. (2) That the alternative policy of developing the production of fuel oil from cannel coal and kindred substances in existing vertical retorts at gas-works should be developed within the limits indicated in this report. (3) That the decision of the Ministry of Munitions to erect a battery of the Chiswick form of retorts was the right course to adopt in the circumstances."

The possibility of obtaining oil in quantity from the low temperature distillation of cannel coal and its cognates was considered by the second of the above-named committees under the following heads: (1) As an immediate war measure, having in view the production of motor spirit and fuel oil for the services; (2) As a permanent commercial undertaking and a measure of reconstruction.

They now strongly urge the adoption of the following recommendations: —

"(1) That the War Cabinet should be invited to lay down a definite policy for the guidance of the Departments as to the relative national value and importance at the present time of oil and coal, the provision of the necessary labor, raw materials and transport. (2) That the Government should afford all necessary facilities to those who are prepared to find the capital and take the risk for the erection at suitable centres of plant for the treatment on a commercial basis of the material known to exist. (3) That an experimental station be established forthwith, so that retorts of any design provisionally approved by the Institution of Petroleum Technologists can be erected and tried out, and material tested with a view to ascertaining its character, oil yield and residual values. (4) That such experimental station shall be maintained by and at the expense of the Government. Or, alternatively, (5) That the Government shall afford all necessary and reasonable facilities to the Institution of Petroleum Technologists for the erection of a testing station of their own."

In reviewing the above-named reports, the Iron and Coal Trades Review, of London, England, August 9th, 1918 says:—

"From the point of view of the coalowner and the miner, the statements contained in Clause 7 are of considerable interest. Various estimates have been made from time to time as to the additional amount of material which could be brought up by the utilization of the shovel, instead of the fork, and perhaps to say 15 per cent. would not be too high. If, therefore, the nation could be provided with a sure supply of oil by bringing up this material, the miner be paid for filling, and the colliery owner obtain a remunerative price for such material for the production of oil, it is quite obvious that the consent of the Government to the recommendations of the Committee would be of the greatest national importance, not only to the consumer, but to those directly and indirectly associated with the mining industry of the country. The question of the utilization of colliery waste is one which has for long been under consideration, and this solution, advocated by some of the highest technical authorities in the country, is one which should receive the general support, not only of those responsible for the provision of oil, but of the colliery owner and the miner.

Now that we have the two reports side by side, one more or less of a political character and the other signed by a committee of experts, it is interesting to recall that the Fuel Research Board (Sir George Beilby, director), which issued its report on September 10th, 1917, finds that "no new carbonization scheme can be justified economically, if it can only live by poaching on the preserves of the existing industries."

The stress of war conditions is now being brought to the attention of the general public, through the shortness of gasolene, and fuel oil, and the consequent closure of garages and stoppage of their use on Sundays. It is also evident in the replacement of fuel oil by coal and coal dust, both ashore and at sea. These indications of "want" cannot be lost sight of, but they do not appear to have received any practical attention from the Scientific and Industrial Research Board. This Board does, however, appear to have taken a distinct interest in the production of an anthracitic briquette, from the lignite coals of Saskatchewan, and in this way some of the residuals may do something to relieve the urgent demand for oil. There is, however, the possibility that this proposal will not come into practical effect until the war is over, and the urgent demand for mineral oils and spirit has become a thing of the past. If the expensive experimental plant to be erected by the Provinces of Saskatchewan and Manitoba, does not prove successful, in competition with the real anthracitic coals of Alberta, then it may prove to be useful and profitable as a means of treating oil shales, if these can be discovered within a reasonable distance of the works.

Canada has become used to a "bonus" system to encourage the introduction of new industries, and the present seems to be a suitable time to further extend this system to encourage the production of oil and other by-products from coal and oil shales, as has already been recently done by the Province of British Columbia as regards iron and steel.

The discovery of manganese ore in the Cowichan district, Vancouver Island, promises to prove of considerable importance to this section of British Columbia and, more important, to provide quantities of that essential mineral for munition manufacture in Canada. Samples treated by the Provincial Mineralogist are said to indicate the presence of ore of just the character that is so much required. A Vancouver, B.C., firm's certificate shows 46.20 manganese, 26.92 silica, and 0.064 phosphorus, while a Seattle assay reads: Manganese 54 per cent., and silica 18.4 per cent.

THE LABOR TROUBLE AT FERNIE.

At the time of writing, September 21st, there are on strike in the Fernie coal district, British Columbia, about 1,200 miners, who are demanding that the single-shift system be introduced in the operation of the mines of the Crow's Nest Pass Collieries. Their action is based on the statement that recent "bumps" in the mines of the locality, while without fatal result very recently, have demonstrated that the lives of the men are in constant jeopardy. The only remedy, they contend, is the introduction of the single shift. In support of their position, they point to the report and recommendations of Prof. George S. Rice, of the United States Bureau of Mines, who made an inspection and submitted a report on conditions in this district for the British Columbia Government.

The walk-out, which affects all the mines of Fernie and Michel, B.C., came suddenly, although there had been talk and agitation for some time before it happened. An understanding, however, had been reached between representatives of District 18, U.M.W. of A. (which includes the eastern section of British Columbia and a part of the Province of Alberta) and Mr. W. R. Wilson, general manager of the Crow's Nest Pass Coal Co., that no drastic step would be taken by the men until the 1st of October, Mr. Wilson promising that he would have his answer by that date as to what course the company would be prepared to take with respect to their demand. The Fernie Union did not consider itself bound by this agreement, however, and declared a strike on September 5th, and called on the district organization for support.

After some preliminary negotiation, which was without result, a conference was arranged to take place in Vancouver, B.C., between Hon. William Sloan, Minister of Mines for British Columbia; Mr. W. H. Armstrong, Director of Coal Operations in District 18; and representatives of the men, the latter including Mr. Thomas Biggs, President of District 18, U.M.W. of A.; Edward Brown, Secretary-Treasurer of the District Organization; and Messrs. Hunter, Potter and Beard. This took place between the 18th and 20th instant, both dates inclusive, all those mentioned attending, with the exception of Mr. Wilson, general manager for the Collieries, who, while in the city, refused to meet the men, maintaining that they had broken faith with him and that, therefore, he did not care to discuss the matter with them in person.

In the course of the conference, Mr. George Wilkinson, Chief Inspector of Mines, was called and gave an account of the steps taken since the submission of Prof. Rice's report for safeguarding the mines against further accident. A more thorough ventilation system had been introduced, with the result that analyses of the air in the return airways showed a reduction of the percentage of methane of from 25 to 75 per cent. Automatic gas detectors of the type approved by the United States Bureau of Mines had been installed and these had detected gas in as small quantities as one-tenth of 1 per cent. The old safety-lamp tests were merely guess work below 2 per cent., so that the automatic detectors were a marked improvement. The company also had agreed not to take out more than 15 per cent. of the coal in the first working, leaving the remainder to be recovered in retreat operations. Coal dust was being treated by sprinkling and by covering with flue dust.

The men did not dispute the assertion that conditions were much better than formerly, in fact, it was admitted that the improvements indicated had taken place. They insisted, however, that what had been done had not eliminated the "bumps" and declared that this danger could only be met by doing away with the double shift. In the ensuing discussion, doubt was expressed as to whether the single shift, even if secured, would do away with "bumps," which were seismic disturbances peculiar to the Crow's Nest Pass coal field. It was further stated that, in order that warning might be obtained of such movements, a seismograph station was to be installed at Fernie by Mr. F. Napier Denison, the official seismographer for the Dominion Government at Victoria, B.C.

All apparent means of a solution having been exhausted, Mr. Sloan, the Minister of Mines, submitted the following as a basis for settlement on his own responsibility:

"In the interest of the industry and for the purpose of arriving at a quick decision so as to enable the much-needed output of coal to be maintained, I make the following proposals to the miners now idle and to the company involved:

"1. The immediate appointment under authority contained in Section 73 of the Coal Mines Regulation Act of a Commission composed of three members, one chosen by the miners and one by the operators and the third to be appointed by the Lieut.-Governor in Council, on the recommendation of the Minister of Mines, this Commission to immediately proceed to take evidence on the questions involved insofar as they affect any or all mines in Coal Creek and Michel and to be prepared to report within thirty days of their appointment to the Lieut.-Governor in Council, whether, in their opinion, the single shift would be advisable in any or all the mines in said area. The recommendations of this Commission, if any, to be binding on both operators and men until the conclusion of the war.

"2. If the above proposal is satisfactory, I will be prepared, as Minister of Mines, to introduce, at the next session of the Legislature, an amendment to the Coal Mines Regulation Act, calling for one shift in every twenty-four hours for the production of coal throughout the Province of British Columbia, except in cases of national emergency. This amendment to become effective within one year after the conclusion of the war."

This was submitted to Mr. Wilson, the company manager, and accepted, but when it was put to a mass meeting of the miners on strike at Fernie and Michel, was rejected unanimously.

Messrs. Biggs, President of the U.M.W. of A., and Brown, its secretary-treasurer, then submitted a counter proposition to the effect that they would be willing to recommend to the men of the affected section that they return to work on condition that they be given the single shift for the thirty days which would be occupied in the investigation and the preparation of a report by the Commission proposed.

This suggestion has been laid before Mr. Wilson, and it is hoped will be accepted, as the continued inactivity of the miners of the Crow's Nest field, and the possibility of the strike extending throughout the whole district, thus taking some 9,000 miners from work, is causing considerable alarm throughout Canada.

THE HOISTING ACCIDENT AT NANAIMO.

In order that necessary tests may be made to determine the cause of the breaking of the cable used for the lowering and hoisting of men in the protection shaft of the Canadian Western Fuel Co., Nanaimo, B.C., which took place on the morning of the 10th September, with the result that sixteen miners were plunged to their deaths, the inquest was adjourned by Coroner Hickling last Friday evening to the 22nd October. Meanwhile, Wm. Fleet Robertson, Provincial Mineralogist, having been sworn as an official of the Court, will take the broken cable to Eastern Canadian laboratories to supervise "critical microscopic and chemical" examinations and tests of the same. He also is taking samples of water taken from the flow in the shaft, which he will have analyzed to ascertain whether it contains any deleterious matter likely to cause corrosion or other deterioration of the cable and, besides, has been given samples of the oil used in lubricating the rope, which will be treated with the same object. Mr. Robertson will have tests made of the springs used in the operation of the safety clutches, with which the shaft was equipped and which failed in their purpose, the cage, freed of the cable, having travelled unchecked to the bottom.

The inquest, which opened at Nanaimo on the morning of Thursday, the 12th instant, the disaster having occurred on the morning of the 10th, was marked by a clear indication on the part of the authorities to bring out all the evidence, without fear or favor, which might be relevant. Examination of witnesses was conducted by Mr. A. Johnson, Deputy Attorney-General, assisted by Mr. George Wilkinson, Chief Inspector of Mines, while the interest of the Government and of the Department of Mines in particular in seeing that the inquiry should be as thorough as possible, was indicated by the fact that Hon. Wm. Sloan, Minister of Mines, was present in person throughout, and frequently took part in the cross-examination of those called upon to testify. Mr. Johnson, at the outset, declared that he was in attendance, with instructions to have all light that could be obtained shed on the circumstances attending the fatality. With that in mind, he had to ask that the inquest be made as broad as was reasonable in its scope and he hoped that, if there were within hearing any who knew anything that might strike them as being of any importance, they would not hesitate to mention it to him, in order that it might be put on record.

The work of taking testimony then commenced, the scene of the fatality at the bottom of Protection shaft having been visited by the jurors, who had been sworn in on the 10th, within a few hours after it happened. This was continued throughout Thursday and Friday, with an interval on the afternoon of the first-mentioned day, when the funeral took place, it being attended by Hon. Mr. Sloan and other Government and company officials. In all, fifty witnesses were called and examined before adjournment.

James Menzies, rope expert, who is employed by the Canadian Western Fuel Company to make examination at regular intervals of all cables in use in the company's mines, was one of the chief witnesses. He informed the court that he made an inspection of the cables once a week. His last inspection of that which broke was on the 4th of September. On that occasion, as at all times, the cable had been paid out and had passed through his closely gripped hand for its full length. If there had been any broken strands then they must have been noted either when they struck his flesh or by his eye. He also said that his practice was to inspect the safety clutches and these also, on his last visit, had been in good working order.

Another important witness was C. Wallbank, who, until the 28th of August, was employed by the company to make the daily inspection of cables, etc., required under the terms of Section 91, General Rule 36, of the Coal Mines Regulation Act. On the date indicated, he had left the service of the company. Up to that time he had made the daily inspection required and filed the necessary report. He had never found anything wrong with the rope in question. It appeared, from the evidence of C. Nicholson, that the latter took Mr. Wallbank's place. The former swore that he had inspected the cable and cage, but, on cross-examination, it was found that this inspection was only of fifty feet of the cable from the cage, whereas his daily report would lead to the belief that it extended over its full length.

S. Tembey, the engineer in charge of the operation of the hoisting machinery at the time of the break, swore that he was not using steam or brakes at the moment the cable gave way. Further testimony on this point was given by Wm. Woodman, an engineer of some thirty years' experience, who said that as the rope had broken 157 ft. from the cage and as the shaft is 650 ft. in depth, the cage, when it was let loose, was only approximately one-quarter down, or had travelled but a short part of the trip. He argued from this that there was no need for the application of the brakes; neither he nor any other engineer, would find it necessary at that point to use brakes. This was of importance, it may be explained, because of the possible theory that the snap was the result of the sudden application or restraint on the descending load.

Inspector of Mines, J. Newton, took the stand, but merely stated that he was on his way to make an inspection of the mine from protection shaft on the morning of the accident. He inspected once a month. His practice was, first, to go to the records to find out whether all the required entries had been made. If these showed that the ropes had been inspected as necessary by Statute, they would be accepted by him as accurate.

In the course of the Friday afternoon session, Deputy Attorney Johnson obtained an admission from Mr. Woodman that the latter had heard complaints from the men as to the methods of one of the other engineers in lowering the cage at protection. It had been stated that the miners at times became indignant at the jerky manner in which they were lowered. Mr. Johnson insisted that the witness give the names of the miners who had made these statements; but Mr. Woodman declared that it was unfair that he should be required to give hearsay evidence. It was explained by Mr. Johnson that what he wanted was to secure such information as would enable him to call the men in question. Witness then said that some of them were in Court, and asked them to declare themselves. One did so, but there were no further volunteers. On the suggestion of Mr. Sloan, the doors were closed and all miners who descended Protection shaft present were put on the stand and sworn. From some of these, it was established that there were complaints from time to time because of the jolting of the cage, in some instances, it being stated, that it was so roughly

handled that the men were almost thrown off their feet.

Before adjournment, Mr. Fleet Robertson was sworn and charged by Coroner Hickling as follows:

"I hand to you Exhibit 7, which is a bottle of water taken from the shaft of the Protection Mine, under the supervision of Mr. Devlin, acting for the Government, and Mr. Garman, acting for the company. I ask you to take this to Montreal and have it analysed and see whether it contains any deleterious matter which would be liable to affect the strength of the cable. I will ask you to be present at the examination of this water and to bring the results of the examination and any unused portion of the water back with you, when you are next called upon to give evidence at this inquest.

"I also hand to you Exhibit No. 9, which is a sample of oil used by the Canadian Western Fuel Co. for oiling the rope attached to the cage in question." Mr. Robertson then was requested to take this to Montreal, that the same tests might be made for the same purpose.

"These are some parts of cable," the Coroner continued, "which I give into your possession. You will take these to McGill University, Montreal, or some other institution with the necessary laboratory equipment, for the purpose of having the same tested and a critical chemical and microscopic examination made of the fractured ends, in order to ascertain, if possible, what caused the rope to break. It will be necessary to obtain an exhaustive examination of this rope to know whether its efficiency had been impaired in any way, and, if so, to ascertain the cause of such impairment, and I request that the ropes be subjected to all practical strains and tests, in order to arrive at your conclusion. I would ask you to attend at these tests.

"Another exhibit, being the springs attached to the clutches in question on the 10th of September, will be placed in your charge for testing, but these have been unavoidably detained at the bottom of the shaft and will come into my possession to-morrow, when they will be given you. I would ask you to be good enough to take these springs and have them tested, in order to ascertain whether or not their efficiency has been impaired.

"And now, Mr. Robertson, I fully realize the responsibility I am imposing on you, knowing the important position you have with regard to the Provincial Government, and I know that you will fulfill the duties I impose upon you to the best of your skill and knowledge, and that you will in due course return with the results of the investigation when you are next called upon to give evidence at this inquest."

License Needed for the Export of Silver.

Export of Canadian silver coin, silver bullion and fine silver bars is prohibited except under license issued by the Minister of Finance, according to Ottawa advices. The regulations are to provide that licenses shall be issued only where the silver is to be used for civil or military purposes of importance in connection with the war and only in cases where the exporter certifies that it has been purchased at a price which does not directly or indirectly exceed $1.01½ per ounce, 1.000 fine, at the point where the silver is refined or at the point of importation in the case of imported silver. The order-in-council states that serious difficulties have arisen in connection with the purchase of silver which is urgently required for coinage by the allied governments and recites the steps taken by the United States and British Governments.

THE E. & N. RAILWAY CO.'S LANDS, VANCOUVER ISLAND, B.C.

The question of the joint administration of all minerals in the E. & N. Railway Co.'s lands on Vancouver Island, with the exception of gold and silver, which alone are vested solely in the Province, was taken up with Lord Shaughnessy, President of the Canadian Pacific Ry. Co., by Hon. William Sloan, Minister of Mines, at Vancouver, B.C., on Thursday, the 19th instant, with results which Mr. Sloan considers very satisfactory.

Mr. Sloan found that the President of Canada's great railway corporation was thoroughly conversant with the situation and that he was prepared to agree with the position taken by the Department of Mines, and unanimously endorsed by the Legislature of British Columbia at its last session, that the present system of mineral control within the area owned by the Island Railway was most satisfactory from a public standpoint.

With Lord Shaughnessy, the Minister of Mines reviewed the situation, pointing out that, because of the existing dual control, the development of the mineral resources of the 3,296.9 square miles of railway land on the Island was being seriously retarded. He emphasized the fact that, owing to the complications likely to arise in the securing of title to minerals other than gold and silver in this section, prospectors were not inclined to go into the field within its limits. The difficulties were aggravated, it was pointed out, by the fact that where gold and silver was discovered on the Island, the ore usually, in fact almost invariably, contained other minerals. For the encouragement of prospecting in the E. & N. Belt, and in the interests of the mining industry of this part of the Province, therefore, it was desirable that there should be some understanding between the Province and the Railway Company as to the development of resources known to exist, but hitherto practically untouched in an economical sense.

Lord Shaughnessy listened to these representations sympathetically and admitted that the situation was not desirable. He intimated that officals of the company would be deputed to enter into negotiations with Mr. Sloan, having in view the arriving at a decision which would be mutually satisfactory.

At the recent annual meeting of the Rambler-Cariboo Mining Co., one of the producing mines of the Slocan District, British Columbia, it was stated by Mr. A. P. McClaine, president, that the company had a surplus of $29,120 on August 3, and that the ore at the smelter, in transit and ready for shipment by September, is valued at $21,000. He continued: "We have found little clean ore in our recent operations, so that the output next year is likely to be confined mainly to ore of a milling grade. We have been able to operate the mill on a basis of only a shift a day because of the shortage of mill men and, under these circumstances, the profits have been light, running about $2.000 a month. We are trying to buy a locomotive for the transportation of men and materials in the tunnel. Speed in transportation has become an essential since the hours of labor are limited to eight hours from portal to portal. Mr. McClaine was re-elected president; Mr. Alfred Coolidge, secretary-treasurer; W. A. Cameron, superintendent; while the Board is composed of the foregoing together with Messrs. H. Coldwell, Jackson Armstrong, Charles F. Mackenzie and the Rev. P. F. Hylebos and Dr. J. F. Hall.

Mineral Production of British Columbia

By E. Jacobs.

The Annual Report of the Minister of Mines for British Columbia for the calendar year 1917, issued recently, includes the revised figures of mineral production in that Province for that year.

In the review that follows the figures showing quantities of minerals produced, rather than those of value, are used, so that the actual production of minerals may be given prominence rather than that of value, the latter being subject to fluctuations of prices and so not constituting as fair a basis for comparison.

An instance of the way in which comparisons of **value only** fail to convey a fair idea of the relative importance of the actual production of minerals in different years may be found in the first paragraph of official comment under the head of Progress of Mining, in the Annual Report under notice. That paragraph reads: "The gross value of the mineral production for 1917 was $37,010,392, a decrease from that of the year 1916 of $5,280,070, or 12.5 per cent., but an increase over that of the previous year 1912 of $4,569,592, or 14 per cent. The gross value of the metallic minerals recovered in 1917 was $27,284,474, which represents a decrease from last year of $4,779,040, a percentage decrease of about 15 per cent."

larger than in 1917 in all but copper and zinc. The comparison between production in 1916 and 1917 is also fairly shown. It may be added that had the same prices been used in calculating the value of the production of 1917 as were used for that of 1912 there would have been a difference of more than $4,500,000 in favor of 1912 instead of, approximately, that sum against the earlier year, which suggests that comparisons of yearly results with fluctuating value are not reliable as indicating progress or the reverse, while the use of quantities shows much better the actual position. Accordingly, wherever practicable, quantities are used in making comparisons that follow, which cover a total of twenty years, in 4-year periods (taking Table IX of the Annual Report as an example of a 4-year comparison), and, as well, give opportunity to compare earlier periods of similar length with that affected directly by the War.

Details of production (quantities and value) for the four years, 1914-1917, are given in the next following table:

Placer Gold.—The yield of placer gold in 1917 was the smallest for any year since 1911, when it was 21,300 oz., as compared with 24,800 oz. in 1917. That

QUANTITIES AND VALUE OF MINERAL PRODUCTS FOR 1914, 1915, 1916 and 1917

	1914		1915		1916		1917	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Gold, placer.....oz.	28,250	565,000	38,500	$770,000	29,025	$ 580,500	24,800	$496,000
Gold, lode.....oz.	247,170	5,109,004	250,021	5,167,934	221,932	4,587,334	114,523	2,367,190
Total gold.....		$5,674,004		$5,937,934		$5,167,834		$2,863,190
Silver.....oz.	3,602,180	1,876,736	3,366,506	1,588,991	3,301,923	2,059,739	2,929,216	2,265,749
Lead.....lb.	50,625,048	1,771,877	46,503,590	1,939,200	48,727,516	3,007,462	37,307,465	2,951,020
Copper.....lb.	45,009,699	6,121,319	56,918,405	9,835,500	65,369,364	17,784,494	59,007,565	16,038,256
Zinc.....lb.	7,866,467	346,125	12,982,440	1,460,524	37,168,980	4,043,985	41,848,513	3,166,259
Total value, metalliferous.		$15,790,061		$20,762,149		$32,063,514		$27,284,474
Coal.....tons, 2,240 lb.	1,810,967	6,338,385	1,611,129	5,638,952	2,084,093	7,294,325	2,149,975	7,524,913
Coke.....tons, 2,240 lb.	234,577	1,407,462	245,871	1,475,226	267,725	1,606,350	159,905	959,430
Miscellaneous products.....		2,852,917		1,571,181		1,326,273		1,241,575
Total value of production.		$26,388,825		$29,447,508		$42,290,462		$37,010,392

In order that the actual mineral production—that is, quantities, not value—of the three years mentioned in that comment may be readily seen and fairly compared, the following table is presented:

	1912.	1916.	1917.
Placer gold .....oz.	27,775	29,025	24,800
Lode gold .....oz.	257,496	221,932	114,523
Total gold	285,271	250,957	139,323
Silver .....oz.	3,132,108	3,301,923	2,929,216
Lead .....lb.	44,871,454	48,727,516	37,307,465
Copper, ...lb.	51,456,537	65,379,364	59,007,565
Zinc .....lb.	5,358,280	37,168,980	41,848,513
Coal, gross, tons of 2,240 lb.	3,025,709	2,485,580	2,398,715
Coal, net, tons of 2,240 lb.	2,628,804	2,084,093	2,149,975
Coke, tons of 2,240 lb.	264,333	267,725	159,905
Miscellaneous products	$3,435,722	$1,326,273	$1,241,575

These figures make it plain that in the year 1912 quantities of minerals produced were substantially

of the intervening years was 27,775 oz. in 1912, 25,500 oz. in 1913, 28,250 oz. in 1914, 38,500 oz. in 1915, and 29,025 oz. in 1916.

Going back over twenty years and comparing yields of periods of four years each, the following results are shown: For 1898-1901, 211,853.5 oz; for 1902-1905, 210,908 oz.; for 1906-1909, 145,020 oz.; for 1910-1913, 101,575 oz.; and for 1914-1917, 120,575 oz. It will be seen that while in the first of these four-year periods the average yearly yield was 52,963 oz., that for the last four years was only 30,144 oz. A comparison with years prior to 1880 would show a much larger decrease in recent years than that just indicated.

The grand total of value of placer gold for all years since production was begun in 1858 is on official record as having been $75,116,103, which calculated at $20 an ounce would represent 3,755,805 oz. for 60 years, 1858-1917. In that long period the yearly yield ranged from a maximum of $3,913,563 in 1863 down to a minimum of $356,131 in 1893. No records are at hand to show the proportions of the several placer gold fields, but it is probable that more than one-half of the total quantity recovered in all years came from Cariboo dis-

trict. In late years, however, Atlin, division of Cassiar district, has been in the lead, as is shown in the following table:

Year.	Cariboo District. Cariboo.	Omineca.	Cassiar District. Atlin.	Other parts.
1914	10,000	300	16,100	1,150
1915	15,000	600	18,850	1,450
1916	8,900	850	16,925	1,100
1917	7,500	600	15,250	350
	41,400	2,350	67,125	4,050

The yield from all other parts of the Province for the four years totalled only 5,650 oz., against 43,750 oz. from Cariboo district and 71,175 oz. from Cassiar district.

Lode Gold.—The output of lode gold in 1917 was 114,523 oz., compared with 221,932 oz. in 1916, 250,021 oz. in 1915, and 247,170 oz. in 1914. Taking 4-year periods for twenty years, they compare as follows: For 1898-1901, 625,913 oz.; for 1902-1905, 930,024 oz.; for 1906-1909, 914,012 oz.; for 1910-1913, 1,026,068 oz., and for 1914-1917, 833,646 oz. If to these amounts be added 215,086 oz. for the five years 1893-1897, a grand total of 4,544,749 oz. will be obtained, and this is the quantity the official records show to have been produced in all years to the end of 1917.

The 1917 production of individual districts was: Of Boundary-Yale, 60,010 oz.; Rossland, 33,290 oz.; Skeena, 9,805 oz.; Coast (Southern), 3,793 oz.; Lillooet, 3,092 oz.; Nelson, 2,521 oz.; Atlin, 1,000 oz.; Omineca, 931 oz., and all others, 81 oz. Of the Boundary-Yale production, about 37,000 oz. was the output of the Hedley Gold Mining Co.'s mine in Similkameen district, and 1,466 oz. that of other parts, including Nicola, Ashcroft, and Kamloops, probably the last-mentioned in largest part.

Silver.—The output of silver in 1917 was 2,929,216 oz., compared with 3,301,923 oz. in 1916, 3,366,506 oz. in 1915, and 3,602,180 oz. in 1914. For the several 4-year periods of the last twenty years the comparison is: For 1898-1901, 16,341,322 oz.; for 1902-1905, 13,576,019 oz.; for 1906-1909, 10,899,841 oz.; for 1910-1913, 10,940,569 oz., and for 1914-1917, 13,199,825 oz. There was an increase for the last 4-year period as compared with the two periods immediately preceding, but a considerable decrease as compared with that of 1898-1901. The official records show that the production of silver was commenced in a very small way in 1887 and that during 11 years, to 1897 inclusive, the total output was 11,380,964 oz. The grand total of production for all years is 76,338,540 oz.

The 1917 production of individual mining divisions and districts was: Of Slocan and Slocan City divisions, 1,547,576 oz.; Skeena division, 343,805 oz.; Boundary-Yale district, 227,208 oz.; Ainsworth division, 224,461 oz.; Fort Steele division, 180,168 oz.; Coast (Southern) district, 112,652 oz.; Omineca division, 82,311 oz.; Windermere-Golden division, 79,685 oz.; Trail Creek division (Rossland), 47,112 oz.; Nelson division, 46,229 oz., and all others, 38,009 oz. It will be seen that the proportion of Slocan district was nearly 53 per cent. of the whole. The production of East Kootenay district, which includes Fort Steele, Golden, and Windermere divisions, was 259,853 oz., while that of West Kootenay district, embracing Ainsworth, Slocan, Slocan City, Nelson, Trail Creek, Revelstoke, Trout Lake, and Lardeau divisions, was 1,903,111 oz., or nearly 65 per cent. of the output of the whole province.

The mines making the larger individual productions were the Standard, with an output of about 500,000 oz., and the Surprise and Queen Bess, each about 200,000 oz. These three mines are situated in Slocan mining division.

It is of interest to note that official records show the total production of silver in the year 1897 to have been 5,472,971 oz., in 1898, 4,292,401 oz., and in 1901, 5,151,333 oz.

Official comment for 1917 is to the effect that about 75 per cent. of the total Provincial output of silver comes from the treatment of silver-lead-zinc ores, and the remainder mainly from the smelting of gold-copper ores also containing silver.

Lead.—The output of lead in 1917 was 37,307,465 lb., compared with 48,727,516 lb. in 1916, 46,503,590 lb. in 1915, and 50,625,048 lb. in 1914. For the several 4-year periods since 1897 the figures compare as follows: For 1898-1901, 168,497,522 lb.; for 1902-1905, 133,852,611 lb.; for 1906-1909, 187,738,999 lb.; for 1910-1913, 161,767,274 lb., and for 1914-1917, 183,163,619 lb. The production of the last-mentioned 4-year period was only once exceeded since the mining of lead was commenced in the Province, namely, in that of 1906-1909, as shown above. The total of the output of lead in all years prior to 1898 was 89,166,942 lb., and the grand total for all years from 1887 to 1917, both inclusive, is 924,186,967 lb.

West Kootenay district mines made a total production in 1917 of 21,204,356 lb., or nearly 57 per cent. of the whole of the output of the Province. The proportions of the several mining divisions in this district were: Of Slocan and Slocan City, 11,808,019 lb.; of Ainsworth, 6,395,350 lb.; of Nelson-Arrow Lake, 2,605,666 lb., and of Revelstoke-Trout Lake-Lardeau, 395,321 lb. The production of mines in East Kootenay district totalled 15,771,289 lb., or rather more than 42 per cent. of the Provincial total. Of this quantity, 13,996,640 lb. was from Fort Steele division, and 1,774,649 from Windermere and Golden divisions. From Omineca division there came 271,885 lb., and from various other parts of the Province not already stated, 59,935 lb.

The Sullivan mine made the largest individual output of lead of all mines in the Province, nearly all of the production from Fort Steele division of East Kootenay having come from that mine. The Paradise mine, in Windermere division, produced about 1,200,000 lb. In Slocan division of West Kootenay, the Standard mine made the biggest output, with the Surprise, Galena Farm, and Queen Bess mines next in order as regards quantity produced. In Ainsworth division the Bluebell made an output of about 3,500,000 lb., the Highland about 1,000,000 lb., and the Florence 900,000 lb. In Nelson division, the Emerald was the largest producer, its output having been practically the whole made in the division. In Omineca division, the Silver Standard made by far the largest output of the several shippers from that part of the Province.

Copper.—The output of copper in 1917 was 59,007,565 lb., compared with 65,379,364 lb. in 1916, 56,918,405 lb. in 1915, and 45,009,699 lb. in 1914. The totals for 4-year periods compare as follows: For 1898-1901, 52,595,095 lb.; for 1902-1905, 137,398,357 lb.; for 1906-1909, 176,695,067 lb.; for 1910-1913, 173,088,432 lb., and for 1914-1917, 226,315,033 lb. Official records show that the production of copper was commenced in the

Province in 1894 and that during the years 1894-1897 a total output of 10,421,256 lb. was made. The grand total for all years, 1894-1917, both inclusive, is shown to have been 776,513,240 lb.

District or division proportions of the 1917 output of copper were as follows: Skeena division, 27,978,015 lb.; Coast (Southern) district, 17,256,534 lb.; Boundary-Yale district, 11,117,290 lb.; Trail Creek (Rossland) division, 1,730,088 lb.; Omineca division, 852,373 lb., and all others, 73,265 lb.

More than one-half of the total production of copper in the Province in 1917 was from the Granby Consolidated Co.'s mines, its Hidden Creek mines, near Anyox, Observatory inlet, having made an output of 27,661,301 lb., and those at Phoenix, Boundary district, of 6,858,718 lb., together, 34,520,019 lb. Other copper producers in Boundary district were the Canada Copper Corporation, from its mines near Greenwood, and the Consolidated Mining and Smelting Co., from the Emma mine. In the Coast (Southern) district, the Britannia is credited with an output of 15,780,830 lb., with the Marble Bay mine, on Texada island, next, but with only a comparatively small output. Rossland mines show a considerable falling off, with an output of only 1,730,088 lb., compared with 4,200,745 lb. in 1916, 4,651,681 lb. in 1915, and 3,779,830 lb. in 1914.

It is noted, officially, that "During the last three years copper-mining has attained the position of being the most important form of mining in the Province of British Columbia, and from all indications it should maintain this prominent place for years to come, as last year the value of the copper mined exceeded the total value of all other metalliferous minerals mined in the Province, and was also nearly double the combined value of coal and coke production. It formed about 60 per cent. of the total mineral production. In the working of the large, low-grade copper deposits and the subsequent smelting of the ores produced, a great number of men are employed and a large proportion of the money value is retained in the country in the payment of wages and purchase of supplies."

Zinc.—The output of zinc in 1917 was 41,848,513 lb., compared with 37,168,980 lb. in 1916, 12,982,440 lb. in 1915, and 7,866,467 lb. in 1914. Although there was some zinc produced prior to 1909, no record of the quantity appears in the tables printed in the Annual Report, but for that year an output of 8,500,000 lb. is recorded. For the 4-year period 1910-1913 the total was 18,935,784 lb., and for that of 1914-1917, 99,866,400 lb. The grand total of production for all years, 1909-1917, is shown as 127,302,184 lb.

The 1917 production from East Kootenay district was 20,733,090 lb., of which 20,715,090 lb. was from Fort Steele division, and the remaining 18,000 lb. from Golden division. West Kootenay mines produced 20,723,762 lb., the proportions of several of the divisions having been: Slocan, 18,789,573 lb.; Nelson, 982,309 lb.; Ainsworth, 918,601 lb., and other divisions of the district, 33,279 lb. The Highland Valley Co.'s mine, in Ashcroft mining division, probably produced the remaining 27,564 lb., making up the comparatively small quantity from other parts of the Province.

In the Annual Report it is stated that in the Slocan district the heaviest shipper in 1917 was the Standard mine, with an output of about 10,700,000 lb. of zinc, followed by the Lucky Jim and the Surprise, each with about 2,000,000 lb.; then the Galena Farm, Van-Roi, and Slocan Star. The Fort Steele production came entirely from the Sullivan mine, the ore from which was shipped to the electrolytic refinery at Trail. The Nelson division production was a zinc-carbonate ore shipped from the Hudson Bay group of mines near Salmo, to United States smelteries for treatment. The Ainsworth division production was mainly from the Bell and Whitewater mines, each with an output of about 400,000 lb. That from Omineca division was hand-sorted ore from the Silver Standard mine, shipped to the United States.

Other Minerals.—The information given in the Annual Report under this subhead does not record much production. It is stated that "the production of miscellaneous minerals produced in British Columbia in 1917 was valued at $37,029. "It is gathered that about $1,700 worth of crude platinum recovered in the Similkameen district" (which includes Tulameen) "was included in the placer output," presumably the placer-gold output. Excerpts from the commend under this subhead follow:

"It has been strongly advocated in many quarters that the conditions are favorable for the establishment of an iron-smelting plant somewhere on the British Columbia Coast. So far nothing definite has materialized, although there is apparently a prospect of such a plant being established. As is well known there is, on the Coast, in the aggregate, an adequate supply of magnetite-iron ore, quite sufficiently free from impurities as to be within the 'Bessemer limit,' to supply ore for such a plant."

"A small quantity of crude platinum is recovered each year from placer-mining operations in Similkameen district. . . . The occurrence of small quantities of platinum in-place in the periodotite rocks of the Upper Tulameen river has been known of for years; and . . . prospecting has been resumed to see if any zones in this formation can be found which would pay to work for the platinum content."

"The actual Provincial output of molybdenite during the year was 152 tons of ore, containing about 12,000 lb. of molybdenite. Nearly all the production was from the Molly group, on Lost creek, in Nelson mining division. . . . The Lost Creek property has several thousand tons of from 2 to 4 per cent. ore, so that, with a suitable mill, a steady production could be maintained. . . . Another property, on Alice arm, in Skeena mining division, is reported to have a large showing of molybdenite. A mill was erected on the property in 1916 and about 383 tons of 2 per cent. ore was treated. Other prospects in Nelson, Kamloops, and Lillooet mining division have been investigated, but as yet none of them have assumed any great importance."

"Near Kaslo (West Kootenay) a manganese deposit has been developed during the past year and there is said to be a considerable tonnage ready for shipment."

"So far as is known, no tungsten ore has been produced in shipping quantities from the Province, but tungsten minerals, generally in association with other minerals, have been noted in a few localities. A deposit of scheelite (calcium tungstate) has been known of for many years, situated near Barkerville, Cariboo district."

"Antimony . . . is a common mineral in British Columbia, occurring in association with lead and zinc ores. It does not, however, as a rule, occur in large quantities, but attempts are now being made in a few places to sort it out from its associated minerals. In 1916, 27 tons of antimony ore were shipped from the Alps-Alturas property, situated in Slocan mining divi-

sion; this ore contained from 50 to 60 per cent. antimony."

"Small deposits of chromite occur in Tulameen district, but so far have been considered too small to be developed. A deposit near Cascade, Grand Forks mining division, is now being developed and other occurrences are being prospected."

"In 1917, 105 tons of talc was shipped from Lillooet district and an increasing production may be expected. Several hundred tons of epsomite (magnesium sulphate) was shipped from Osoyoos division."

"For the first time in the history of the Province there was a production of arsenic; this was made from the Hedley Gold Mining Co.'s Nickel Plate mine and amounted to $20,000. The arsenic occurs as arsenical iron pyrites in the concentrates shipped by this company to the Tacoma smeltery. Concentrates have been going to the smeltery for years, but until the recent installation of an arsenic-burner the arsenic content was not recovered."

The total value of "miscellaneous minerals, etc.," for all years up to and including 1917, is shown in the Annual Report to have been $554,448. This includes a lot of iron ore which, years ago, was shipped to smelting works from Cherry creek, Kamloops mining division, for use as a flux.

Coal and Coke.—The gross production of coal in 1917 was 2,398,715 tons of 2,240 lb., compared with 2,485,580 tons in 1916, 1,972,580 tons in 1915, and 2,166,428 tons in 1914. The quantities made into coke in the several years were: In 1917, 248,740 tons; in 1916, 401,487 tons; in 1915, 361,451 tons, and in 1914, 355,461 tons. Net quautities of coal were: In 1917, 2,149,975 long tons; in 1916, 2,084,093 tons; in 1915, 1,611,129 tons, and in 1914, 1,810,967 tons. Following the official custom in the Province, credit is taken for the coal "lost in washing, etc.," as well as that "used under companies' boilers, etc." In 1917, that "lost in washing" amounted to 226,430 tons, and that used under colliery boilers, etc., to 198,102 tons.

The totals of net coal (that is, after deduction of that made into coke) for 4-year periods are as follows: For 1898-1901, 5,342,115 long tons; for 1902-1905, 5,203,528 tons; for 1906-1909, 7.001,695 tons; for 1910-1913, 9,759,395 tons, and for 1914-1917, 7,656,164 tons. Official records show that coal-mining was commenced in 1836 and that production of coal for all years prior to 1898 totalled 12,081,687 tons, which, added to the total for 20 years, 1898-1917, makes a grand total of 47,044,584 tons net produced.

The following table, copied from the Annual Report, show the proportions of production of coal and coke by the several districts in the Province during the last four years, in tons of 2,240 lb.:

Mines of	1914	1915	1916	1917
Coal—				
Vancouver Island	1,072,314	1,020,942	1,492,761	1,695,721
Nicola & Similkameen	138,931	99,066	110,549	151,243
Crowsnest	955,183	852,572	882,270	551,751
Total quantity of coal mined	2,166,428	1,972,580	2,485,580	2,398,715
Less made into coke..	355,461	361,451	401,487	248,740
Net qantity of coal produced	1,810,967	1,611,129	2,084,093	2,149,975
Coke—				
Vancouver Island	.....	5,450	27,604	30,406
Crow snest	234,577	240,421	240,121	129,499
Total quantity of coke produced	234,577	245,871	267,726	159,905

The totals of coke production for 4-year periods are as follows: For 1898-1901, 281,481 long tons; for 1902-1905, 803,771 tons; for 1906-1909, 928,242 tons; for 1910-1913, 834,412 tons, and for 1914-1917, 908,078 tons. Coke-making was commenced in the Province in 1895; in three years, 1895-1897, there was made 19,396 tons. The grand total for all years is 3,775,380 tons.

A general idea of where the coal and coke produced in British Columbia is consumed can be gained from the following statement relative to 1917: Coal sold for consumption in Canada, 935,469 long tons; for export to the United States, 754,568 tons; for export to other countries, 38,211 tons; total, 1,728,248 tons. Coke sold for consumption in Canada, 147,811 long tons; for export to the United States, 12,711 tons; total, 160,522 tons. The small difference between the totals of production and sales of coke is accounted for by what was taken from stock.

Building Materials.—The total value placed on the structural materials produced in 1917 is $1,204.546, in the following proportions: Portland cement, $587,829; lime and limestone, $102,223; building stone, $113,275; riprap, $28,170; crushed rock and flux, $138.830; sand and gravel, $61,642; pottery and clay, $81,728; fire, face, and red brick, $190,849; total, $1,204,546. Figures are not at hand for a comparison of 1917 production with that of preceding years, except as appearing in the general table of production for four years, 1914-1917. The total value of building materials, etc., for all years is given in the Annual Report as $27,902,381.

Official comment on the 1917 production includes the following: The production of building materials in 1917 was slightly less than in the preceding year, having been $1,204,546, as compared with $1,299,553. . . . Since 1912, when a production amounting to $3,435,722 was recorded, the output of building materials has steadily declined, due to the cessation of the building trade, brought about by the continued financial depression and the war. It is probable that the figures have now reached a minimum, and that an output amounting to from $1,000,000 to $1,500,000 represents the steady yearly demand for these materials for use in repairs, renewals, and various small demands, without any new construction work. . . . The outputs of sand and gravel, of brick and pottery, are all slightly less than in 1916, but the decrease is not serious. The outputs of fire and face brick and cement show an increase. . . . Approximately 88 per cent. of the total production of building materials comes from the Coast district, and the larger part of this finds its markets in the Coast cities.

The production of portland cement in the Province is made by two companies, namely, the Vancouver Portland Cement Company, with works at Tod inlet, and the Associated Cement Company, with works at Bamberton, both in Victoria division in the southern part of Vancouver island. The combined production for 1917, valued at $487,829, compares with $436,459 in 1916.

It is stated that nearly $100 000 worth of limestone (included in the item "crushed rock and flux") was quarried for use as flux in the respective smelting works of the Granby Consolidated Co. at Anyox, and the Consolidated Mining and Smelting Co. at Trail.

Total Value of Production.—The Annual Report shows the total value of the mineral production of the Province for all years, 1852 to 1917, inclusive, to have been $595,571,107. For all years to 1897, inclusive, the total was $112,510,465; that for later 4-year periods was as follows: For 1898-1901, $59,731,523;

for 1902-1905, $76,421,188; for 1906-1909, $99,157,408; for 1910-1913, $112,613,336, and for 1914-1917, $135,-137,187.

The proportions of value of the different minerals were: Of placer gold, $75,116,103; of lode gold, $93,-717,974; of silver, $43,623,761; of lead, $39,366,144; of copper, $130,597,620; of zinc, $10,379,018; of coal and coke, $174,313,658; of building stone, bricks, etc., $27,-902,381, and of miscellaneous minerals, $554,448.

The Columbia Mines Company's Operations on Pine Creek.

The Gold Commissioner for Atlin, B.C., in his report for 1917 respecting operations on Pine Creek of that District, says: "On Pine Creek the Columbian Mines Company, representing the North Columbia Gold Mining Company, the Pine Creek Power Company, and the Atlin Consolidated Mining Company, under the general management of Paul W. Greyer, with a force of between 40 and 45 men, operated at two points on the south side of the creek, besides carrying on drifting operations on the Atlin Consolidated Mining Company's ground on the north side."

These operations since have ceased. Certain judgments were secured against the company, and a considerable part of its holdings were offered for sale by the sheriff for the satisfaction of judgment creditors. It is alleged that fifty-two gold placer claims, a number of mineral claims, a lake dam, ditches and water system, blacksmith's shop, machine shop and equipment, engines, boilers, machinery, a telephone system, electrician's shop and supplies and "one certain Ford automobile" changed hands for sheriff's charges, a matter of $62 odd. The holdings, plant, etc., have a value running well into the thousands of dollars, and their sale at such a ridicuously low a figure caused considerable comment in Atlin. It is pointed out, on the other hand, that the purchaser and his associates have unsatisfied claims against the company of a substantial character. It appears that there are a number of miners in the District to whom the company owes back pay for labor performed, and the new owners, no doubt recognizing their right to consideration, granted several of them a lay on the ground thus acquired, the terms being that they should pay all expenses of operation in return for 75 per cent. of the gold recovered. Not all of those to whom wages were due and unpaid, however, obtained this privilege, according to reliable report. Consequently, there was no little dissatisfaction. However, those who were granted the lay, went to work and in a short time made a rather tidy clean-up, the gold being shipped to the Coast. In the meantime, Messrs. Tallmire and Wesche, the former of whom is reported to also have a claim against the company, staked claims which were being worked by the lay-men. Mr. Tallmire, in taking the oath necessary in the process of recording under the British Columbia Placer Act that "the said land is at present **unoccupied** for placer-mining purposes," made affidavit that his understanding of the word "unoccupied" was that it was "unoccupied" in a legal sense. Following this, Messrs. Tallmire and his partner were charged with perjury, committed for trial, and their hearing is to take place at an early date. Meanwhile, the historic gold mining camp of Atlin is astir over the affair, and its development is being closely watched throughout the Province. The unfortunate position of the company, which has been forced to close down and whose property and plant has thus been disposed of, is a commentary on the conditions which gold producing concerns find confronting them because of the fixed value of their product while that of other minerals soars and labor and other expenses increase.

PERSONAL

Mr. D. B. Dowling, president of the Canadian Mining Institute, expects to return to Ottawa from the West about October 12th.

Mr. Reginald E. Hore has returned to Toronto from Nova Scotia.

Mr. F. W. Gray, who recently joined the staff of the Nova Scotia Steel & Coal Co., Ltd., is now at New Glasgow.

Mr. Thos. J. Brown has been reappointed general superintendent of Nova Scotia Steel & Coal Co., Ltd.

Mr. Gerald Murphy, of the Technical College, Halifax, has been granted leave of absence and is now on the staff of the Nova Scotia Steel & Coal Co., Ltd.

Fraser & Chalmers of Canada, Ltd., of Montreal, Que., have been awarded a contract by the Corporation of the town of Pointe Claire, Point Claire, Que., for a 1,500-gallon centrifugal pump direct connected to a Sterling gasoline engine.

Mr. P. Kirkgaarde is building an electric smelting plant at Cordova Mines for the production of ferro-chrome.

Mr. H. Vassiliadi, of London, Eng., was in Toronto recently en route to Kirkland Lake.

Mr. E. Jacobs is in Phœnix, Arizona.

VISITING HERB LAKE GOLD FIELD.

The Pas, Man., September 13.—Commissioner J. A. Campbell returned on Sunday last from his trip to Port Nelson and Churchill, accompanied by his brother, C. N. Campbell, superintendent of the Granby Mine at Phœnix, B.C. They took the Ross Navigation Co. boat on Tuesday evening for Sturgeon Landing, and then on to the mining regions at Athapapuskow and Schist Lakes. After giving that district a look-over they will return to The Pas and take gasoline car to Mile 82 on the H.B.R. line, where they will trail in to Herb Lake gold fields on a visit.—The Pas Herald.

PICTOU STRIKE SETTLED.

New Glasgow, N.S., Sept. 27.—The miners' strike at the Pictou county collieries is settled. The operatives go to work next Monday, accepting an advance of 20 cents per day in wages. The acceptance was based on the balloting to-day, which resulted in an overwhelming majority of "yeas" at the three mines—Drummond, Acadia and Thorburn. The committee to investigate the high cost of living as it affects the miners will be appointed to-morrow, the chairman to be chosen by the Trades and Labor Council. The other two members, one to represent the men and the other the companies, will be elected.

The Mining Department of the Sudbury High School offers a practical technical education in the subjects related to the mining industry. The course includes mathematics, surveying, drafting, chemistry, physics, mineralogy, geology, mining, metallurgy and extends over a period of four years. While this course admits to any department of the Faculty of Applied Science of Queen's University, it is intended chiefly for the boy who will not go to college.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

New Manager for Beaver.

Mr. J. W. Moffet, who for many years has managed operations at the Beaver mines here, has tendered his resignation to the company, owing to ill-health. The management of this property is more than ordinarily strenuous owing to the fact that the Beaver company, as well as operating the parent property at Cobalt, controls and operates the Kirkland Lake Gold Mines, Limited, at Kirkland Lake. At the latter property a mill is nearing completion while underground upwards of $800,000 in gold is blocked out. At the Beaver property in Cobalt, results of development work during the past few months have proven highly gratifying to the management, and it is anticipated the company has a number of years' successful operations still ahead of it. Mr. L. W. Ledyard, who has had a fitting experience in mining in the north country, has been appointed to the position of manager of the Beaver and the Kirkland Lake mines. Mr. Ledyard was for a considerable time connected with the Buffalo Mining Company at Cobalt and later with the Teck-Hughes at Kirkland Lake, where, until early in the present year, he occupied the position of manager, thus gaining an intimate knowledge of both districts in which the Beaver company are at present operating properties.

Kerr Lake.

During the month of August the Kerr Lake Mining Company produced upwards of a quarter of a million ounces of silver, which compares with 231,000 ounces during July. With the exception of the month of July the August output was the highest in the history of the company. The fiscal year of the Kerr Lake ended on August 31st. During this period upwards of 2,575,000 ounces of silver was produced. Owing to the high price prevailing for the white metal during the past year it is quite apparent the company's earnings have exceeded all previous records.

Nipissing.

Production at the Nipissing Mines for the month of August was considerably retarded owing to the fact that the aerial transmission line conveying ore from the Meyer and Fourth of July shafts to the mill on the east side of Cobalt Lake being out of commission for about ten days. This accident necessitated the treating of ore from other portions of the property, which was of a lower grade, and considerable inconvenience was otherwise experienced. The trouble was speedily overcome and the mine is operating at full capacity.

Development Work at Dome Mines.

A force of about sixty men are engaged in development work at the 1,250-ft. level of the Dome Mines, where an important development crosscut is being driven to the east and a great underground roadway built for the haulage of ore which has been indicated in the diamond drilling programme carried out by the company some time ago. If ore is found to continue in the same volume to the depths now indicated on the property at the first few levels, a great and prosperous future is in store for the Dome Mines. In the neighborhood of ten millions of dollars in gold has been developed in the Dome Mines above the seven-hundred-foot level, and the present point of operation is almost double the depth of these workings. The closing down of the large mill at the property, owing to the scarcity of labor, was a discouraging event to the shareholders, but in view of the present economic conditions, this step will ultimately work out to the benefit of the shareholders. At the beginning of the current year the books of the company showed a cash surplus of about half a million dollars. This ready capital places the company in an excellent position for the carrying on of development work and the proving up of the ore bodies at greater depths. At the same time, the general scheme of development of the property is being carried out and with a return to satisfactory working conditions, it will be possible to operate at maximum capacity with a minimum of cost. When this time arrives, it is the opinion of well-informed mining men, Dome Mines will once again take its place among the leading gold producers of the Dominion.

Lake Shore Mine.

The official report of the manager of the Lake Shore Mines to the president and directors of the company, covering the operations at the property during the month of August, shows an increase in production of approximately $5,000 over the month of July, and establishes a new high record of production for the company. According to the report, the mill ran 95.18 per cent. of the possible running time, the value of the output being estimated at $44,000. Underground work consisted of crosscutting on the No. 1 vein at the 200-ft. level; also advancing the drift on the No. 2 vein. The raise on the No. 1 vein at the 300-ft. level was connected up with the No. 2 level, while the No. 2 vein was further opened up during the month. The ore hoisted for the period totalled 1,732 tons. Since the commencement of milling operations on March 8th last a steady increase in output has been recorded with the exception of the month of July, when delays were experienced which resulted in the mill running only 85 per cent. of the possible running time. During the first six months of operation 9,393 tons of ore have been treated, from which a recovery of $236,049 has been made. The consistency of the milling operations and uniformity of ore value is evident by a perusal of the monthly tonnage and production of the company since the commencement of operations, which is as follows:

Month.	Tons.	Value.
March (8th to 31st)	1,050	$23,606.56
April	1,520	42,090.00
May	1,750	43,000.00
June	1,761	43,353.36
July	1,580	39,000.00
August	1,732	44,000.00
Totals	9,393	$236,049.00

During the month of August the mill heads averaged $25.40 per ton. It is estimated the cost of production runs around $8 to $10 per ton, thus it will be seen a substantial profit is being made above the requirements of the company to disburse a regular quarterly dividend of 2½ per cent. At the same time, as a large amount of the ore being treated in the mill is coming from development work, the ore reserves of the mine are being added to at a rapid rate.

The Wright-Hargreaves Mill.

Mr. James Grant, who for a considerable time has been connected with the McIntyre-Porcupine mines, has been engaged to design and ultimately construct a mill for the Wright-Hargreaves property at Kirkland Lake. The new mill, which will be of 150 tons capacity, will be of the most modern type, similar to those in operation at the McIntyre and Lake Shore mines, and which have given excellent results at both these properties. The grinding will be done in ball and tube mills with the continuous counter-current decantation process of treatment.

The auriferous zone of the Kirkland Lake district passes directly through the Wright-Hargreaves, which embraces a stretch of nearly three-quarters of a mile of this important orebody. High-grade ore has been proven to a depth of 400 ft. on the property while on that of the Kirkland Lake Gold property at a depth of 700 ft. the grade and width of the orebody has been found to persist, with every indication of continuing to much deeper levels. From the foregoing it would appear the Wright-Hargreaves will eventually develop into a large mine.

Tough-Oakes.

About twenty-five men are now on the pay-roll of the Tough-Oakes Mines at Kirkland Lake, engaged in pumping, and cleaning up around the mill. It is expected this work will be completed about the first week of the coming month and if arrangements for the transfer of the money liberated by recent court proceedings in England is then available a large programme of underground development will be undertaken and the mine again placed in good shape. It is understood that after legal expenses are paid the Tough-Oakes treasury will be swelled to the extent of one hundred and fifty thousand dollars by the court's decision.

Ontario-Kirkland.

Camp and other buildings on the Ontario-Kirkland Mining Company's property have been completed. Electrical machinery throughout will be installed for the operation of the mine and already a four-drill compressor and electrical hoisting apparatus have been placed on order. Two veins have been uncovered on the property of good promise. One is said to be about two feet in width, containing average values of forty dollars; while a second vein, about four feet in width, gives average assays of twenty-five dollars per ton.

Teck-Hughes.

Efforts are being made by the management of the Teck-Hughes mine to re-open the property and it is hoped that an efficient organization will be secured to recommence operations the early part of next month. Owing to the fact that material for the refinery has also been placed on order it is expected both mining and milling will be proceeded with. Underground operations at this property have been carried to a depth of six hundred feet.

Kirkland-Porphyry.

Mr. Joseph Houston, formerly assistant manager of the Dome Mines, has accepted the position of manager at the Kirkland-Porphyry property. Development work at this property has reached a depth of 400 feet, with lateral work at each 100-foot level. Results of development to date have been highly encouraging. Where the vein was encountered at the 400-ft. level, gold values were shown over a width of twenty feet in places. The principals of the company are predicting that the mine will be on a producing basis before the conclusion of 1919.

Lightning River.

Mr. J. Morrison, formerly connected with the Lake Shore Mines at Kirkland Lake, has taken charge of operations at the Howie-Cochenor Williams discovery claims in the Lightning River district. The plant recently installed is now in operation and the shaft has reached a depth of fifty feet. With the steam power available, it is expected more rapid progress will be made with the work from this time forward.

To Develop Water Power in Gauthier Township.

According to reports received at Cobalt, Montreal interests have organized a syndicate for the development of a water power on the Beaver House River in Gauthier township. It is estimated about one thousand horsepower will be made available. The De La Huronia mine is located in this township and is owned by Montreal interests, which leads to the belief that the two propositions may have some connection.

Mr. Globe Goes to Sellwood.

Mr. A. R. Globe, formerly assistant general manager of the Hollinger Consolidated Mining Company at Porcupine, has taken charge of operations on an iron property near Sellwood in the Sudbury district. The town council of the town of Timmins presented Mr. Globe with a handsome club bag and address on his departure from the town.

A Mill for Burnside Property.

A new mill is to be erected at the Burnside property which is operated by the Aladdin-Cobalt Company at Kirkland Lake and will have a capacity of about thirty tons per day. The process will be straight amalgamation. The development of this property is being carried on with all possible speed. One shaft has reached a depth of 360 ft. and will be carried to the 425-ft. level. At this depth it is the intention of the management to run a crosscut to the south to the number six vein which is a distance of about 750 ft. A new shaft is now being commenced on this vein. When these two workings are connected, operations at the property will be greatly facilitated and better ventilation provided. It will then be possible to draw ore from the number six vein through the main shaft to the mill. Three other veins located a short distance south of the number six will be crosscut at a later date.

Activity in Boston Creek Area.

A number of important gold discoveries have been reported at widely separated points in the Boston Creek district during the past two weeks, and much general activity is apparent in the district, with many deals for properties being put through. During the week the O'Donald group of claims were optioned to Robert W. Norrington and associates, of Detroit. This group of claims comprises 200 acres, being claims Nos. 17951, 17953, 17954, in the township of Pacaud, and two claims, Nos. 5023 and 5024 in the township of Boston. The group lie directly between the R.A.P. Syndicte and Boston Creek Gold Mines on the west and the Patricia Mines on the east. The purchase price is said to run well up in six figures. A minimum of $1,000 per month is to be spent in development work on the property and is to be commenced at once. Situated as these claims are, in the heart of the new gold camp, their development promises to be full of interest The O'Donald group have long been known as the pioneer claims of the Boston field, having been purchased by J. C. O'Donald in 1913, since which time much development work has been done and a number of promising discoveries made.

During the past week a discovery of gold of considerable importance was made on the Campbell claims, situated in the northwest corner of the township of Catharine and including ground in the southwest corner of the township of McElroy.

Later in he week, word was received of still another discovery being made, this time on the Rogers-Barnett group of claims in Catharine township. A number of samples containing free gold were brought out recently and the discovery promises to be of more than ordinary importance. The dike in which the discovery was made is about forty feet in width and appears to be composed of altered basalt and diorite in which quartz veins carrying gold in coarse particles occur. This latest discovery

does not resemble in any way the ore being developed at the Miller-Independence property which lies about eight miles to the northwest, the occurrence of the gold as well as the rock formations of the district being greatly different, porphyry being absent at the point of the new discovery. The new find is on one of a group of six claims in lot 5, concession 2, Catherine. This latest discovery has caused a number of prospectors to flock to the district, with the result that practically all the surrounding territory has been staked. The area of the Boston Creek field is greatly enlarged and increased activity will likely prevail in the prospecting line from this time forward until the snow flies.

At the Miller-Independence property the shaft has reached the 200-ft. level and crosscutting is under way on the vein. The mill is being put in order for operation and when completed at least four faces on the new vein will be available from which to draw ore for milling. The results of the initial run on the ore from the new vein will be awaited with a good deal of interest.

The new railway station at Boston Creek has been completed and the camp has telegraphic and station service, the agent having been moved from Dane. Developments during the past summer have been of sufficient importance to make the change very necessary and much inconvenience is thus eliminated. Both passenger and freight traffic to and from the camp during the past summer has shown a very marked increase.

Will Operate Parragon-Hitchcock Property.

Arrangements have been completed for the commencement of operations on the Parragon-Hitchcock silver property at Wabun station on the T. & N. O. Elk Lake branch. These two properties figured in a consolidation several months ago.

May Develop Timagami Iron Deposit.

It is understood there is a possibility of a syndicate being formed for the operation of the Caldwell and Mulloch iron property, about one and a quarter miles north of Timagami station on the T. & N. O.

Skead Township.

Efforts are to be made this fall to secure assistance from the government in the building of a winter road from the Boston Creek camp west to the Skead township mining district. Plans are under consideration for co-operation between property owners in the district and the government in the construction of the proposed new roadway.

Matachewan.

The option held on the Ryan group of claims in the Fort Matachewan district by Robert Norrington and associates of Detroit, has been allowed to expire and the claims have reverted to their former owners. The equipment from these claims has been moved to the Boston Creek camp, where it will be used in the exploration of a number of claims under option to Detroit interests, among which are the Renaud-Cullen group.

Will Reorganize Bailey Company.

Word comes to hand this week that the Shareholders' Protective Committee of the Bailey Cobalt Mining Company have secured judgment against the directors of the company, and negotiations are now in progress for a restoration of the business of the corporation on a new basis. It is expected the company will be properly organized within the next sixty days and an accounting will then be taken of the outstanding shares. The judgment of the court is that the property belongs to the shareholders and that the total liabilities of the company will be $15,000 inclusive of the legal expenses. The property has been idle for the past two or three years.

JAMES DOUGLAS.*

By Rossiter W. Raymond.

James Douglas was born at Quebec, Canada, November 4, 1837. His father, James Douglas, was a distinguished physician and surgeon, known in many lands, especially in the Orient, and famous in his own country for his philanthropy as well as his skill, having established and directed for many years the first retreat for the insane in the Dominion of Canada.

One of the latest literary labors of his son was the editing and publishing of his father's journal and reminiscences—a fascinating volume, the review of which, though a tempting task, I must here forgo. Nearly fifty years ago, I had the great pleasure of spending an hour with the elder Douglas, who guided me through his collection of Egyptian and Asiatic treasures. I might almost say souvenirs; so many of them were connected with personal experiences and exalted personages. The veteran's memory had already begun to fail with age, but his vivacity and imagination glowed all the more brightly; and his reminiscences of travel and adventure were embroidered with Oriental magnificence. I felt, after that hour, as if I had visited a stately, half-ruined edifice, overgrown with vines and flowers.

The father's genius, adventurous spirit and generous philanthropy descended to his versatile, yet practical son. Like other men of such temperament, James Douglas tried many things before circumstances beyond his own control forced him into the line of his principal lifework. At the age of 18, he was sent to the University of Edinburgh, where he studied for two years. Returning to Canada, he entered Queen's University, at Kingston, Ontario, where he was graduated as Bachelor of Arts in 1858. Subsequently he studied medicine at Laval University, Quebec, and it was doubtless during this period that he assisted his father in the management of the Quebec lunatic asylum; and also traveled extensively with him in Europe and the East. In connection with his study of medicine at Laval University he became interested in chemistry, which he afterward taught for several years at Morrin College, Quebec. No doubt his excursion in this direction was initiated by his acquaintance with a man who was destined to have a decisive influence upon his future career, namely, Thomas Sterry Hunt, at that time about 33 years old, who was lecturing on chemistry in the French language at Laval. Hunt's prodigious intellectual activity, keen insight into the facts and laws of nature, and fierce enthusiasm in the pursuit of scientific truth (qualities evident enough in later years, but doubtless supereminent in his youthful prime) must have affected profoundly a mind like that of Douglas. The two became close friends and in after years business partners. Yet meanwhile their paths were widely sundered. Hunt continued his brilliant career as chemist and geologist, on the Canada Geological Survey, in the faculty of McGill University, on the juries of successive international expositions, as the recipient of sundry honorary degrees and decorations, as prolific author of notable scientific papers, and finally as Professor of Geology in the Massachusetts Institute of Technology, and one of the most active promoters and officers of the American Institute of Mining Engineers. Douglas, meanwhile, returned to Edinburgh, to continue the study of medicine—choosing, however, this time the more scientific branch of surgery—and pursuing as an avocation at the same time a course on theology, which he carried so far as to receive a license to preach. It is permissible to con-

*From the September bulletin of the American Institute of Mining Engineers.

jecture that he prophetically foresaw the type of spiritual leader who ministers to both soul and body—a type more fully developed nowadays in the medical missionary, and furnishing for Douglas a welcome compromise, or rather combination, of activities, satisfying at once his love of science and his love of men. But his professional plans were cut short by the pecuniary embarrassments of his father, who had made unfortunate investments in mining schemes; to assist him, the younger Douglas returned to Canada, about 1871.

The investments referred to were in the Harvey Hill copper mines in Quebec, the 2 per cent. copper ores of which could not be economically treated at that time by any known process. Douglas was doubtless familiar with the researches of Sterry Hunt on the reactions between cupric oxide, sulphur dioxide, etc., and had recourse to his old friend in this emergency. Together they worked out the famous Hunt and Douglas process, the original form of which was described by Hunt as follows:

"The essential principle of this new process . . .is the dissolving of the oxides of copper by a hot solution of protochloride of iron and common salt. In the action which takes place, the protochloride of iron is converted into peroxide, while the oxides of copper are changed to protochloride and dichloride, the latter of which, though insoluble in water, is readily soluble in a hot, strong brine. From the solution thus obtained, metallic iron throws down the copper in a metallic state, regenerating the protochloride of iron, which is then ready for the treatment of a fresh portion of oxidized copper ore."

The obvious ingenuity and beauty of this process made it very attractive to metallurgists; and for a time it was believed that the treatment of 2 per cent. copper ores had been made economically practicable in this way. It would be easy but tedious to enumerate here the many practical and commercial difficulties which have proved, so far, insurmountable by such methods. In 1893, Douglas himself wrote:

"There has been, however, but little patronage extended to wet copper-methods, mainly because we do not possess, within accessible reach of the chemical centres, any large bodies of cupriferous pyrites, whose residues, after the extraction of sulphur and copper, would possess value as an iron-ore. The treatment of the low-grade oxidized ores of the Southwest is awaiting realization. In the past, various attempts have been made to employ old and new wet methods; but none has proved commercially successful, nor has any survived until to-day."

In 1875, Mr. Douglas went to the United States as Superintendent of the Chemical Copper Co., of Phoenixville, Pa., which treated copper ores and pyritic cinders, and also melted and refined base metal. A variety of the Hunt and Douglas process was employed for extraction. It was a small plant, and ill-supplied with capital. I remember examining it while Douglas was in charge, and admiring the courage with which he struggled against technical difficulties, and the ingenuity with which he devised substitutes for expensive apparatus. It was an up-hill business, and after some years of strenuous endeavor the plant was destroyed by fire. But the discipline of the long contest had made a strong man of Douglas, while his business relations had brought him into contact with many who could not fail to be impressed by his ability and integrity. For some years after the failure of the Phoenixville enterprise, he was without fixed employment, though he did some important consulting work, visiting Montana, Colorado and other mining districts. Concerning the stroke of well earned "good luck" which placed him on the straight road to fame and fortune, I cannot do better than quote the story as told by Dr. Ledoux:

"An accident brought him into contact with the old metal house of Phelps, Dodge & Co. When the Copper Queen mine was opened by Martin and Reilly, the first carloads of copper bars were sent to Phœnixville to be refined by Dr. Douglas's works. He had been introduced to Mr. William E. Dodge and had been retained to report on the Detroit Copper Company's mines in Arizona. This firm was conservative in the extreme and, while very large sellers of metals, had but recently entered into the mining field, considering mining somewhat of a gambling venture. Urged by an acquaintance, they had taken an option on the former Copper Queen—the original of the name—in Arizona, and engaged Dr. Douglas to examine it. They agreed to pay his expenses and to furnish him with a certain sum of money with which to test the property, promising that if they took it over on his recommendation, they would place the management in his hands and give him an interest.

"The world knows to what great heights Phelps, Dodge & Co. have attained in the mining business. Dr. Douglas, upon the incorporation of the firm, became its President. The writer feels sure that those who have succeeded to the control of this corporation after the deaths of Messrs. William E. Dodge, Senior and Junior, and of Mr. D. Willis James, will not resent the statement that, in the writer's opinion, Dr. Douglas supplied the imagination necessary in all great enterprises, while they supplied the money and equally important careful business management.

"The product of the smelter at Bisbee was hauled several miles to the railroad by mules. He put in the first traction engines employed in the southwest. This method becoming too slow, he built the railroad from Bisbee to Fairbanks, the junction with the Southern Pacific. When the product of the Copper Queen became too great to handle economically at Bisbee, it was his idea to establish at Douglas the beginning of the great smelting plant which to-day is second to none—if not in capacity, at least in well thought-out installation and correlation of its parts; in efficiency and economy in management.

"Looking further ahead than the life of the Copper Queen, it was Dr. Douglas who suggested the taking over of adjoining properties in the Bisbee camp, and the agreement to disregard the law of the apex and questions of extra-lateral right, so there has been no litigation at Bisbee from these fertile sources of trouble in most mining camps.

"It was Dr. Douglas, again, when fuel became expensive and irregular in delivery, who suggested the organizing of a coal company to supply their own needs and to enable them to sell coal and coke to others without paying tribute in high freights to the railroad. Again, it was his suggestion that their railroad should be extended to El Paso, and that branch lines should be built into Mexico, where, on his initiative, Phelps, Dodge & Co. had already secured important producing mines, destined to add a very considerable tonnage to their output of copper."

In 1875, the year when Douglas came to Phoenixville, he was elected a member of the American Institute of Mining Engineers, and in June, 1876, he entertained at his works a visiting party of its members. Already, thus early in his career, he manifested the

quality which was afterward so characteristic of him—a great willingness to communicate, as well as to receive, the results of discovery and practice. The Institute, founded to promote this open interchange of professional knowledge, appealed peculiarly to his mind, which disdained to harbor secrets. Through the five years in which he bravely fought at Phoenixville a losing fight, he remained in the Institute; but when that enterprise had failed, and he was obliged to begin again somewhere else, he resigned his membership, the annual expense of which he could not conscientiously afford. But after professional recognition and business success had returned to him, he secured reinstatement in that relationship and thenceforth unto the end was in every way a loyal, potent and munificent supporter of the Institute. I mention this episode of his temporary retirement, because it was influential in the history of the Institute itself. For years after Dr. Douglas had become a leader in its management (he was Vice-president in 1897-8, President 1899-1900, Director from 1905 to 1913, Honorary Member from 1906, and Vice-president of the Board of Directors from 1906 to 1911) he was a strong opponent of the increase of annual dues. Even after the acceptance by the Institute of Mr. Carnegie's gift (involving a heavy land-debt), he was not willing to meet additional expenses in that way. "I remember," he used to say, "when even ten dollars a year was too great a burden for me; and I will not vote to lay a heavier load upon young American engineers."

At the time when Phelps, Dodge & Co. became a corporation, the members of the firm set aside $10,000 as a gift to Dr. Douglas, in recognition of his past services. But under his earnest persuasion, they gave the money to the Institute land-fund instead, in addition to their earlier subscription of some thousands of dollars. He was himself also at that time already a large subscriber.

This does not exhaust the list of his benefactions to the Institute. After the land-fund had been completed, he gave $100,000 to the Library; and it is reported in the newspapers that he left to the same object $100,000 more in his will.

Dr. Douglas in 1860 married Miss Naomi Douglas, daughter of Captain Walter Douglas, of Quebec, who survives him, together with two sons and two daughters: Major James F. Douglas, developer of the United Verde Extension Mine, who is now serving in France; Walter Douglas, who succeeded his father as President of the Phelps-Dodge Corporation; Mrs. Edith M. Douglas, wife of Archibald Douglas, a New York lawyer of extensive mining interests, and Miss Elizabeth Douglas.

Good-by for a while, James Douglas!—unwearied worker, courageous leader, wise counsellor, glad giver, faithful lover and friend—"Douglas, Douglas, tender and true!"

Magistrate Atkinson has handed down a decision in the case recently heard in the Cobalt courts, involving the alleged infringement of the Ontario Land Surveyors' Act by a mining engineer. The decision is against the land surveyors and the mining engineer is acquitted. The decision promises to be far-reaching in effect. The trouble began some three weeks ago when M. P. MacDonald, a mining engineer, was summoned into the Cobalt police court charged with infraction of the Ontario Land Surveyors' Act.

MARKETS

STANDARD MINING EXCHANGE.

(Messrs. J. P. Bickell & Co., report the following quotations on the Standard Stock & Mining Exchange, Sept. 27, 1918.)

Gold.

	Ask.	Bid.
Apex	.03	.02½
Boston Creek Mines	.30	.25
Davidson	.32	..
Dome Cons. Mines	.03	...
Dome Extension	.16	14¾
Dome Lake	.15	..
Dome Mines	10.25	10.00
Eldorado	.02	.00½
Elliott-Kirkland	.36	..
Hattie Gold Mines	.62	.61
Hollinger Cons.	4.95	4.90
Keora	.06	.05
Kirkland Lake	..	.38
Lake Shore M., Ltd.	.74½	.72
McIntyre	1.49	1.48
Moneta	.08	.06½
Newray Mines, Ltd.	.12½	.11½
Porc. Crown	.15	.14½
Porc. Imperial	.01½	.01
Porc. Tisdale	.01½	.01¼
Vipond	.14	.11
Preston East Dome	.03	.02½
Schumacher	.20	.19
Teck-Hughes	..	.23
Porc. V. N. T. Gold M.	..	.09
Thompson-Krist	.04¾	.04½
West Dome	.09¾	.09
Wasapika Gold M., L.	.30	..

Miscellaneous.

Vacuum G.	.08¾	.07½
Rockwood Oil & Gas	.32	.30½

Silver.

	Ask.	Bid.
Adanac Silver M., Ltd.	.07	.06½
Bailey	.04¼	.03¾
Beaver Consolidated	.30	.29
Chambers-Ferland	.11	.10¼
Coniagas	..	2.60
Crown Reserve	.22	.19
Foster	.02½	.01½
Gifford	.02¾	.02½
Great Northern	.03⅛	.08
Hargraves	.03	.02¾
Hudson Bay	18.00	16.00
Kerr Lake	6.15	5.75
La Rose	.53½	.53
Lorrain Con. M. Ltd.	.02	...
McKin.-Dar.-Sav.	.41	.40
Mining Corp. of Can.	2.50	2.30
Nipissing	9.00	8.55
Ophir	.06¼	.06⅛
Peterson Lake	.09	.08
Right of Way	.04	3½
Seneca-Superior	.01½	...
Silver Leaf	.00⅞	.00½
Temiskaming	.30½	.30
Trethewey	.25	.23½
Wettlaufer	.07½	.04½
York Ont.	.01	.00¾

CHROMITE IN THE UNITED STATES

Significant articles have appeared recently in the mining journals concerning a higher and more equitable price to the man who mines and markets the chrome ore used in making ferrochrome now selling at $400 a ton. The Geological Survey has suggested an increased and more stable price for chromite as a most effective means of increasing domestic production by encouraging and arousing the small producer to do his utmost.

The price of 40 per cent chromite at the beginning of 1917 was $15 a ton, that is, 37½ cents a unit of chromic oxide, but at the end of the year the price had been raised to 70 cents a unit, or $28 a ton. The actual price reported to the U. S. Geological Survey ranged from $10 to $50 a ton and the average price of the ore sold during the year by producers was a little more than $24 a ton. Early in 1918 the price for 40 per cent ore reached 85 cents a unit ($34 a ton). The impending crisis resulting from lack of ships to import the ore needed for war purposes has impelled the principal consumer, the Electro-Metallurgical Co., of New York, to advance prices greatly in the hope of increasing domestic production. The statement of the company was published March 17, 1918, in the form of an appeal, as follows:

To Pacific coast prospectors and miners: The California Chrome Co., which has operated in California and Oregon for the last two years, will contract for the balance of this year for chrome ore at a minimum price of $1.25 per unit for 38 per cent chromic oxide and upward. Premiums will be paid for early delivery. Advances will be made on good prospects for development work. Settlements in full will be made on independent chemists' sampling and analysis on receipt of bills of lading and weight certificate.

All low-grade chrome ores cannot be concentrated to advantage. This is especially true of low-grade ores in which the chromium has been replaced by aluminum and iron. Chrome ore rich in magnetite may under some conditions be successfully handled by a magnetic separator. Concentrating plants have been a feature of the chrome industry in Canada ever since 1898.

The measure of normal annual consumption of chromite for all the various uses before the war may best be expressed by the sum of domestic production and imports in 1913, about 65,000 long tons. On account of the greatly augmented demands of war conditions it has been estimated by the committee on mineral imports and exports of the Shipping and War Trade boards that the needs of the United States in 1918 will be equivalent to about 130,000 long tons of 50 per cent ore, of which 67,500 tons will be needed for ferrochrome, 40,000 tons for making bichromates and other chemicals for tanning, etc., and 22,500 tons for refractory purposes.

MOND NICKEL COMPANY.

At the annual meeting of the Mond Nickel Company, Limited, held in London recently, particulars of which are contained in British exchanges to hand, it was shown that owing to the scarcity of labor and material the company had not been able to complete the extension intended. The Chairman, Mr. Robert Mond, said that satisfactory progress was being made in the erection of the fifth unit, and that some steps were being taken towards the erection of a sixth. He said that the management in Canada, not having suffered to the same extent as the parent company in Great Britain, had made much better progress in construction work. In spite of the shortage of labor, the company had not only substantially increased its output of Bessemer matte, but had also been able to put itself in a position to supply for the intended increase of the refining plant. Their supplies of matte in Canada for the refining work had, he said, been brought across the Atlantic without interruption, while the Government authorities had provided the company with the necessary permission to secure the requisite material to maintain the plant in full working order.—The Globe.

RICH ORE FOUND AT LANARK MINE

A rich strike is reported at the Lanark mine, Illecillewaet, B.C., one of the oldest mines of British Columbia. One ore shoot has been uncovered for 350 ft., and the ends are not reached. There are fourteen inches of clear lead and copper ore and four to five feet of concentrating ore running 20 to 25 per cent. lead. The clear ore runs from 50 to 70 per cent. lead and from 40 to 100 ounces silver to the ton, and has been assayed to 248 ounces of silver. The company is running a cut into the shoot 90 ft. deep and $40,000 worth of machinery is being installed.

Permission has been granted by Mr. George Wilkinson, Chief Inspector of Mines for British Columbia, for the opening of the Jingle Pot Coal Mine, Vancouver-Nanaimo Coal Mining Co., Ltd., which was ordered sealed ten months ago owing to the discovery of fire. In the interim, the mine has been flooded.