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### MEN AND METHODS

On page 15 of the *Toronto World* of September 14th, 1907, there appears a short article entitled "Larder Lake Investors Making Money—Larder Lake Gold District Proving the Greatest in the World." It begins by stating that eminent engineers from England, Germany and France have recently made "searching examinations of the Larder Lake gold fields," and that, one and all, they have endorsed the reports of United States and Canadian experts in terming Larder Lake the mining wonder of the world.

The next paragraph implies that "English, German and French engineers," familiar with the great gold deposits of South Africa, Australia and Siberia and the world generally, state that the Larder Lake district out-classes them all.

"One of the most prominent engineers of London," just back from a six weeks' examination of the district, is quoted as stating that South Africa never offered as inviting a field as does Larder Lake.

The fourth paragraph, however, brings us to the significant feature of the article. In vague terms a "report" is repeated, that London engineers have gone to examine the Blue Bell and Lucky Boys' mines, that well-known mining interests of England and France are to become "strongly identified therein," and that a great smelting plant is to be erected. "The price at which these interests" (we quote the *World's* phrases here unchanged) "will become interested is reported to be considerably above par and is not from private holding, but from the treasury stock of the companies." Reference is then made to the fact that Law & Company, brokers, of Toronto, during the past six months placed the shares of the Lucky Boys and Blue Bell mines on the market at 6 and 10 cents respectively. The development of many veins "running in width from 4 feet to 140 feet" is mentioned, and the value of the ore in sight and available for the two companies is estimated at more than thirty millions of dollars.

The "outcome" of all this is taken as vindicating the judgment of the brokers mentioned above. The article concludes with the statement that engineers and miners who have examined and are familiar with the properties claim the shares of Blue Bell and Lucky Boys will be worth ten dollars per share within the next year.

Incidentally we shall make a point of remembering that last prediction. If, within a year, shares in Blue Bell and Lucky Boys reach the ten dollar mark, we shall gladly retract all that we intend to say.

There are certain pointed comments called for by this article. In the first place, there are no indications, beyond internal evidence, that it is an advertisement.



Therefore we take it that the *Toronto World* is responsible for its appearance.

Secondly, statements to the effect that Larder Lake gold district is proving the greatest in the world are totally unjustifiable. They are false and they are harmful alike to Larder Lake and to investors. Larder Lake is not "proving the greatest in the world."

Larder Lake is yet and will be for many months a new and unproved camp. The newspaper reports circulated about it have done it vastly more harm than good. Among those competent to express an opinion the district is looked upon as a low grade "proposition" with a possible future before it. The most sanguine of the reputable mining men who have visited the camp do not go farther than expressing their belief that when Larder Lake shakes herself free of wild-cats she will settle down into a steady low grade gold camp.

Therefore nothing could be more fatuously silly than comparing Larder Lake with the established gold camps of Australia and South Africa.

We invite the *Toronto World* or the person or persons who are responsible for the article to give us (in confidence if necessary) the names of the eminent English, German and French engineers who entertain such glowing opinions of Larder. Meanwhile we shall frankly say that we do not believe that any English, French, German, American or Canadian mining engineer of good standing would make any such statements for publication. We are similarly incredulous of the reported statement of "London Engineer," in the third paragraph.

The report that strong English and French interests are to buy stock in the two mines, floated by Law & Company, at considerably above par value, is not given as merely a rumour. It is so placed that the unwary reader will be led to conclude that the deal is about to be consummated. It will therefore require our attention for a moment.

It is very unusual, to put it mildly, for mining engineers commissioned by "well-known mining interests" to advertise their intentions or to allow them to be advertised. The *Toronto World*, after saying that "engineers have gone to examine" the mines in question, implies that, as a foregone conclusion, their report is to be favorable and that English and French capital will be at once injected into the concern. Now this is not only unlikely, but so extremely improbable as to warrant us in calling it fantastic. What decent mining engineers would allow their employers or any one else to take their opinions for granted? If examinations are to be made on these mines by clean engineers, then neither the *Toronto World* nor THE CANADIAN MINING JOURNAL can have any legitimate means of knowing what their dictum is to be. As it stands then, this portion of the paragraph is unworthy of credence. It follows logically that the statements based upon this rumour, concerning the acquisition of the stock, fall into the same category. It also follows that, contrary to the

*Toronto World's* opinion, the whole business reflects no credit upon Law & Company, brokers, of Toronto, Ontario.

The *Toronto World* is oftentimes the outspoken and fearless champion of right. The publication in its columns of trashy mining advertisements and of inspired mining news can add nothing to the paper's reputation. This applies, in varying degrees, to almost every newspaper in Toronto. We wish for the benefit of the Toronto papers, to direct their attention to the principal British Columbia dailies. Their Western contemporaries publish well-authenticated correspondence in mining matters. Their columns are clean and reliable to a very commendable extent.

### THE PASSING OF THE SCOTT ACT

(Contributed)

In the County of Cape Breton at the present moment the average man "dunno where 'e are" in the matter of liquor laws, and in Glace Bay at least there is "no King in Israel." The fourteenth was pay day, and at night the streets of the town were full of "drunks." The local paper states that the sounds of revelry and blasphemy continued till three in the morning of Sunday. It was presumed that Saturday was the last day of the Scott Act, but the lawyers are not yet quite sure whether the Scott Act is in existence or not, as its repeal has not been gazetted. Samuel Weller said the law was a "hass." He was right. We imagine that the smaller fry amongst the legal fraternity will deplore the passing of the Scott Act into the limbo of things that have been, for it was the cause of much profitable litigation. Peace to its ashes, and may it never be resurrected until our councillors are men of more wisdom than those who represent us to-day. It is stated that under the Provincial License Law no license application can be entertained until December, and no license can be granted until March, 1908, and that further, any person convicted of selling liquor forfeits his right to apply for a license for the space of four years. Hence we are told that for six months we shall get real prohibition. Shall we? The Scott Act was not carried out, and the Nova Scotia License Act will not be carried out. So long as liquor is manufactured in Halifax and Upper Canada it will be drunk in Cape Breton, and the tighter the bands of prohibition are drawn the viler will be the stuff dispensed, and the more flagrant will be the evils of secret drinking in the unmentionable dives that such sumptuary laws encourage. The Mayor of Sydney in a recent speech said "one might as well try to enforce the Ten Commandments, as try to enforce prohibition." Such a remark is not orthodox and its morality is doubtful, but alas, men in general are neither orthodox nor moral, indeed we have it on good authority that men are "deceitful and desperately wicked." The utterly impossible and hopeless attitude of the extreme temperance party on this subject is well illustrated by a remark that was made to the



writer when discussing this matter with a gentleman who is fairly representative of his class. This gentleman said: "If I thought that the granting of a restricted number of licenses in Sydney would cut down the drinking by fifty per cent. I would not append my name to an application, simply because I object to the principle." We had thought it was the drinking these gentlemen objected to.

We again submit that the only cure for the drink evil lies in a gradual education of public opinion along temperance lines, and the provision of suitable and cheerful places where light beers and refreshments are dispensed and where men can read and indulge in various games of skill and recreation. Good work has been done along these lines under the auspices of our Governor-General, Earl Grey, in the large cities of England. Workingmen, and particularly miners, must have occasional amusement and relaxation, and if it is not provided for them elsewhere they will find it in the saloon. Temperance bodies may debate, legislatures may legislate, and preachers may fulminate until the crack of doom, but nevertheless, the workingman will have his beer, willy nilly. Then why not appreciate this fact, and give it to him of good quality and openly, and amid congenial surroundings. For when all is said and done have it he will.

### REWARDING PROSPECTORS

An excellent point is made by a correspondent in this number of THE CANADIAN MINING JOURNAL. He brings forward the suggestion that prospectors should be rewarded by the State. Not only should the successful prospector share in the beneficial results of his ardour and perseverance; but the unsuccessful should receive some recognition. Not always are the prospectors who make the biggest stake the men who have done most for the opening up of the country. It is not unusual to find the boldest and sturdiest pioneers quite dependent upon small tradesmen for their grubstake. If, in process of time they make no remunerative discoveries, this precarious means of support is cut off and the knights of the wilderness find themselves stranded on the high and dry shore of destitution.

Assuredly no better use could be found for a moiety of the wealth that the country derives from her mineral deposits than that of providing for the old age of prospectors.

### STEEL VERSUS COAL

Judge Longley's decision in favor of the Dominion Steel Company was in some respects a surprise. While it was apparent to those who carefully watched the progress of the suit that the Dominion Steel Company would get at least a favorable decision, it was hardly expected that every contention put forward by the Dominion Coal Company would be brushed aside. In the interests of lasting peace it is probable that a less sweeping decision would have been better. If the Dominion Coal Company

needed any incentive to continue the fight, that incentive has been given it now. Apparently an appeal on the part of the Coal Company is certain.

When one considers that an English expert was retained by the Dominion Steel Company to give evidence, that he was paid at the rate of \$250 per day outside of his expenses, and when one further reflects that this is but a small item in the total expenditure of one of the litigants, the conclusion obtrudes itself that neither company has the moral right to waste its substance in such riotous foolishness.

A summary of the principal points of Judge Langley's decision will be found on another page.

### MINE TAXATION

Arizona is enforcing a mines taxation law, the provisions of which will probably surprise Canadian mine owners. The basis for evaluation of mining property is taken as 25 per cent. of the gross metal output of productive patented and unpatented mines, and \$20 per acre for non-producing mining claims. Under this system of assessment the larger mining companies have a well-proportioned share of the tax. The relatively heaviest tax, however, falls upon non-producing mining claims. We note, in passing, that owners of the latter class of claims have done most of the growling.

### RESULTS

The Big Ben Cobalt Mines, Limited, has suspended operations. It is to be hoped that the directorate of that company will seize the opportunity of putting themselves in a more favorable light. Had our recent criticisms been unjust we would doubtless have heard from some of the officials. From their silence we draw the conclusion that they cannot gainsay the facts adduced. Hence we fully expect to hear of a thorough re-organization of the company or of the refunding of the moneys sent in by purchasers of the stock. It is hardly necessary yet to remind investors that they can easily recover their subscriptions by availing themselves of the Ontario Companies' Act.

### Editorial Notes

A German correspondent enquires for Canadian shippers of agate. Quotations on any quantities that can be supplied at market figures c.i.f. Hamburg, Marseilles and Trieste. THE CANADIAN MINING JOURNAL will gladly give further information to any one interested.

Canada's pre-eminence over the United States in the production of mica is encouraging. Statistics given on another page demonstrate that Canadian exports of mica exceed the total production of the United States by over 100 per cent. The regularity and extent of Canadian mica deposits, and the high grade of the mineral found, should be ample guarantees that the relative positions of these two countries will be maintained.



## A LARDER LAKE WILD CAT

We have before us what purports to be the prospectus of "The Blue Bell Gold Mines, Limited," issued by Law & Company, stock brokers, Traders Bank Building, Toronto, Ontario.

In this document there are four pages. The first page begins with a caption in heavy letters, "Larder Lake the New Eldorado of Northern Ontario." Next comes the column title, "The Golden North and the Golden Opportunity." This is succeeded by almost two columns of lyrical prose, interstrewn with exclamation marks, capitals and other typographical devices. As a specimen of English literature it is wonderfully tawdry; as a sample of the brokers' art it is a nauseating reiteration of exaggerations and falsehoods.

Here we have brokers, making high claims to respectability and reliability, offering to the public something for which they wish the public's money in return—in itself a strictly commercial transaction. Instead of telling their prospective customers exactly what they wish to sell them, they engage a printer to put together a collection of adjectives and punctuation marks! After the manner of the patent medicine vendor, this is good work; but as a presentation of facts and figures about a gold mine, it is balderdash.

The phantasm of "ground floor" prices is held out. The imagination and the sentimentality of the reader are appealed to. "Why," the prospectus asks, "should the thousands of strong men who braved the north winds last winter around Larder Lake, etc., etc., etc., have done so unless they knew full well the treasures they were guarding?"

Let us, following Master Socrates, answer this question with another. "Why," we query, "should Law & Company, stock brokers of Toronto, Ontario, devote so much space to claptrap if they have so fabulously rich a mine?" We are persuaded that not ourselves, and very much less Law & Company, would allow the public in on one share of a mine whose ore assayed as high as \$15,000 to the ton from "the very grass roots."

In this we may misjudge our friends Law & Company, stock brokers of Toronto. They may be (who knows!) a new type of self-effacing Christians. But in that case we shall consider it our sacred duty to protect them from themselves.

Out of several hundred color effects in words these facts emerge from the first section of the prospectus. Law & Company invite the public to join them and participate in the profits and benefits "that are sure to come to all" who invest in Blue Bell Gold Mines, Limited. The company owns "28 well-selected gold claims." Assays showing \$15,000 to the ton have been obtained. The men identified with the project are all that could be desired.

As pointed out in a previous issue, such an assay may mean anything or nothing. In Larder Lake it is certain that no large body of ore carrying anything like a fraction of this amount to the ton has yet been discovered. The directors, if respectable mining men they are, have had very little to do with this prospectus.

Page 1 concludes with an extract from the *Toronto World*, April 4th, 1907. The second page also is largely given up to quotations from the *Toronto World* and the "Ontario Mining News." In connection with this free use of extravagant mining news we wish to make some remarks. Enquiry at the *World* office failed to elicit information as to whether such items were paid for as advertisements, were directly inspired by promoters, or

were evolved by the paper's reporters. On these points the reader can easily draw his own conclusion—and there is but one conclusion to draw. Here, too, we may insert a warning against two mining brokers' sheets. One for some time known as the *Ontario Mining News*, has recently changed its name to the *Canadian Mining News*. The other appears under the appellation of the *Mining Digest*.

Page 3 presents a map of Larder Lake, on which the 28 forty-acre gold claims of the Blue Bell Company are shown in black. An excerpt from the *Ontario Mining News* contains the usual amount of hyperbole and one gem of phraseology. Quartz is referred to as "these quartz." We mention this trivial circumstance because such things have a deeper significance than is generally known.

Half of page 3 is devoted to three reasons why Blue Bell is a good investment. These reasons are sheer twaddle. What does a business man care about the opinions of old miners about Larder Lake's future?

Why should the fact that thousands of brave men have been frost-bitten in their passionate longing to give Law & Company advertising material, influence the investor?

And, again, more emphatically we protest that directors are not gold mines!

Page 4, except that it is called a "Proclamation," is merely a re-hash of the previous pages. A blank application form appears at the bottom of the page. It is made out to the Trusts & Guarantee Company, Limited, 14 King street west, Toronto.

Not once throughout this prospectus is the capitalization of the company mentioned—an omission which is a most barefaced breach of the requirements of the Ontario Companies' Act. We cannot look upon this as merely an oversight. It is evidently an intentional gap and, just as evidently, Law & Company do not care to give facts and figures. Otherwise why should they offer such a production as this in lieu of the statements demanded by the statutes of the Province?

We shall, in conclusion, enumerate a few of the facts gathered from records in the Provincial Secretary's office. The company was incorporated on April 7th, 1907. Its capitalization is \$5,000,000, divided into 5,000,000 shares of \$1 each. Its board of directors comprise the followings names:—

President—J. H. Hunter, Cobalt, Ont., capitalist.

Vice-President—D. T. Hughes, Buffalo, N.Y., hotel proprietor.

Secretary-Treasurer—W. A. Abentroth, Toronto, Ont., accountant.

John S. Crawford, Ottawa, Ont., manufacturer.

W. R. Graham, Cobalt, Ont., architect.

The mining claims owned by the company were purchased from William L. Russell for the consideration of 3,000,000 shares of the company's stock. The directors are authorized to pay brokers a commission of 25 per cent. of the stock sold by them. These facts speak volumes for themselves and for the subscriber's chances of getting a run for his money.

Mr. H. Mortimer-Lamb, Secretary of the Canadian Mining Institute, has completed a tour of British Columbia, during which he was successful in adding a considerable number of members to the Institute.



## Smelting Works of the Consolidated Mining and Smelting Company of Canada, Limited, at Trail, B.C.

J. M. TURNBULL.

The smelter of the above named company is located at Trail, British Columbia, on the edge of a flat bench which rises about 200 feet directly above the Columbia River at the junction of Trail Creek.

The smelter began as a small plant producing copper matte from Rossland ores. It was built by F. Augustus Heinze, and was first blown in during February, 1896.

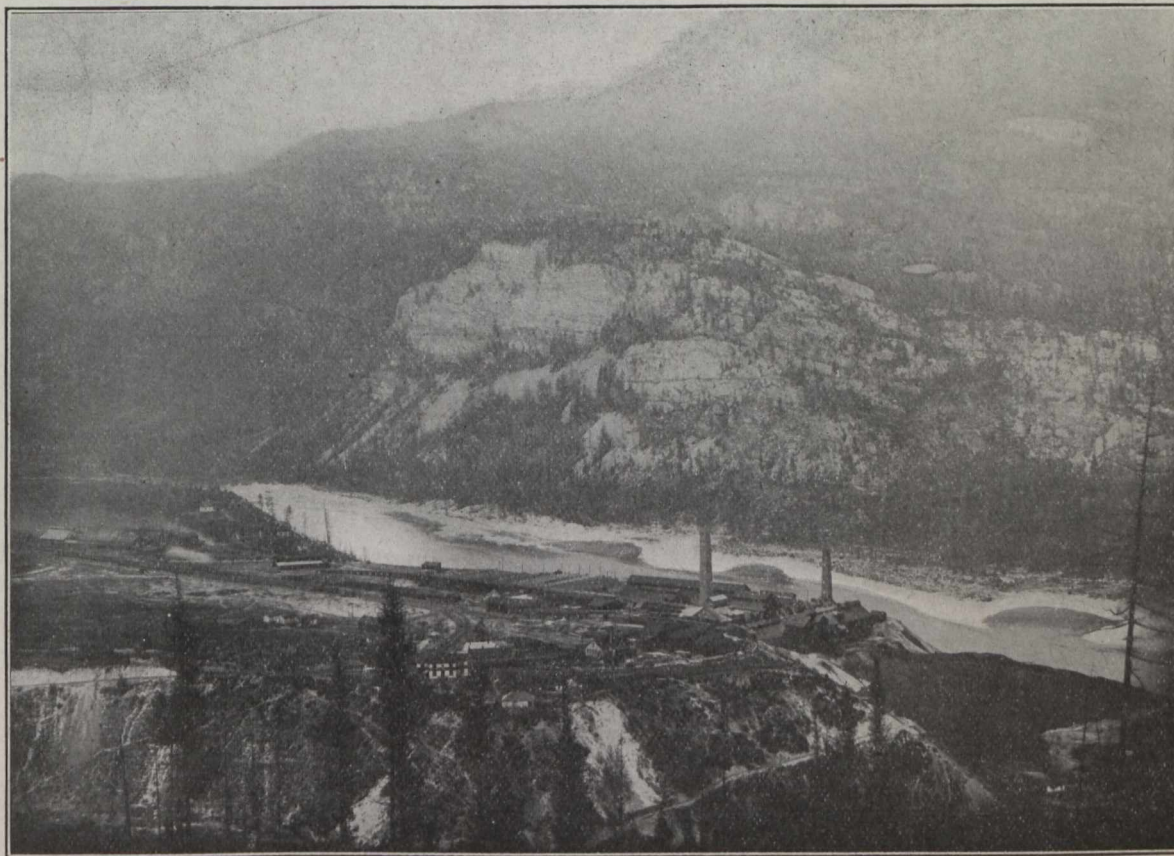
The Canadian Pacific Railway Company acquired it from Heinze in 1898 and greatly enlarged and extended it, lead blast furnaces and refinery being among the additions.

One 100 ton Fairbanks railway scales.

Five copper blast furnaces. Three of these are 263 x 42 inches at the tuyeres; the others are smaller but will be enlarged to the same size this year. Each of these is capable of handling about 300 tons of Rossland refractory ore per day.

Two lead blast furnaces, 45 inches by 140 inches and 45 inches by 160 inches respectively, at the tuyeres, each capable of handling 125 to 150 tons per day, according to the ores treated.

An extensive system of flues is installed connecting



TRAIL SMELTER—FROM ACROSS TRAIL CREEK.

The Consolidated Company purchased it on January 1st, 1906, and have made extensive additions also, including the installation of the Huntington Heberlein process for lead ores, a large addition to the lead refinery, a new copper furnace, enlargement of old copper furnaces and a new sampling mill capable of handling 200 tons per hour.

The total expenditure on plant and equipment to date runs to about \$1,250,000.

The Canadian Pacific Railway Company has some three miles of sidings on the smelter flat, and connects the works with Rossland and the other mining camps of British Columbia.

The main features of the equipment consist of the following:—

the furnaces with two brick stacks, the highest being 185 feet high.

Two O'Hara roasters, 9 by 95 feet and 12 by 97 feet respectively.

Four Huntington Heberlein circular roasting furnaces, 26 feet in diameter, and twenty-four Huntington Heberlein convertors have replaced the ten hand roasting furnaces formerly in use.

Blowing plant consists of three No. 7, one No. 7 1-2, one No. 8 Connerville blowers; one No. 8, one No. 9, one No. 9 1-2 Root blowers. Each is connected to a separate electric motor, the total power used being some 1,100 horse-power.

Briquetting plant contains two Chisholm, Boyd & White briquette presses, and necessary pugmills, etc.



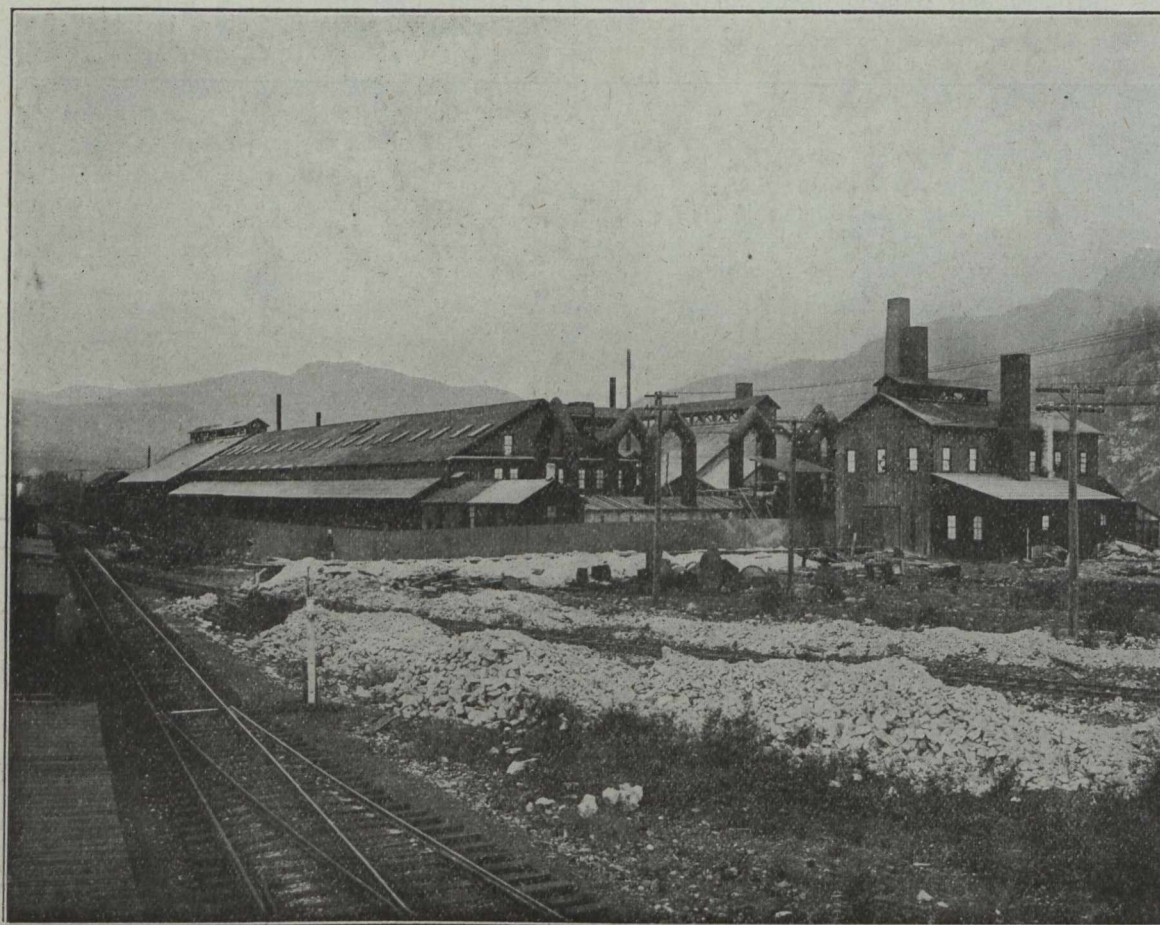
Old sampling mill for copper ores is equipped with No. 6 Gates crusher, elevator, and series of Vezin samplers and small crushers. Its capacity is 80 tons of ore per hour.

New sampling mill is equipped with No. 8 Gates crusher and Vezin samplers. The capacity is 150 tons per hour, enabling all sampling to be done on one shift, with much resultant economy. Among other improvements in this mill the use of manganese steel is expected to result in a saving in repairs and consequently a saving in time.

The sampling mill for lead and high grade ores has a capacity of 30 tons per hour and is equipped with Blake crushers and Brunton samplers.

made up here and weighed in specially designed side dump cars, which are run to the furnaces by a locomotive, the former system of handling by hand being nearly superseded.

The assay office is a large brick building, and is very completely equipped. It was built in 1902 and is modern in all respects. An electric motor drives the crushers and grinders. Electric heaters are used in the moisture sample dryers and in the chemical laboratories. Four large muffle furnaces are installed and the chemical and other equipment is very complete. A large range of work is done here, including assays and analyses of all kinds of ores, smelter products, coal and coke, and products from the lead refinery.



TRAIL SMELTER REFINERY.

Six Bruckner roasters were installed some years ago, but are not much used at present, not being suitable for use with the products now being turned out in the works.

The haulage system is quite extensive. A large generator with motor is installed in the blower room, and four three ton electric trolley locomotives are used, operating on three levels. The top level runs over the storage yards and distributes ore over the storage yards, which have a capacity of about 40,000 tons of ore. The second level is the main haulage level. It connects with the sampling mills and with a tunnel below the storage yards. Ore, coke, limestone are handled from the yards and sampling mills to the charging bins. The third level is on the charging floor. The charges are

The lead refinery deserves a longer description than can be here given. The equipment consists of three motors totalling 650 kw. and corresponding generators, which supply current at about 80 volts and 3,500 amperes for the electrolyzing tanks. One 50 ton melting pot and anode casting machine, 224 tanks, made of wood and lined with asphalt, each holding 20 anodes. The anodes weigh about 350 pounds apiece. The tank and melting room is 311 by 50 feet, and an electric travelling crane runs the length and handles all materials. Two 50 ton melting pots with pump and casting moulds dispose of the refined lead, which is loaded directly into cars at the door. A patent machine is used for turning out thin cathode starting sheets. The slime plant consists of drying tanks, small reverberatory melting fur-



nace, parting kettles for parting the dore silver bars, tanks for precipitating the silver on copper plates, and an evaporating plant for evaporating the resultant copper solution. A lead pipe machine is part of the equipment, making pipe from 1-8 to 4 inches in diameter, of any length required.

The hydro-fluo-silicic acid required is made in the acid plant, which consists of two distilling furnaces and condensing tower with storage bins for fluor spar and silica.

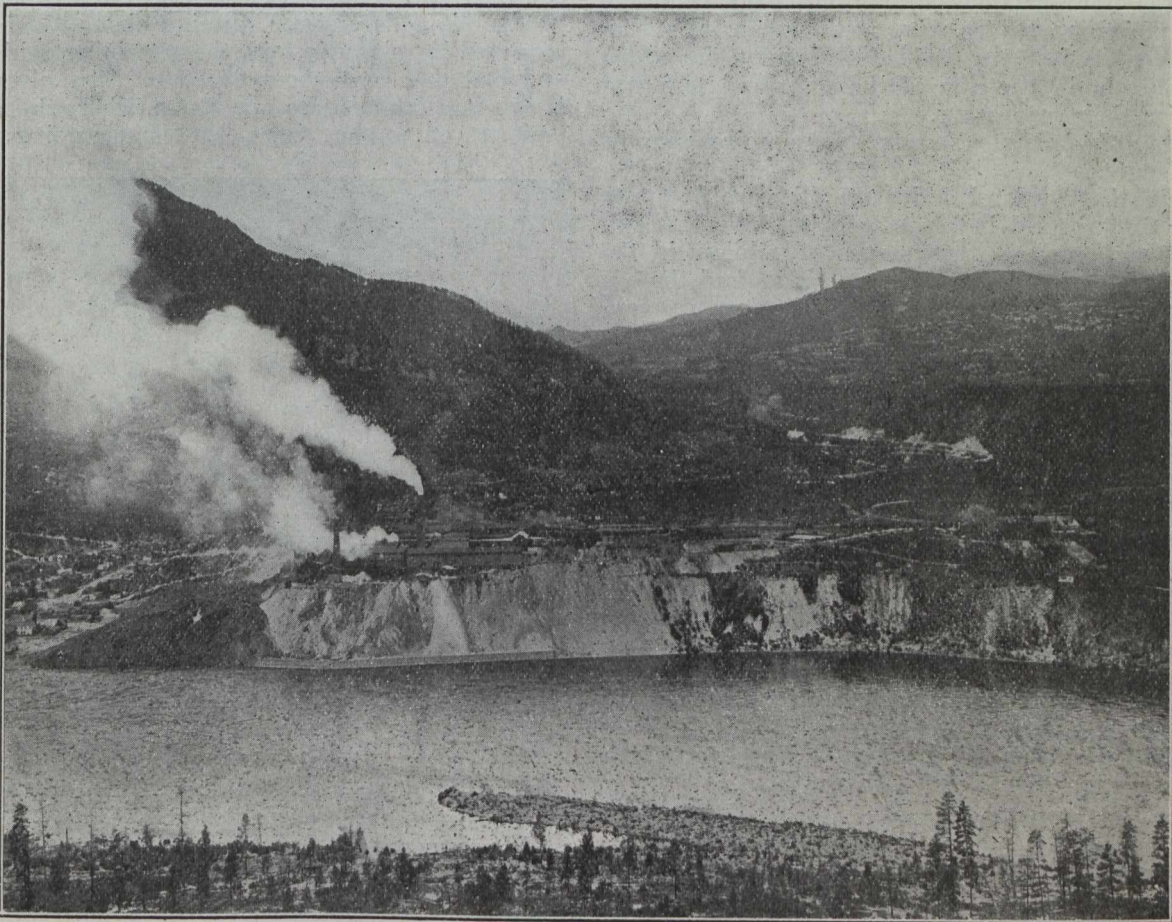
Handling of material between the furnaces and the refinery, about one-quarter of a mile apart, is done by the yard engine on the tracks of the Canadian Pacific Railway.

The general equipment includes a great amount of smaller plant not mentioned specifically. Complete

B.C., some 244 miles east of Trail. The quality is good, though rather high in ash.

Lime rock comes from the company's own quarry at Fife, B.C., on the Canadian Pacific Railway line. The rock assays about 50 per cent. lime or calcium oxide. Up to 200 tons per day is used.

As regards ore supply the smelter is in a very strong position. The Consolidated Company own the Centre Star Mines in Rossland, capable of producing 500 tons of gold copper ore per day. This is the chief single supply of ore. The company own the St. Eugene mine, the largest lead-silver ore producer in British Columbia, which is capable of producing 100 tons per day of high grade lead ore and concentrates. The company also have a lease on the Snowshoe mine at Phoenix, which



TRAIL SMELTER—FROM ACROSS COLUMBIA RIVER.

blacksmith, boiler, machine and carpenter shops attend to construction and repairs, and there are a large number of buildings, including general offices, warehouse and a number of fine residences on the bank of the Columbia River above the smelter.

An ample water supply is obtained from a five mile line of 14 inch and 16 inch wood pipe connecting with three different creeks. It reaches the smelter through two steel penstocks at a head of about 100 feet.

The fire protection system includes a 700 gallon Worthington centrifugal pump, with hydrants and hose reels at convenient points.

Coke and coal are obtained from the Crow's Nest Pass Coal Company's ovens and mines at Fernie and Michel,

ships 200 to 300 tons per day to the smelter and is easily capable of turning out two or three times this tonnage if pressed. It is worthy of note that the smelter is treating this ore from Phoenix, in spite of the long haul to Trail directly past the Granby smelter, of whose low smelting costs so much has been heard.

A large tonnage of custom ore is also handled. Copper and dry ores are received from the Boundary, Kamloops, East Kootenay, Lardeau, Slocan, Nelson, Ymir and other districts of British Columbia, and occasionally from the United States. Lead ores come chiefly from East Kootenay, Slocan and Lardeau districts.

The great diversity in composition of the ores received renders it possible to smelt without the admixture of



any barren fluxes except limerock. Lead bullion from other smelters and mill products are also handled.

The ore buyer is a technically trained mining engineer, and the securing of ore supplies well in advance of needs is one of the most important branches of the work, demanding not only a careful consideration of the metallurgical requirements, but a wide familiarity with the mining districts and most of the mines.

Treatment rates vary considerably with the nature of the ore and the distance of transportation, since the latter is included in the rates given. The freight and treatment rates on Rossland gold copper ore, for instance, has been reduced from \$11 per ton in 1896 to \$3.25 per ton at the present date. Dry ores receive rates varying from \$8 to \$12, and heavy lead ores an average rate of about \$12, depending on the lead content. Concerning methods of treatment:—All shipments are carefully weighed-in on the railway scales, and are then put through the appropriate sampling mill, the resultant pulp and moisture samples going to the assay office. The mines representatives are enabled to inspect the whole process and obtain portions of the pulp and moisture samples for their own assay.

An extra pulp is kept under seal for umpire assay in case of dispute.

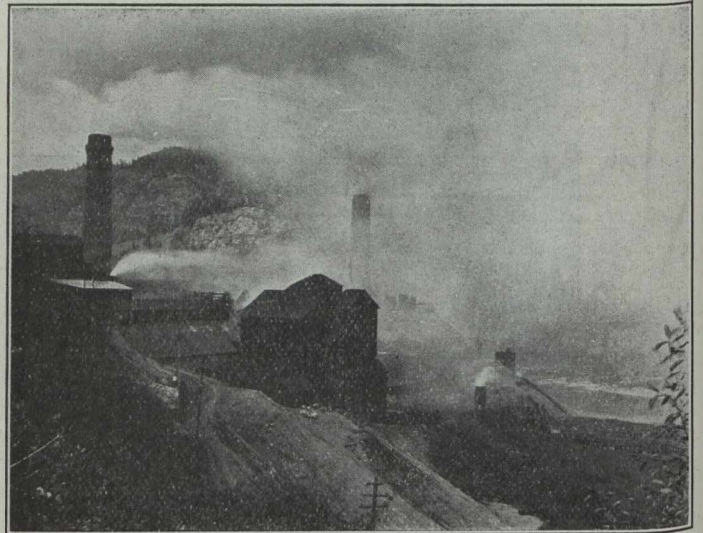
Formerly the Rossland and some other gold copper ores were first roasted in heaps to drive off excess sulphur, but of late years the amount of sulphur in the charges has been less and the custom is to feed the ore raw to the furnaces. The products of the furnaces consist of slag, which is granulated and carried away by streams of water, very conveniently and cheaply, and a matte which runs 10 per cent. to 15 per cent. copper. This matte is granulated by pouring into a stream of water, and the granulated product is treated in the O'Hara roasters and the roasted matte is briquetted in the briquette plant. As an alternative the granulated matte may be treated in the Huntington Heberlein convertors, the resultant mass simply being broken up and not requiring briquetting. In either case the roasted matte is re-smelted with certain selected ores and a high grade matte running 45 per cent. to 50 per cent. copper is produced. This product is shipped to the United States for treatment, as the Trail smelter does not yet possess copper convertors for the production of blister copper. The slag from this smelting is largely returned to the low grade furnaces for re-treatment.

The flue dust from the furnaces is collected periodically and briquetted, and the briquettes are returned to the furnace with succeeding charges.

Briquetting is done by mixing the flue dust or granulated matte with 5 per cent. of lime, and the moistened material is mixed in pugmills and pressed in the briquette presses. The necessary lime is burned in two small kilns on the premises, the limestone coming from the company's own quarry.

Lead ores, which are mostly in sulphide form, are crushed and mixed with a certain proportion of crushed lime rock. The mixture is bedded in the yards, a variety of ores being bedded together, so as to get a correct smelting mixture. This mixture is roasted at a low heat for eight hours in the Huntington Heberlein roasting furnaces. The resultant sinter is somewhat cooled and then fed gradually into the convertors on top of a small wood fire, air is then blown in and the mass begins to glow, and more sinter is fed in until the convertor is full of a glowing mass in about 8 hours. The mass is allowed to cool and is then dumped out and broken up. The product is fed to the blast furnace, with certain other

high grade ores and products and the requisite amount of coke. The product from the blast furnace is lead bullion. This is cast into bars and sampled by punching and shipped up to the refinery. In the refinery the lead bullion is cast into anodes, which are placed in the tanks alternately with thin starting sheets of refined lead. The electrolyte contains lead fluo-silicate and other chemicals in solution. The electric current used is rated at 3,500 amperes at 80 volts. At the end of 8 days the lead has passed over on to the cathodes, which are taken out, washed, melted and cast into shipping bars. These bars run over 99.98 per cent. pure lead. The precious metals and impurities of the anodes remain as a black slime in the tanks. This is taken to the slimes plant, where it is washed, the washings being evaporated down to recover the electrolyte contained. The washed slime is dried and melted in a small reverberatory furnace, connecting with a system of flues, the dust from which is periodically collected and sent to the smelter for treatment. The product is a dore silver running about 950 fine. This is parted in sulphuric acid, the remaining gold is melted and cast and runs about 995 fine. The silver solution is run into tanks, heated by steam, where the silver precipitates on copper plates, the copper going into solu-



TRAIL SMELTER FURNACE BUILDING.

tion. The silver is melted and cast into bars weighing about 80 pounds. It runs about 999 fine.

The copper sulphate solution is run over to an evaporating plant, which it is crystallized out, re-dissolved, re-crystallized out and put up in barrels.

Mr. A. J. McNab, metallurgist at the smelter, has worked out a process for recovering the 30 per cent. or so of antimony which the slimes contain, so that antimony will become one of the regular products of the works in the near future.

To recapitulate, the products of the works are:—Copper matte, carrying 50 per cent. copper and the bulk of the gold produced; fine gold, fine silver, refined lead, lead pipe, copper sulphate, and, in the near future, antimony.

The copper matte is sold to the United States smelters. The fine gold and silver to the United States mints at Seattle; fine silver also goes to the far east, etc. Lead is largely sold in Canada, the balance going to the far east or London. Analyses made by the Japanese Technical Department at Osaka, and published in the *Engineering and Mining Journal* of June 22nd, 1907, show that the Trail lead compares favorably with other well-



known brands, and is in fact probably the purest in the world. Copper sulphate is used by the farmers on the prairies to kill the smut in wheat.

The total number of employes averages about 500, a considerable number foreigners of several European nationalities. No Japs, Chinese nor Hindus are employed.

The power used in running the works is entirely electric, coming from Bonnington Falls at 20,000 volts; it is stepped-down by a battery of transformers to 550 volts for use in the works. The total power consumed runs from 2,500 to 3,000 horse-power.

The production of the works from the beginning to June 30th, 1907, has been 1,322,573 tons of a gross value of \$28,786,146. At present production is at the rate of about \$5,000,000 per year. With an adequate coke supply assured, this would become between \$6,000,000 and \$7,000,000 per year.

The refinery produces up to 75 tons refined lead per day, and about 1,800,000 ounces fine silver and 15,000 ounces fine gold per year. Most of the gold, however, and all the copper, which constitute the remainder of the valuable metallic shipments, are shipped in the form of high grade copper matte.

The quantity and variety of custom ores received, together with the assured supply from the company's own mines and the variety of products produced, on account of which the values produced are not dependent on the fluctuations in price of any one metal, place the smelter in a very strong position with an assured future.

The Consolidated Mining & Smelting Company are paying 10 per cent. annually on their capital stock, and have paid a total in dividends of \$714,945 since the amalgamation of the company, January 1st, 1906.

The officers of the company are:—W. D. Matthews, Toronto, president; W. H. Aldridge, Trail, managing director; Jules Labarthe, Trail, manager of Trail smelter and refinery, and R. H. Stewart, Rossland, manager of mines.

## MICA IN 1906

(Condensed from a Bulletin of the U. S. Geological Survey.)

Of the mica minerals only two are commercially valuable. These are muscovite, or potash mica, and phlogopite, or magnesia mica. Mica depends for its value upon its cleavage and the toughness, flexibility and elasticity of its cleavage sheets. The properties, combined with transparency and non-conductivity of electricity, render the varieties mentioned valuable in the industrial world.

Commercially mica is formed in rough blocks, sometimes with crystal outlines; thus crystals are often called books. In color mica is somewhat variable and generally muscovite is much lighter than phlogopite. Muscovite may be white, gray, yellow inclining to amber, brown, red and green. Phlogopite is generally some shade of yellow or brown to black, often possessing a coppery appearance, and is called "amber" mica from its color. Other colors observed in phlogopite are milky or silvery gray. The luster of muscovite is brilliant and glimmering on fresh surfaces, while that of phlogopite is less brilliant and more silvery or pearly.

Muscovite often contains inclusions of other minerals, either between the laminae or cutting across them. Common inclusions are magnetite, quartz, feldspar, garnet, and other mica crystals, with tourmaline, apatite, beryl, and rare minerals of less common occurrence. Inclusions

of magnetite are in the form of minute crystals, often arranged in definite positions with respect to one another. Intergrowths of biotite possessing the same cleavage as the inclosing muscovite may occur. The various inclusions detract from the commercial value of the mica.

**OCCURRENCE.**—Of the two valuable varieties of mica only one, muscovite, is found in deposits of commercial value in the United States. Commercially valuable muscovite is confined to pegmatite. As a coarse product of crystallization of pegmatite, mica is sometimes found in blocks more than a yard in diameter.

Mica crystals occupy various positions in pegmatite masses. Where the pegmatite has a typical granite texture the mica may be found evenly distributed through it. Often the large crystals will be found either in clusters at intervals through the "vein," in places partly connected by streaks of small crystals, or along one or both walls of the pegmatite. When there is a quartz streak within the pegmatite the mica occurs on either or both sides of it, being in places partly embedded in the quartz or occupying any of the positions noted above in the remaining portion of the pegmatite. The common forms of occurrence of pegmatite, commercially valuable for mica, are over-lapping lenticular-shaped bodies and sheets of more persistent extent. The minimum limit of thickness for a workable pegmatite body may be arbitrarily placed at from 1 to 2 feet for rich and regular bodies.

Outside of the United States, mica of commercial size has been found in India, China, Japan, Mexico, Brazil, Argentine, German East Africa, Australia, and other countries.

**MINING METHODS.**—Where mica deposits are regular in content, direction, and extent, they may be, in Canada, all systematically mined. Irregular deposits do not lend themselves to such methods of approach.

In Canada there seems to be a stronger tendency for systematic mica mining than in the United States, especially in the phlogopite deposits in pyroxenic rocks, which are probably more regular in nature than most muscovite deposits in pegmatite. In India the deposits are more irregularly worked than in any other region, since nearly everything is done by hand, even to removing mica and waste from the mines.

**PRODUCTION.**—In the United States the production of sheet mica for 1906 amounted to 1,423,100 pounds, valued at \$252,248. The total production of scrap mica was 1,489 short tons, valued at \$22,742. Canada in 1906 exported 913 short tons, valued at \$581,919.

**PRICES.**—For sheet mica the price per pound ranges from 13 cents for uncut mica, 1 1-2 inches by 2 inches, to \$2.50 per pound for uncut sheets 6 inches by 8 inches. Sheets of manufactured selected mica run from 60 cents per pound for sizes 1 1-2 inches by 3 inches, to \$6.75 for sizes 6 inches by 8 inches. Scrap mica sells for from \$8 to \$30 per short ton.

The executors of Andrew Marks Wiley are suing for \$150,000 commission before Master-in-Chambers at Osgoode Hall for the sale of the Anthony Blum Mine, Wabigoon, Ont., to Hugo Von Hazen, New York, for \$8,000,000. It is alleged that \$10,000 was paid on account, and that the Laurentian Mines Company then took over the property and that Mr. Blum was given stock in it instead of cash. The vendor claiming that the transaction was altered, refused to pay the commission to Wiley.







**PROFITS ON LOW GRADE ORE—SOME INSTRUCTIVE FIGURES**

For the first six months of the current year the gold mines of the Witwatersrand have earned an aggregate profit of £4,700,000. Companies for which detailed returns are available have netted £4,659,000, and the Vogelstruis Estate and the Orion Mines, together with one or two small producers, may be calculated to bring the full total up to approximately £4,700,000. In 1906 a total of £8,220,000 was earned, and at the rate of earning for the first six months the 1907 total may be anticipated at £9,400,000. For the last four months working costs in respect of sixty-three companies have been under 22s. per ton, the expenditure per unit during June being 21s. 6d., and the profit being at the rate of 12s. 4d. per ton. Last year the cost of expenditure worked out at 22s. 5 1-2d. per ton, the profit being at the rate of 12s. 1d. per ton. A study of aggregate profits, together with costs and profits on a per ton milled basis, show that, whilst working costs have been reduced by about one shilling per ton during the past year, the revenue per ton has also fallen by practically the same amount. This is the common history of Witwatersrand mining, and in future this particular phase is likely to be brought into much greater prominence than hitherto. Each reduction in the cost of operation brings a certain number of tons into the zone of payability, and whilst the mines are to-day dealing with ore worth just under 34s. per ton, it is not unreasonable to think that before very long 30s. will be the value of a Rand ton. If the present rate of profit-earning is to be maintained, working costs, it will be seen, must be brought down to about 17s. 6d. The relation of the cost of operation to the productive value of the Rand is a fascinating but highly intricate problem. It is extremely difficult even to approximate the additional amount of pay ore which a reduction of, say, 4s. per ton in the cost of working means to the Rand, but it is certainly enormous. In the earlier days of the Rand small mills and more expensive stores necessitated the working of richer ore than heretofore, but the days of very high costs and 12 dwt. ore are over. An instructive view of Rand mining economics may be obtained by estimating the cost of winning a sovereign's worth of gold. To-day it is costing 12s. 9 1-2d.; just previous to the war it was about 12s. 6d. Despite the fact, then, that working costs per ton have been very appreciably reduced since the 1899 days, the expenses entailed in winning a sovereign's worth of gold are higher to-day than in the period preceding the war. The obvious deduction is that the grade of ore milled has decreased more than working costs.

Of the sixty-two companies which declared profits in June, just 50 per cent. earned less than 10s. per ton. The Robinson, which is an exceptional proposition, earned £65,050, or 40s. 2d. per ton. Important mines like the

Witwatersrand, which made £14,752, the Rose Deep with £63,100, and the Geldenhuis Deep with £14,050, each earned less than 10s. per ton. These facts serve to emphasize the importance of fully realizing that the Rand is a low grade field, and that in the deeper level future companies earning profits at the rate of under half a sovereign per ton will account for the greater part of the Rand's earnings.—*Exchange.*

**Abstract of Judge Longley's Decision in the Suit of the Dominion Steel vs. Dominion Coal.**

The Dominion Coal Company was in default in its deliveries during the months of August, September and October, 1906.

The contract makes it clear that coal suitable for the operating of an iron and steel plant is the basis of the bargain.

The defendant company proved that Dominion No. 6 and its workings are on the Phalen Seam.

It also established that No. 6 coal was fit for steam purposes and capable of being consumed in grates and furnaces, and the judge finds that coal from No. 6 pit was commercial coal.

The coal received by the Steel Company was carefully mined and picked but not reasonably free from stone and shale.

The rejected coal from No. 6 contained 15.63 ash and sulphur 6.63. The average of the coal delivered in the preceding year from other pits on the same seam was 2.3 sulphur and 7 per cent. ash.

The exact and only thing the parties intended was that coal should be furnished to operate an iron and steel plant.

Coal to operate an iron and steel plant must be coal with which such a plant can be operated.

The objects of courts is "to give efficacy to the transaction and prevent such a failure of consideration as cannot have been in the contemplation of the parties."

The Coal Company committed a breach of the contract and is liable to the Steel Company for all the loss and damage which result from this breach.

A referee should be appointed to ascertain and determine the damages.

The contract of October 20th, 1903, is in full operation, and the judge orders that after the damages are assessed a decree issue requiring the Coal Company to specifically carry out the terms of the contract.

The court has power to enforce such decree by the appointment of a receiver if any attempt were made to evade specific performance.

CONCENTRATES					MERCURY							REMARKS
WIGHT	VALUE PER TON	TOTAL VALUE	VALUE PER TON OF ORE	Average Value TONS PER TON	TOTAL VALUE OF ORE PER TON	PERCENT TOTAL VALUE OBTAINED	TOTAL VALUE USED	TOTAL MER. RECV.	NET MER. USED	ORE GOLD RECV. PER 1 LB. NETT. MER. USED	LOSS OF MER.	
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Continued.



# COAL BRIQUETTING IN THE UNITED STATES\*

By EDWARD W. PARKER, Washington, D.C.

(Toronto Meeting, July, 1907.)

[NOTE.—The material from which this paper has been prepared was collected for the *U. S. Geological Survey Bulletin*, Contributions to Economic Geology, 1906, and appears also, though in somewhat more extended form without illustrations, in that publication.]

Although the briquetting of coals and lignites has been carried on for many years in Europe, and has reached a particularly high state of development in France, Belgium and Germany, it has made comparatively little progress in the United States. The causes for the backwardness of the United States in this regard are several, and first among them has been the abundant supply of cheap raw fuel with which the manufactured article has to compete. With our millions of acres of coal-productive territory, from which the production can in most cases be cheaply extracted, it has appeared in many districts to be more economical to waste the slack or culm, which constitutes a considerable percentage of the product, than to attempt to save it at the additional expense required for briquetting. It is for this reason that the view in all sections of the anthracite region of Pennsylvania is marred by the unsightly culm banks which encumber the ground, and that in some of the bituminous districts one sees huge piles of unmarketable slack allowed to burn up in order to get ride of them. When the coal is of a coking quality, or when the slack can be used for steaming purposes, these losses are not sustained, but many thousands of tons of what might be converted into usable fuel have been wasted every year simply because of the increased expense involved in its preparation.

The rational development of the briquetting industry has also been retarded by the attempts to exploit patented or secret processes for which all kinds of extravagant claims have been made, but which have almost invariably proved expensive and unprofitable, and the investment of capital in enterprises of this character accordingly has been discouraged. The Patent Office records teem with patents issued on all sorts of inventions relating to binders, many of which are as fanciful as the idea of perpetual motion.

Another reason for the failure to build up a briquetting industry in the anthracite region of Pennsylvania, where the best opportunity for its development is offered, has been the opposition shown by some of the operators to the introduction of a manufactured domestic fuel which would come into competition with the prepared sizes of anthracite. And such an opposition is natural. The competition of bituminous coal has almost entirely shut out anthracite as a steam fuel. The use of coke has supplanted the use of anthracite for iron-making, and the use, for domestic purposes, of coke and gas made from bituminous coal is growing. Owing to the greater depths to which the mining of anthracite is being carried, the thinner and less favorably located beds which are being worked, and to the increasing tendency in labor cost, the mining and preparing of anthracite are constantly becoming more expensive on one hand, while competition is becoming more keen on the other. A cer-

tain rate of production must be kept up for the protection of the properties themselves, and when all these conditions are considered, the unfavorable attitude on the part of the operators toward further competition is at least realizable.

Still another reason which has been assigned, rightly or wrongly, for our halting progress in fuel-briquetting has been the lack of assurance of a regular supply of coal tar pitch at reasonably low prices. Out of the many, and sometimes costly, attempts that have marked the incubating period of briquetting development has grown the knowledge that coal tar pitch must be relied upon to supply, in the Eastern States at least, all, or the greater part, of the binding material. In California, Arizona, and other parts of the far West, asphaltic pitch, the residual product from the refining of the heavy asphaltic base petroleum of that region, has been, and is now, successfully used in recently constructed briquetting plants. But in the East, coal tar pitch is the base of the economically successful cementing material. The extended investigations carried on at the United States Geological Survey coal testing plant at St. Louis bear out this statement.<sup>1</sup> These investigations included experiments with all kinds of organic and inorganic binders, embracing, besides coal tar pitch, such materials as rosin, sugar-house refuse, molasses, acid sludge, quicklime, and various mixtures. The results show that either coal tar or asphaltic pitch are the only really successful binders. Any materials used with them must possess above all others the essential virtue of cheapness.

But while it is claimed that the briquetting industry has been held back by the lack of assurance of a steady supply of coal tar pitch, it also happens that one of the reasons assigned for the comparatively slow development of the by-product coking ovens in the United States in the last few years is due to the lack of a profitable demand for coal tar, one of the principal by-products of the retort coke ovens. It is well known that the demand for creosoting oils to be used for the preservation of ties, bridge timbers, etc., by the railroad companies is far beyond the present domestic production of that coal tar product, and the statistics compiled by the Bureau of Statistics, Department of Commerce and Labor, show that our imports of the chemical products of coal tar exceed \$10,000,000 in value yearly. To the ordinary observer it would appear that the conditions here presented afford an opportunity for the organization of a community of interests which would prove profitable to the projectors and beneficial to the general public. The constantly increasing expense involved in the mining and preparation of anthracite coal is making that commodity slowly but surely more and more of a luxury, and manufactured fuel which will take the place of anthracite for domestic use, particularly among consumers of moderate means, appears to be needed. This is especially true in the northeastern section of the United States.

Two of the briquetting plants recently constructed, and which are discussed in more detail in the following pages, indicate somewhat of a "getting together" of the coal tar producing and the briquetting interests. These are the plants of the United Gas Improvement Company, at Point Breeze, Philadelphia, and of the Semet-Solvay Company, at Del Ray, Mich. Both companies are producers of coal tar, and the plants have

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been constructed for the purpose of briquetting mixtures of anthracite culm and coke breeze.

It appears now, moreover, that the period of failure and discouragement has passed, and that the manufacture and use of briquetted fuel is being placed upon a substantial footing. The first successful plant in the United States of which I have any definite knowledge was one built to Stockton, Cal., a few years ago by the San Francisco & San Joaquin Coal Company. This plant, unfortunately, was entirely destroyed by fire in 1905, and the plans for its reconstruction, this time at San Francisco, were interrupted by the earthquake and fire which destroyed a large portion of that city in April, 1906.

During the past two years a number of briquetting plants have been constructed, and as complete descriptions of them as it has been possible to obtain are given in the subsequent pages. Some of them have been put in operation since January 1st, 1907.

#### NEW YORK, N.Y.

*New Jersey Briquetting Company.*—During 1904 and 1905 the New Jersey Briquetting Company of New York constructed at the foot of Washington street, in Brooklyn, a plant for exploiting the briquetting process of the Zwoyer Fuel Company. This plant was intended to be operated in connection with a coal yard on Adams street, but during the construction of the piers and anchorages for the new Manhattan bridge the company was prohibited from operating the tramway from the coal yard to the plant. This naturally interfered with the operations of the plant, and as extensive storage capacity, either for raw material or for the product, had not been provided for, the work already done has been accomplished under much disadvantage. The prohibition put upon the tramway, and the lack of dock facilities for loading and unloading material, have crippled the plant to such an extent that what was supposed to be an excellent location has turned out to be an unfortunate one, and the present methods of receiving and handling the material make the operations too expensive for successful competition of the briquettes with raw fuel. As a result of these unfortunate conditions it is proposed to remove the plant to a site better adapted for the receiving, storage, and shipment of material. The officials of both the New Jersey Briquetting Company and Zwoyer Fuel Company are entirely satisfied with the experimental results, and are confident of making the enterprise a commercial success.

A description of the plant in Brooklyn has already been published,<sup>2</sup> and the following notes are partly abstracted therefrom and partly furnished by Mr. Virgil H. Hewes, treasurer of the Zwoyer Fuel Company.

Prior to the construction of the plant in Brooklyn, the Zwoyer Fuel Company had built a small experimental plant in Jersey City, N.Y., but while this was of sufficient capacity for this purpose, it was not large enough to be operated as a commercial undertaking, and was abandoned.

It may be stated here that after a considerable expenditure of time and money in experimenting with different kinds of binders, coal tar pitch was decided upon as best suited to the work, a decision which has been generally reached in the Eastern States, as asphaltic pitch has with a binder composed of 6.25 per cent. of rosin and

been adopted in the far West, where that article is cheaply obtained. During the progress of the experimental work, about 200 tons of briquettes were made oil, 1.5 per cent. of flour and water, and from 6 to 10 per cent. of bituminous coal, the body of the briquette being anthracite dust. About 900 tons of briquettes were made, using from 5 to 7 per cent. of rosin and oil and 10 per cent. of bituminous coal; 400 tons were made with from 5 to 7 per cent. of wood pitch and 10 per cent. of bituminous coal, and 1,500 tons were made with from 6 to 7 per cent. of coal tar pitch alone. In applying the binder during the last three experiments an atomizer was used.

The plant in Brooklyn has a capacity of 10 tons per hour, and was built for the purposes of demonstration. During the winter and spring of 1905-6 about 3,000 tons of anthracite briquettes were made and sold. The price received was \$5 per ton of 2,000 pounds at the plant, \$5.50 per ton delivered, and \$6.60 per ton in bags of 100 pounds each. These prices were \$0.50 below the prices of the domestic sizes of anthracite.

A plan of the building,<sup>3</sup> which is nearly triangular in outline, is shown in Fig. 1, which gives also the general arrangement of the machinery.

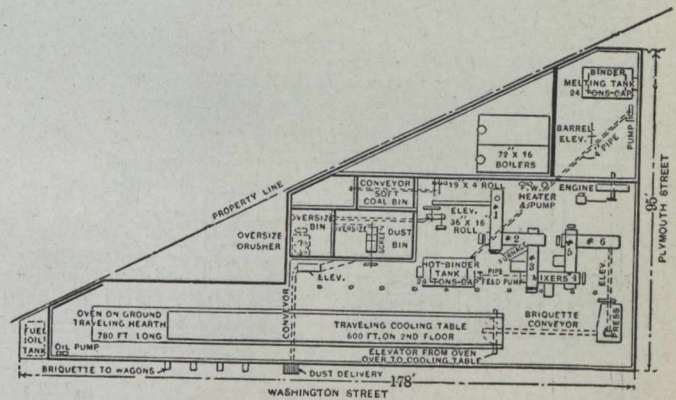


Fig 1—Plant of N. J. Briquetting Co., Brooklyn, N. Y.

The anthracite dust is received on Washington street at the end of a screw conveyor, which carries it to the foot of an elevator, where it is lifted to the top of the plant and is then spouted to a screen located over the dust bin. The coarser material is spouted either to the boiler room or to an over size bin in the rear of the dust bin, and from here fed into a crusher and then passes to the foot of the dust elevator, where it is again carried to the screen. The dust is drawn from the dust bin by a conveyor driven from a variable speed countershaft, and is fed to the 16 inch by 36 inch roll crusher. It then passes to an elevator which carries it to the mixers. After passing through mixers Nos. 1 to 6 it is carried to the second floor, when it falls into the press hopper.

From the press the briquettes are carried by a belt conveyor to the baking oven (when smokeless briquettes are wanted), and are then elevated to and distributed upon the cooling table, which is located on the second floor. After cooling, the briquettes are run into chutes and loaded into wagons for delivering, or are stored. In New York the briquettes sold readily when not baked.

On one side of the dust bin a soft coal bin was built from which soft coal was fed into a 19 inch by 4 inch roll crusher and passed to the same elevator which carries the dust to the mixers. Development has shown that it is not necessary to use the soft coal with anthra-

<sup>1</sup>United States Geological Survey Bulletins Nos. 261 and 290, and Professional Paper No. 48.

<sup>2</sup>*Iron Age*, vol. lxxvii., pp. 1330 to 1333 (1906).

<sup>3</sup>*Iron Age*, vol. lxxvii., p. 1330 (1906).



cite dust. However, this bin is used when experimental runs are made requiring the mixing of different materials with the dust.

**The Binder.**—Coal tar pitch, used as a binder, is received on the Plymouth street side of the building. It is hoisted to the second floor by means of a barrel hoist, where the staves are removed and the pitch is thrown into the binder melting tank (the tank holding about 15 tons of pitch), and pumped by means of a rotary pump into the storage or hot binder tank, where it is kept heated.

**The Mixers.**—Fig. 2 shows a plan and elevation with the relative position of the connecting mixers and heat flues, and Fig. 3 shows a typical section of a mixer unit. The number of units necessary in a mixer depends upon the material to be briquetted and the condition in which it is received. At this plant six were used, and have proved well adapted to the handling of coal, hard and soft, wet or dry, coke breeze and even iron concentrates.

The dust enters No. 1 mixer at *C*, Fig. 2, and is carried through mixers Nos. 1 to 6 in the direction indicated by the arrows to a point, *O*, mixer No. 6, and then by conveyor to the press. In passing through mixers Nos. 1 and 2 the dust is heated by the furnaces,  $F_2$  and  $F_3$ ,

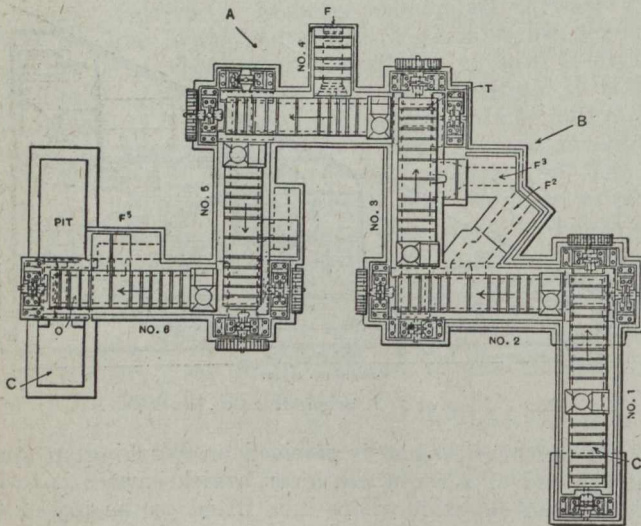


Fig. 2—Plan of the Mixers.

to drive off all the moisture. The coal tar pitch, being previously heated, is pumped from the storage tank by a small rotary pump driven from a variable speed countershaft, which regulates the percentage of pitch used.

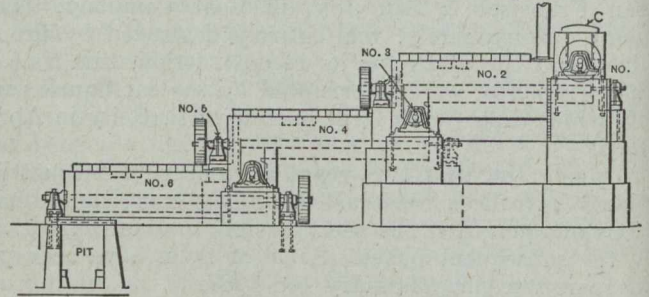
The pitch is delivered to the mixer No. 3 at the point, *T*, Fig. 2, where it is atomized by means of a steam jet.

The above apparatus and process are patented.

**The Press.**—The roll type of press, shown in Fig. 4, is used, the rolls being built up of discs which are milled to form the pockets and are then assembled and bolted together on the shaft. This method, as well as the design of the briquettes, is patented. Two sizes of briquettes are made, 1 7-8 inch by 1 7-8 inch by 1 1-4 inch and 2 1-8 inch by 2 1-8 inch by 1 3-8 inch. The briquettes are square "pillow" or "pin cushion" shape. The smaller ones weigh 2 ounces and the larger 3.3 ounces.

**Cooling Table.**—The cooling table consists of three endless belts composed of steel plates carried at their ends by sprocket chains, the belts being placed one over the other and carrying the briquettes back and forth six times over a distance of 84 feet, making a total travel of 504 feet. The briquettes are then run into bins or loaded into wagons.

**Staten Island Plant.**—The Briquette Coal Company, J. P. Egbert, manager, No. 2 Stone street, New York, N.Y., has just completed the construction of a briquetting plant at Stapleton, on Staten Island. This plant is constructed for the purpose of using anthracite dust with coal tar pitch as the basis of the binding material. The anthracite dust is used as delivered. The plant does not possess any novelties in its design, except that there



No. 2—Vertical Section of Mixers.

are two presses of radically different types. One of these is of German manufacture, built at the works of Schüchtermann & Kremer, of Dortmund. This press is of the plunger type, in which the manner of feed, compression and ejection is similar to the Johnson (English) machine used at the United States Geological Survey testing plant at St. Louis, except that the disc containing the compressing moulds is set and revolves horizontally instead of vertically. The briquette is parallelepiped in shape with the end edges rounded. Its dimensions are 4.75 by 2.25 by 2.5 inches. Each briquette weighs about 1.5 pounds and has a specific gravity of about 1.24.

The second press is what is generally classed as the Belgian type, similar to the one described as the "American" machine used at the United States Geological Survey testing plant. This particular machine was made at the works of H. Stevens, at Charleroi, Belgium. The product is of the eggette pattern, which is more desirable for domestic use than the larger briquette. The eggettes weigh about 5 ounces, and have a specific gravity of 1.37. The manager of the company, Mr. Egbert, extended to me every courtesy possible, but unfortunately was not able to furnish any complete drawings or other illustrations, the plant having been constructed without them. The total capacity of this plant with both presses in operation is 120 tons of briquettes per day of

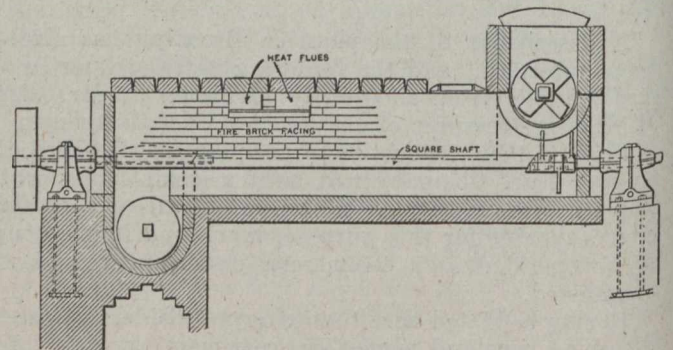


Fig. 3—Section of a Typical Mixer.

10 hours. The German machine will turn out 4.5 tons, and the Belgian machine 7.5 tons per hour.

**South Brooklyn Plant.**—Another plant, which has just been completed as this report is written, is that of the National Fuel Briquette Machinery Company, of New York, N.Y. This plant is located at the foot of Court and Smith streets, Brooklyn, and close to the Gowanus



canal, by which the materials to be used can be brought in barges and discharged at a minimum of expense. While intended to be operated upon a commercial basis, it may be considered rather as a demonstrating plant. It is intended for the use of anthracite dust with coal tar pitch as a binder. The press is of the Belgian type, producing eggettes or "bouletes," somewhat smaller than an ordinary hen's egg, and made exclusively for domestic use. The machinery used in this plant was patented in this country<sup>4</sup> by Mr. Robert Devillers, with whom I visited the plant, and to whom acknowledgments are made for courtesies extended. The eggettes produced by this plant are much smaller than those ordinarily made, weighing only about 1.5 ounces each, and having a specific gravity of 1.3.

*North American Coal Briquette Company.*—The company, with office at 177 Broadway, New York, N.Y., has been incorporated for the purpose of exploiting the Forst briquetting process, which comprises chiefly the material to be used as a binder, part of which, though kept secret, consists principally of coal tar pitch. The merit claimed for the secret ingredients of the binder is a great economy in the quantity of binder used for the manufacture of superior briquettes. The company has negotiated for the purchase of a Duprey (French)

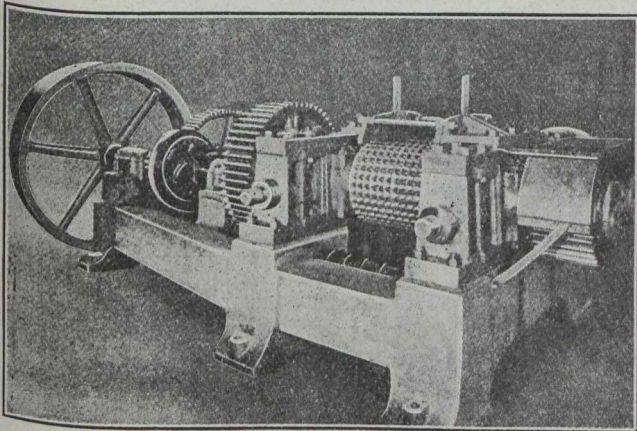


Fig. 4—Briquetting Press of the N. J. Briquetting Co.

machine, and has sent 10 tons of anthracite coal and one ton of binder to Paris for the purpose of demonstrating the claims made for the process controlled by the company.

*The Mashek Briquetting Process.*—The briquetting machine designed by Mr. G. J. Mashek (now with the Traylor Engineering Company, New York, N.Y.) has been described in detail by him.<sup>5</sup> The process was designed for the purpose of overcoming the objections to the use of briquetting machinery which had developed, principally through the failure of certain foreign-made machines to meet the requirements of the American trade. When starting on the development of his plans, in 1903, the general type of machinery in use in Europe was that making the large rectangular briquettes, weighing from 7 to 20 pounds each, and these proved unsuitable to American use. In designing his press Mr. Mashek adopted the Belgian idea of moulds contained in the peripheries of two tangential wheels, but instead of the eggette pattern, developed one which minimizes the blank spaces between the moulds and produces a briquette of pillow or pin cushion shape.

<sup>4</sup>U. S. Patent No. 799,149, Sept. 12, 1905.

<sup>5</sup>*Iron Age*, vol. lxxvii., pp. 1330 to 1333 (1906).

A view of the Mashek press, Fig. 5, shows the moulds on the periphery of the cylinders, and Fig. 6 is another view of the press.

The Traylor Engineering Company has recently built for Mr. E. B. Arnold a Mashek press, which has been installed at the foot of West 47th street, New York,

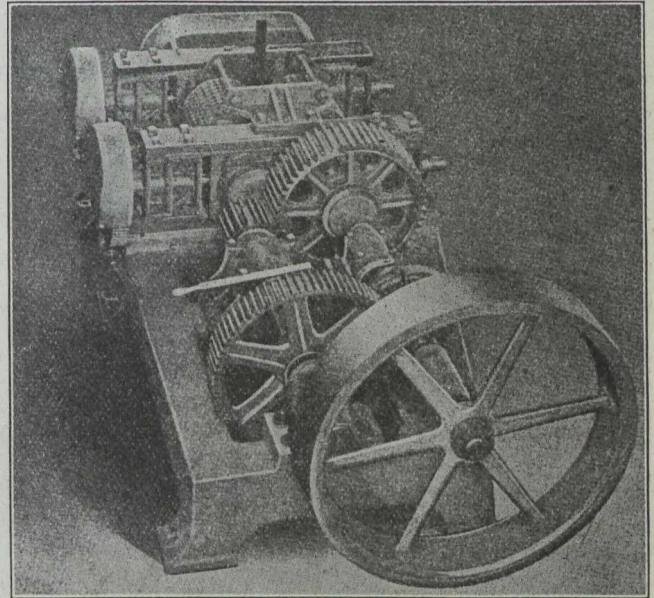


Fig. 5—Mashek Press—Moulds on Periphery of Cylinders.

N.Y. The building in which this is located was designed and erected for, and originally equipped with, a different type of machinery, but the briquettes made proved to be of a shape and character unsuited to the trade, and the cost of manufacture was also too high to enable the briquettes to compete with natural coal. When it was decided to substitute a Mashek press for the old one, it was also deemed advisable to use the same building, which is a substantial one, and also, as far as possible, the old machinery (such as elevators, shafting, power plant, etc.), which was practically new and in good order, but which did not permit of the most desirable arrangement.

The new press installed has a capacity of about 14 tons per hour of 2 ounce briquettes, but on account of

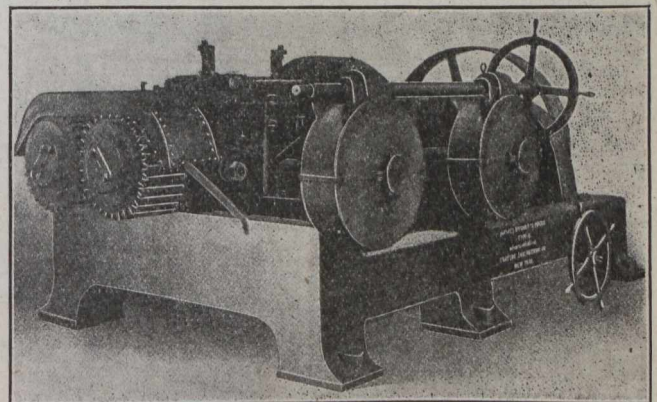


Fig. 6—Mashek Press Complete.

using so much of the old equipment it is impossible to handle sufficient material to keep the machinery running at its full capacity, and it is now operated at the rate of about 10 tons per hour. The cost of labor, fixed charges and other expenses being the same, the cost of production is slightly higher per ton of briquettes than would



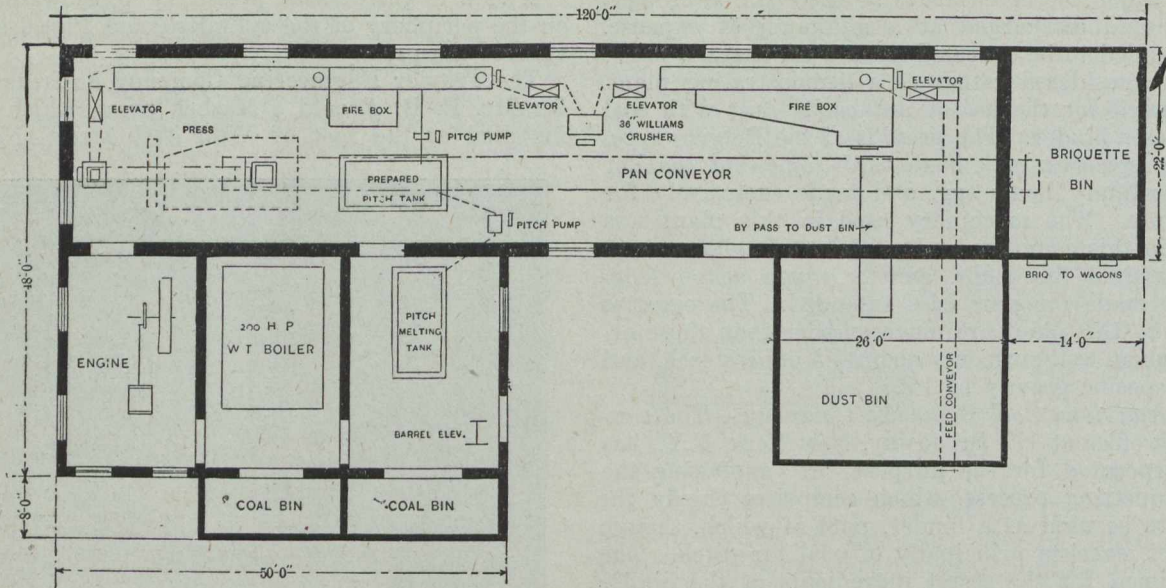


Fig. 7—Plant of Mashek Process—(Plan).

have been the case if the plant was operated up to its maximum capacity. The size of the briquettes to be made has been determined by putting them on the market and selling them for domestic purposes, starting with 1 ounce briquettes and running up to 3 ounce. It was found that the majority of users preferred a 2 ounce size, which corresponds with the stove coal size of anthracite. The weight, of course, will vary with the nature of the dust from which the briquette is made, and it has been found that in using coke breeze a 2.5 briquette is most desirable, and about a 3 ounce if made of soft coal and lignite. The press is so designed that a change of the mould shells can be made in about 2 hours.

The plan and elevation of the Arnold plant are given in Figs. 7 and 8. The arrangement of the machinery is shown in Fig. 8. The anthracite dust is elevated to the dust bin, from which it is drawn by a feed conveyor so arranged that the feed is constant and can be regulated as desired. This conveyor discharges into a chain elevator, which in turn discharges into a battery of five 18 inch rotary driers and heaters. These are super-imposed one above the other and all bricked in. The material is conveyed through these driers by means of screw mixers until it passes into the following elevator.

On the side of these driers is constructed a furnace, the products of combustion from which are distributed into the driers through openings into the different units, so that no unit gets heat sufficient either to char the dust or to burn out the ironwork of the paddle conveyor. An exhaust fan draws off the products of combustion and the moisture. The temperature of the discharge gases and moisture from the drier rarely exceeds 212 degrees F. After the material passes out of the drier into the elevator it is elevated and dropped into a 36 inch Williams pulverizer, where the larger pieces are crushed, so that everything passes through about a 12 mesh screen. From the pulverized the material is again elevated to another series of mixers and coolers similar in construction to the driers. The anthracite dust at this point has a temperature of about 300 degrees F. The coal tar pitch is here introduced by means of a pitch pump so arranged as to deliver a definite quantity of pitch, as desired. Alongside of this last battery of mixers is a small furnace which heats the two upper mixers, maintaining an even temperature of the mixture and not allowing it to stiffen or set. From the last mixer the material drops to an elevator which takes it up to the second floor and discharges it on to an 18 inch belt con-

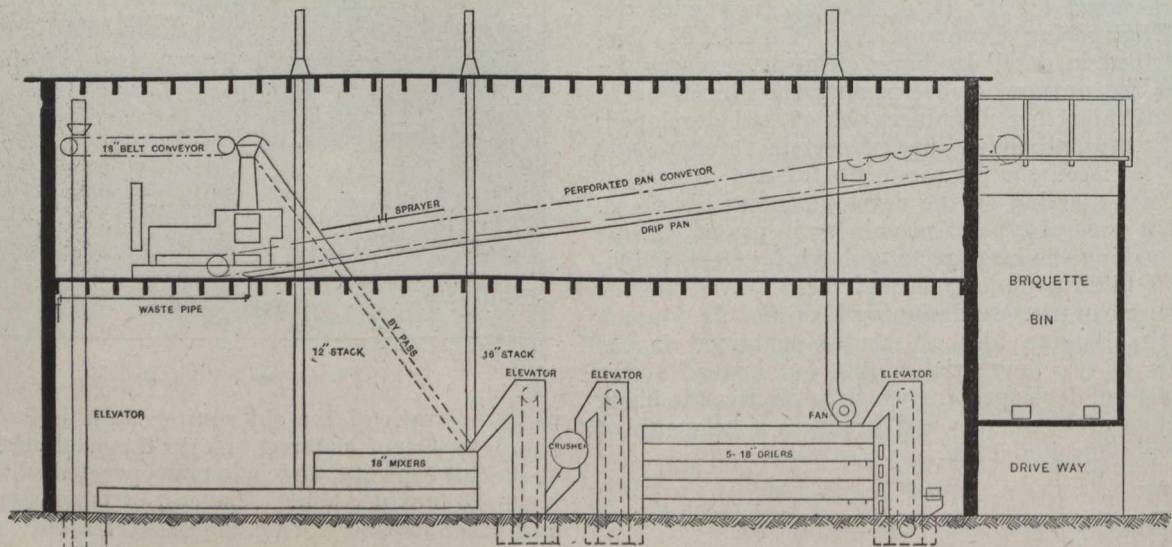


Fig. 8—Plant of Mashek Process (Elevation).



veyor, which delivers the material over the press and into the hopper. The press is run continually, discharging the briquettes into a perforated pan conveyor, which conveys them to the briquette bin. The briquettes while in this conveyor are subjected to a heavy spray of water in order to cool and clean them.

The coal tar pitch used in this plant is of the ordinary roofing hardness; it is delivered by lighter on an adjacent dock and carted to the pitch melting house, where it is melted in a tank 6 feet wide, 12 feet long, and 8 feet deep.

This pitch melting tank will hold about 22 tons of pitch, which requires in the neighborhood of 20 hours to melt. After the pitch is melted and brought up to the proper temperature for use it is drawn off by means of a large pitch pump into the "prepared pitch tank," from which it is pumped into the mixers.

This plant requires about 125 h.p. to turn out 10 tons per hour. It has been in operation about two months and is said to be giving excellent results. The product is used almost entirely for domestic purposes, and com-

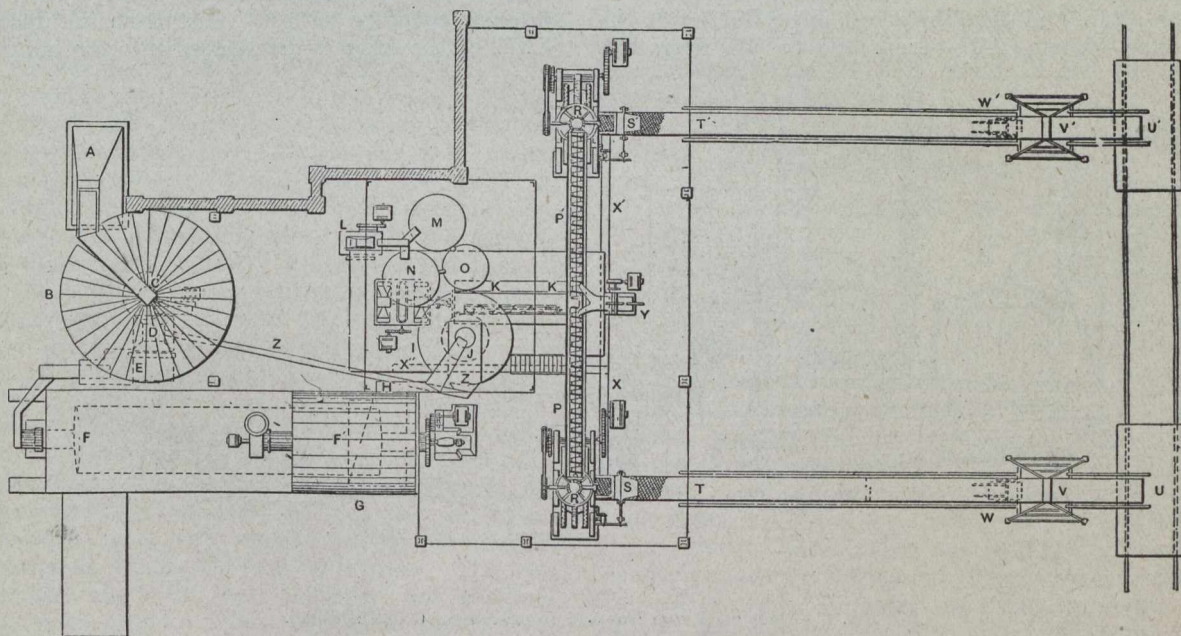


Fig. 9—Plant of United Gas and Improvement Co., Philadelphia (Plan)

mands the same price as the best grade of prepared anthracite coal in the New York market. A large portion of the output is put up in paper bags and handled by grocers and small coal dealers the same as charcoal or crushed coke. The bag trade caters to the poor people who do not buy in large quantities, and is a considerably cleaner method of distributing the product than that formerly used.

Out of the briquette bin the briquettes are handled the same as ordinary coal, and experience has shown in this and other plants that abrasion or breakage averages about 3 per cent., which is slightly less than with ordinary prepared coal.

The cost of manufacture is as follows:—

*Pitch—*

Using 6 per cent. of pitch at \$10 per ton..	\$0.60
Deducting increased weight of product due to 6 per cent. of pitch .....	0.30
<b>Net cost of pitch .....</b>	<b>\$0.30</b>

*Fuel—*

For boiler, broken coal and screenings, broken briquettes, 4 tons per day of 10 hours, at \$2.50 per ton .....	\$10.00
Per ton of briquettes .....	0.10
For heaters, driers and pitch melting, 3 tons at \$2.50 per ton=per ton of briquettes..	0.075

*Labor—*

	Per day.
1 foreman .....	\$5.00
2 pitch melters .....	3.50
1 dust bin man .....	1.75
1 engineer .....	3.50
1 man on second floor .....	1.75
1 man on ground floor .....	1.75
1 night watchman .....	1.75
1 oiler .....	1.75
	<hr/>
	\$20.75
Per ton of briquettes .....	0.21

*Miscellaneous—*

Wear and tear, per ton of briquettes.....	0.21
Lubricating oil, per ton of briquettes .....	0.01
Insurance .....	0.005
Interest on capital invested, \$40,000, at 6 per cent.....	0.10
Office expense, telephone, stenographer and stationery, \$2,000 per annum .....	0.09
	<hr/>
Anthracite dust at \$1.40 per long ton=per ton of briquettes .....	1.25
	<hr/>
Total cost of briquetting .....	\$2.24
Re-briquetting 3 per cent. of breakage and abrasion, charging it back to plant as dust, per ton of briquettes .....	0.06
	<hr/>
Net cost per ton of briquettes .....	\$2.30
Wholesale selling price in bin .....	4.80
	<hr/>
Net profit per short ton .....	\$2.50



## PENNSYLVANIA.

It might be supposed that the briquetting industry would have its greatest development in or near the anthracite region of Pennsylvania, where a plentiful supply of raw material is available in the great culm banks created through the many years of mining, and in the still large amount of fine coal produced at the breakers for which no profitable market has yet been found. Up to the present time, however, there are but two briquetting plants in operation in the State, one at Point Breeze, in the City of Philadelphia, and the other at Dickson, a few miles from Scranton. Both of these were put in operation in 1906. The plant at Dickson is in the immediate vicinity of the mine of that name, operated by the Delaware, Lackawanna & Western Railroad Company, and uses the fine coal or screenings, below marketable sizes, coming from the washery operated in connection with the mine. The owner of this plant, the Scranton Anthracite Briquette Company, withholds information relative to the details of its operations. I have been informed, however, by one of the officials of the company that the base of the binding material used is coal tar pitch, and that the plant is producing at the present time—April, 1907—from 300 to 325 long tons

anthracite culm and coke breeze, with from 5 to 7 per cent. of coal tar pitch as a binder. The proportions of culm and coke used are variable, according to the quantity of material on hand. At the time I visited the plant—November, 1906—three parts of culm to two parts of coke were being used. The press is of the Belgian type, producing eggettes about the size of a goose egg. The rated capacity of the plant is 10 tons of eggettes per hour. It has been in operation regularly, producing 90 tons per 9 hour day, except when it has been shut down for repairs and changes. Figs. 8 and 9 show the arrangement of the plant.

The breeze or screenings from the coke screen (not shown on the diagram) of the coal gas plant fall into a pocket or hopper, *A*. Into this pocket is also dumped the culm. The contents are raised by an elevator into the storage tank, *B*, discharging through the funnel-shaped bottom on to the automatic feed table, *C*, by which a measured stream of the material is continuously poured, part into the crusher, *D*, and part directly into the hopper, *E*, below the crusher. The material is then elevated and discharged into the drier, *F*, *F'*. The dried material, together with the dust from the dust chamber, *G*, *G'*, of the drier is discharged into the hopper, *H*, *H'*,

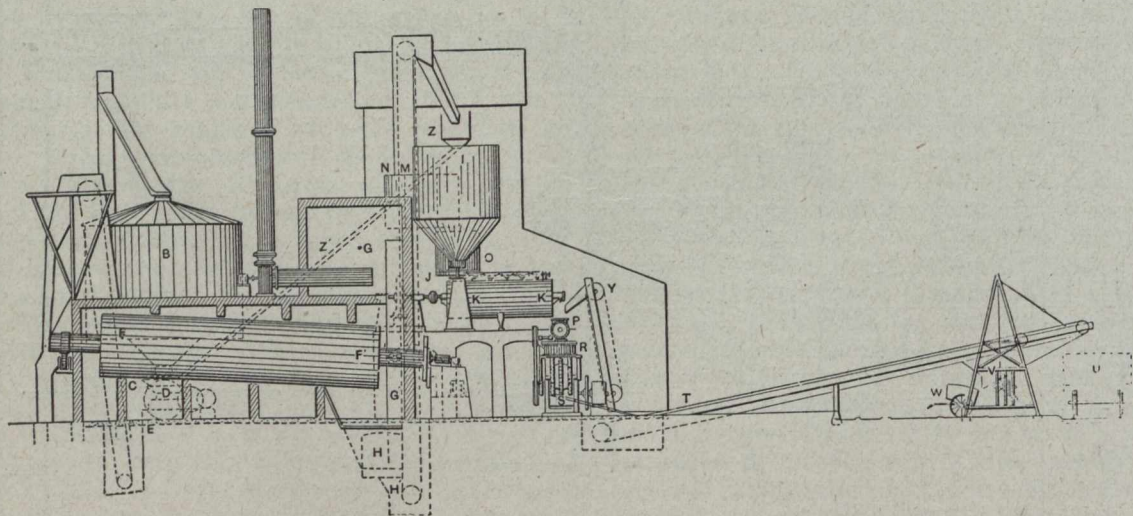


Fig. 10—Plant of United Gas and Improvement Co. (Elevation).

of briquettes per day. It is the intention to double this output by running the plant night and day. The briquettes are of the oval or eggette shape, the press being of the Belgian type, and similar to the "American" machine used at the testing plant of the United States Geological Survey at St. Louis during the exposition period.<sup>6</sup> The entire product is taken by the Delaware, Lackawanna & Western Railroad Company for use, principally, on its locomotives.

The other plant, at Point Breeze, is owned and operated by the United Gas Improvement Company, and was constructed for the purpose of utilizing the coke breeze produced at the gas houses of the company, and in this case, as in the case of the plant at Dickson, the product is not placed upon the market but is used by the company in its retorts for the manufacture of water-gas. I am indebted to Mr. W. H. Gartley, Engineer of Works of the United Gas Improvement Company, for the following detailed description of the plant, and for the accompanying illustrations, Figs. 9 and 10.

It has been found advantageous to use a mixture of

elevated and discharged through a shaking screen into the storage tank, *I*, located above the mixer. All material not fine enough to pass through the screen, *Z*, is returned by a spout, *Z'*, to the crusher, *D*. The dried material in tank, *I*, is discharged through the funnel-shaped bottom on to the automatic feed table, *J*, by which a measured stream is continuously poured into the mixer, *K*, *K'*. Into the feed end, *K*, of the mixer is also poured a continuous stream of liquid pitch through a positive measuring faucet (not shown), driven from the driving mechanism of the mixer through a variable speed device (not shown). The pitch is brought into the building as broken from the pitch bays of the tar distillery, fed into the pitch cracker, *L*, elevated and discharged into the large steam heated pitch storage tanks, *M*, *N*, where it is melted. From these tanks the melted pitch is drawn, as required, into the smaller steam heated tank, *O*, to which the faucet, previously mentioned, is attached.

The warm, dry, and continuously measured crushed breeze and culm, together with the melted and continuously measured pitch, are thoroughly mixed and kneaded in the steam jacketed mixer, *K*, *K'*. The mixed mass is discharged from the mixer, divided (devices not

<sup>6</sup>United States Geological Survey Bulletin No. 261, and Professional Paper No. 48.



shown) into two streams and carried by two mixing conveyors, *P, P'*, allowing time for cooling and setting, into the feed pans of the two presses, *R, R'*, purchased in France. From the feed pans the material is fed to the presses, which press out the eggettes and discharge them on to the shaking screens, *S, S'*, below, which screen them from the waste and fines. They are then discharged on to the woven wire belt conveyor, *T, T'*, giving the eggettes time to cool and set, and conveyed either to the

cars, *U, U'* or to the hoppers, *V, V'*, from which the buggies, *W, W'* for the generator house are filled.

The waste and fines from the shaking screens, *S, S'*, under the presses, are conveyed by conveyors, *X, X'*, to the hopper, *H'*, at the discharge of the drier.

Screenings from the eggettes taken from the storage piles are returned by an elevator, *Y*, to the discharge of the mixer and assist in the cooling of the heated mixture.

(To be continued.)

## THE AUSTRIAN IRON INDUSTRY DURING THE LAST 25 YEARS\*

BY WILHELM KESTRANEK, General Manager of the PragerEisen-Industrie-Gesellschaft and of the Böhmischen-Montan-Gesellschaft.

At the meeting of the Iron and Steel Institute, held in this city twenty-five years ago, the celebrated Professor Peter von Tunner described the iron industry of Styria and of Carinthia as representing the iron industry of the whole of Austria. He warned the members present at the meeting who were prepared, like you are now, to visit the centres of production of the Austrian iron industry, that they might be disappointed in their expectations, and his statements principally dealt with the reasons why the Austrian iron industry generally, and that of Styria and Carinthia specially, had remained stationary, and had been surpassed by that of England, of Germany, and even of France and Belgium.

He referred to the proud past of the ancient Alpine iron industry, and made due mention of the legend that the nails with which Christ was crucified were made of Noric iron obtained by the Romans from the Alpine districts. From the description of Peter von Tunner, the Austrian iron industry appeared to play the role of an impoverished nobleman, who, whilst regarding the future with apprehension, recalls the past with pride. The iron industry of the monarchy has, however, not resigned itself to this role. Indeed it has spared no endeavor to maintain its position, and I believe that, viewing the development of the home iron industry during the last twenty-five years, I am in a position to state that these endeavors have been successful, even if the industry, for reasons which will be considered later, has not reached that degree of development which the leading iron and steel producing countries have reached during the last twenty-five years.

In order to ascertain what progress has been made it will be necessary to compare the present production of pig iron with that of twenty-five years ago. In the year 1882 the world's production of pig iron, which in the year 1807 had been 760,000 metric tons, had reached about 21,000,000 metric tons. To this total the most important producing countries contributed the following proportions:—

The world's annual production of pig iron is at the present time about 61,500,000 metric tons; and the various iron-making countries now stand in the following order:—

	Metric tons.
United States, with about .....	27,000,000
Germany, including Luxemburg, with about .....	12,800,000
Great Britain, with about .....	10,100,000
France, with about .....	3,400,000
Russia, with about .....	2,800,000
Austria-Hungary, with about .....	1,900,000
Belgium, with about .....	1,500,000
Sweden, with about .....	600,000
Spain, with about .....	400,000

From the above it will be seen that the iron industry of the monarchy, which twenty-five years previously held the sixth position among iron-producing countries, still occupies the same position, while in the meantime other countries have undergone many changes. For instance, Great Britain has had to cede the leading position to the United States, and during the last few years has also been surpassed by Germany. France, where the conditions of the iron industry resemble in many respects those of this country, has been able to maintain its place in the fourth position. The fifth place, which is now occupied by Russia, was taken from Belgium, whose production of iron formerly exceeded that of Austria-Hungary.

The Austrian iron industry contributes the principal share to this increase in the production of pig iron in Austria-Hungary, and the increase approaches to that of Great Britain during the same period. Of the 612,000 metric tons of pig iron produced in 1882 in Austria-Hungary, 436,000 tons were produced in Austria and 176,000 tons in Hungary. To the present total production of 1,910,000 metric tons, Austria contributes 1,434,000 metric tons, Hungary 450,000, and Bosnia 46,000.

It is interesting to note that during the last twenty-five years the world's production of pig iron increased in value from about 17000 million Austrian crowns to about 4800 million crowns, while the value of the production of gold rose from 510 million crowns to 1950 million crowns. The value of the pig iron produced represents at the present time about two and a half times the value of the output of gold.

\*Paper read before the Iron and Steel Institute, September, 1907.

	Metric tons.
Great Britain .....	about 8,600,000
United States .....	about 4,600,000
Germany, including Luxenburg .....	about 3,400,000
France .....	about 2,000,000
Belgium .....	about 700,000
Austria-Hungary .....	about 600,000
Russia .....	about 400,000
Sweden .....	about 400,000
Spain .....	about 100,000



If Peter von Tunner, twenty-five years ago, rightly ascribed the advantages of the leading countries in the European iron industry as due to their abundance of mineral fuel, it may still be said that the progress of the Austrian iron industry would have been far greater if coke had been available in greater quantities.

The country, however, suffers from a scarcity of coking coal, and for this reason it has had to import coke from foreign countries, especially from Germany. In 1906 the production of coke in Austria was 1,700,000 metric tons, while for other countries the following returns are available:—

	Metric tons.
France (1906) .....	1,700,000
Russia (1906) .....	2,000,000
Belgium (1905) .....	2,200,000
Great Britain (1905) .....	18,300,000
Germany (1906) .....	20,300,000
United States (1905) .....	29,200,000

Austria-Hungary exports yearly about 300,000 metric tons and imports about 600,000 metric tons, so that the difference of 300,000 tons has to be obtained from abroad.

Austria-Hungary possesses several very rich deposits of iron ore, such, for instance, as the celebrated Styrian Ore Mountain. A more extensive smelting of the Austrian-Hungarian ores is hindered by the want of fuel, and for this reason Austria-Hungary at the present time is one of those countries which export iron ore.

The imports of iron ores amount yearly to 246,000 metric tons, and the quantity exported, to which Hungary contributes the largest share, amounts to 324,000 tons.

It can be taken as an axiom that the development of the iron industry of a country, in relation to the consumption, depends more on the richness of its fuel resources than on an abundance of iron ore. Thus it is seen that countries such as Sweden and Spain, which are rich in ore and poor in fuel, export the greater part of their output of ores to countries rich in fuel, and are, in proportion to their wealth in ore, only small producers of pig iron. Other countries, on the other hand, such as Great Britain, which depends to a large measure on the importation of iron ores, and Germany—which also has to import considerable quantities of ore—occupy a leading position. It is unnecessary to mention the happy United States, which rejoices in the possession of an abundance of ore and of coking coal, and for this reason naturally occupies the leading position.

The quantity and quality of the iron ores are as important a factor in commercial competition in the iron industry of a country as are the number and condition of the soldiers of an army; while the fuel resources are for the iron industry what the generalship and armament are for such an army. Under otherwise equal conditions the superiority in training and equipment of an army are more efficacious at the present time than mere weight of numbers. It therefore appears to me that the quality and quantity of fuel available are more decisive factors in the industrial development of the iron trade of a country than wealth of ores.

If I may further develop this comparison, it may be mentioned that the conditions of two combatants are also naturally influenced by other important circumstances, such as the existence of ramparts, or in other words, protective duties; further by the natural resources and financial wealth of the two competitors, which in the case under consideration is the demand of the home market. Finally, the fortune of war depends on whether the

forces are kept free from disease. Such diseases, mostly of a contagious character, are strikes, and the efforts of organizations to hinder production.

As an example, I believe that the development of the British iron trade would have been far more successful if the introduction of technical improvements had not been hindered by the action of trade organizations.

It must be specially remarked, with reference to the demand of the Austrian market, that there is great need of development, because large tracts of territory—not only in the mountainous Alpine districts, but also in the east of the Empire—are capable of a more intense productive activity.

It must be here mentioned that the yearly output in Austria of merchant iron is not more than 350,000 metric tons; 150,000 of girders, 70,000 of rails, and 65,000 of sheets.

The consumption of iron in any country obviously depends to a considerable extent on the population; and for this reason, in order to judge the figures given and particularly the amount of the production of pig iron of the several iron-producing countries, their populations are compared for the years 1882 and 1906:—

*Population of Chief Iron-Producing Countries.*

	1882.	1906.
United States .....	49,000,000	90,700,000
Germany .....	45,500,000	61,500,000
Great Britain .....	31,400,000	44,200,000
France .....	36,000,000	39,300,000
Russia .....	77,000,000	120,000,000
Austria-Hungary .....	42,700,000	49,100,000
Of this fell to		
Austria .....		27,300,000
Hungary .....		20,000,000
the Occupied Provinces		1,800,000
Belgium .....	5,900,000	7,300,000
Sweden .....		5,300,000
Spain .....		18,500,000

The yearly consumption in kilogrammes per head of the population, based on the production of pig iron, and also taking into consideration the export trade in machinery and in other iron ware for the various countries at the present time, may be taken as follows:—

	Kilogrammes.
United States .....	320
Great Britain .....	220
Belgium .....	160
Germany .....	145
France .....	65
Austria .....	50
Hungary .....	25
Russia .....	25

The measure of the industrial condition of a country depends less on the production of iron than on the production and consumption of fuel. The production of coal of the various countries for the year 1906 was as follows:—

	Metric tons.
United States .....	375,500,000
Germany .....	193,500,000
Including:	
Coal .....	137,100,000
Brown coal .....	56,400,000
Great Britain .....	255,000,000
France .....	34,300,000
Including:	
Coal .....	33,600,000
Brown coal .....	700,000
Russia .....	19,600,000
Austria .....	37,700,000
Including:	
Coal .....	13,500,000
Brown coal .....	24,200,000
Belgium .....	23,600,000



The yearly consumption of coal per head of the population in these various countries is given in kilogrammes in the following table:—

	Kilogrammes.
Great Britain .....	4680
United States .....	4050
Germany .....	3140
Belgium .....	2980
Austria .....	1370
France .....	1190

It may be remarked that the degree of general industrial activity of the countries named is proportional to the figures given for the consumption of coal, which agree, except for a few small differences, with the proportions given for the production of coal, calculated per head of the population. These figures therefore afford a measure of the economical conditions of the civilized countries mentioned.

With regard to the production of coal of Austria, it must be stated that the greater part of the output consists of brown coal, so that if the calorific value be taken into consideration, the production of coal of Austria can be approximately estimated as equal to that of France. The demand for coal in Austria-Hungary is not fully met by its own production, and at the present time about 7,500,000 metric tons of bituminous coal are imported, against an export of 8,100,000 metric tons, of which, however, only about 900,000 metric tons are bituminous coal, and 7,200,000 metric tons are brown coal.

If not only the weight but also the calorific value be included in the calculation, the import exceeds the export in fuel value.

The prosperity of the Austrian iron industry is not only impaired by the want of mineral fuel, but also by the circumstance that it can only be brought to the principal producing works by costly methods of transport. The pig iron producing centres of Bohemia and Styria are situated in localities possessing rich supplies of iron ores, and have at their disposal, on the spot, extensive deposits of coal. They are, however, entirely without coking coal, and depend on the import of coke from the Mährisch-Ostrau, Prussian-Silesia, and Westphalian coal fields. The Ostrau pig iron producing centre, on the other hand, possesses an ample supply of coke, but has to obtain its ores chiefly from Hungary, which renders them expensive, owing to the high railway freight charges. The blast furnaces situated in the southern parts of the monarchy, like Bosnia, possess large deposits of ore, but mineral fuel is wanting. Throughout the whole of Austria there are no blast furnaces which have both ore and coke on the spot.

If, in spite of this want of mineral fuel, in spite of the circumstances conspiring to increase the cost of production, and that either the fuel or the ore can only be brought to the producing centres by costly routes, and in spite of the limited demand of an extensive portion of the Empire, the Austrian iron industry has been able during the last twenty-five years to keep pace relatively with the other iron-producing countries, this can be attributed to three reasons: firstly, to the sufficiency of the protective import duties, behind the wall of which a prosperous development of the iron industry has been possible; secondly, the association of the ironworks into a syndicate, whereby ruinous competition has been prevented; and thirdly, the concentration of the smaller works into larger units. By these two last mentioned means the adoption of more economical methods of working has been rendered possible.

The protective duties of several countries are given as follows, in order that the duties prevailing in Austria may be more clearly appreciated.

	Duty Per Metric Ton in Crowns.			
	United States.	Germany.	France.	Austria-Hungary.
Pig iron .....	19.4	11.7	14.3	15.0
Rough plates .....	54.4-108.8	58.5	71.4	90.0
Girders .....	54.4	29.3	47.6	70.0
Rails .....	38.1	29.3	57.1	60.0
Iron bars .....	65.3-87.0	29.3	47.6	60.0

Should any one feel astonished and filled with envy at the height of the duties protecting the Austrian iron industry, and at the high prices obtained in the country for iron manufactures, it must be remembered that a large share of the profit is absorbed by the State and other corporations, such as land, district, and Commune, in the form of taxes and rates.

As an illustration of this it may be instanced that the Prager Eisen-Industrie-Gesellschaft, together with the Böhmischen Montan-Gesellschaft, during the last eight years, a period contemporaneous with that of the application of the new taxes, paid to the State and to the other corporations mentioned 21,840,000 crowns, and to the shareholders 62,650,000 crowns, so that the former, which enjoy practically the position of preference shareholders without having had to provide any capital whatever, received more than one-fourth of the resulting profit, while on the other hand the real shareholders, who undertake the entire risk, received less than three-fourths. According to the peculiar construction of the rating law it has even happened that in one year the shareholders of the Prager Eisen-Industrie-Gesellschaft received in dividends 3,877,500 crowns, whilst the State and corporations received 4,116,107 crowns.

In this regard the Elysian fields must not be sought for in Austria, but are to be found in the United States, where the iron industry, working under the most favorable conditions both of production and protection by high duties, is so little liable to public taxation, that—according to authentic reports—a contractor, who in one year had obtained a net profit of 1,500,000 dollars, only had to pay 6,000 dollars in public taxes.

As a result of the import duties protecting the Austrian iron industry, Austria is completely closed to foreign iron; and thus we see that, whilst only twenty-five years ago a considerable proportion of the home consumption even for those manufactures in which high quality was imperative, had to be drawn from foreign countries, at the present time home products take their place.

Twenty-five years ago the inland railways purchased the greater part of the tires required, especially for passenger locomotives, in foreign countries; at present we find none but home manufactured tires in use. At that time in the workshops English tool steel was the most prized, but now it has been completely superseded by the highest qualities of steel made in Austrian steel works. Formerly the Austrian War Office purchased cannons, projectiles, and armour plates from the leading producers of foreign countries, and the warships of the monarchy were almost entirely built of foreign materials; at the present time home manufacturers of armour plates, of cannons, and of projectiles, whose products do not need to fear comparison with those of any other countries are available, and warships of the most modern construction, whose parts from keel to top-mast are manufactured in home workshops, navigate our seas.



Thus in the last twenty-five years Austria has made herself entirely independent of foreign countries, both as regards quantity and quality of the iron manufactures required in the country. The system of protective duties has therefore completely fulfilled its principal object.

During this period, as already mentioned, the Austrian iron industry has combined to form a syndicate, which embraces nearly all the branches of the iron trade. By this means it has been possible to utilize the full advantages of protection, not only to protect the home market from foreign invasion, but also to obtain an opportunity in providing a share, if only a modest one, for the markets of the world.

How greatly the conditions in this respect have changed during the last twenty-five years can be best ascertained from the fact that in the year 1895 the imports of iron and of manufactures amounted to 230,000 metric tons, against an export of scarcely 40,000 metric tons, so that the imports exceeded the exports by over 190,000 metric tons. In the year 1906, 120,000 metric tons of iron and ironware were imported, against 240,000 metric tons exported, so that the difference in favor of the export was 120,000 metric tons.

In 1895, 174,000 metric tons of pig iron were imported, and only 9,000 metric tons were exported. Up to the year 1906 the import of pig iron declined to 62,000 metric tons, and the export increased to no less than 74,000 metric tons.

As already stated, the Austrian iron industry during the last ten years has welded together the smaller scattered ironworks into larger units in many cases, whereby, in combination with the division of production by the syndicate, the possibility of adopting more economical methods of working has been attained.

It is exactly twenty-five years ago that, to take an example, the Oesterreichische Alpine Montangesellschaft was formed from nine concerned, which then comprised thirty-three producing workshops, and produced yearly 165,000 metric tons of pig iron and 620,000 metric tons of coal, and employed 17,500 men. The same concern produces at the present time 470,000 metric tons of pig iron and 1,200,000 metric tons of coal, and only employs 13,400 men.

To what extent the conditions in Austria has rendered imperative the division of labor, made possible by the organization of the syndicate, and the concentration of the producing works, is best seen from the fact that the average annual output of girders in Austria during the last ten years was only 95,000 metric tons, and at the present time is not higher than 150,000 metric tons, in the production of which five works participate, or that the demand of the Austrian railways for rails amounted during the last ten years to an annual average of not more than 80,000 metric tons, and at the present time this quantity is not exceeded. The production of this small quantity is also divided amongst five ironworks.

Theorists express the opinion that protective duties and trade syndicates hamper technical progress, because they put into the pockets of those interested abundant profits without any trouble. Opposed to this view, the Austrian iron industry can with pride point out convincingly that such a theory is devoid of foundation, because they are always endeavoring to improve their works technically. The Austrian ironworks have utilized all the modern methods for economical working, although they have been naturally limited, because their plant and appliances require to be fitted to a great variety of manufactures, and must be designed to suit

the proportionately small consumption of the country.

The Austrian iron industry has therefore to avoid mere slavish imitation of the gigantic works in the United States, and has modified methods to suit the given conditions.

It is quite a different thing to erect a rail rolling mill, which has a yearly production of 800,000 metric tons, as is done in the United States, and, as is the case in this country, to arrange that five ironworks shall share between them one-tenth of this production, and at the same time be forced to produce rails, girders, sleepers, and similar material in one and the same mill. Though the Austrian ironworks endeavor to render serviceable all appliances which are intended to effect a saving of manual labor, yet they are not in many cases urged so far in this direction as the American works, which are guided by the scarcity of workers and the high rate of wages. Whilst in that country the demand for labor is met by immigration, a mighty living stream flows from our monarchy, especially from the other half, Hungary, where the emigration is facilitated, by the Government; and it is greatly to be regretted that our Empire stands at the head of those countries which provide the rest of the world with workers. During the year ending with the 30th of June, 1906, the number of emigrants amounted to 265,000, of whom 153,000 came from Hungary. During the month of March of this year alone 43,000 persons emigrated from Austria-Hungary to the United States, of whom 27,400 were Hungarians. With these figures our monarchy even surpasses Italy, which up to recent times had furnished the largest contingent of emigrants.

If then you consider the various centres of production of the Austrian iron industry, you must, in forming opinions as to whether the plant and the improvements adopted represent the most modern requirements or not, continually keep before you the conditions depicted, and especially consider that the consumption of iron is very limited, that a production of large quantities, attainable by the most intense specialization, as is to be found in the United States, in Great Britain, and Germany, appears to be out of the question, and that the Austrian ironworks are obliged to divide their proportionately small productions into a considerable number of different manufactures.

Taking into consideration all the local conditions, the Austrian ironworks believe that they have done the best possible to them with regard to technical progress, and await your judgments with tranquility.

You will find that, where the conditions exist for a larger production of pig iron, at the Oesterreichische Alpen Montangesellschaft, and also in Witkowitz, blast furnaces, with a daily production up to 450 tons, equipped with all the most modern appliances, such as automatic utilization apparatus. You will find the most complete utilization of blast furnace gases, as, for example, in the Königshof ironworks of the Böhmisches Montan-Gesellschaft, where blast furnace gas engines of more than 6,000 horse-power are installed, by which not only the blowing engines but also the rolling mill for rolling sheets (the most important in the monarchy) are wholly driven. You will be able to observe the greatest possible utilization of other by-products of the blast furnaces and steel works; you will find the slags rich in phosphorus in Kladno and Königshof converted into artificial manure; at Witkowitz, Kladno, and Königshof the blast furnace slags are manufactured into slag bricks and slag cement, and the slag cement works at Königshof are the largest of the kind on the continent.



You will find everywhere the most extensive application of electricity, mostly in conjunction with blast furnace gas engines, and also coke oven gas engines for the generation of power, and, as an example, in Witkowitz a plant of this description of 5,700 horse-power exists.

It should here be noted that at the Austrian blast furnaces which yield 790,000 cubic metres of gas per hour, 263,000 cubic metres are used for blast heating, so that 527,000 cubic metres are available. Of this quantity, at the present time 358,000 cubic metres, or 68 per cent., are utilized for boiler heating, and 34,000 cubic metres, or 6.5 per cent., representing 12,000 horse-power, in gas engines, whilst the remainder of the gas is used partly for ore roasting or in drying kilns, and partly drawn off unutilized. The Böhmsche Montan-Gesellschaft, which at present is utilizing blast furnace waste gases on the most extensive scale, utilizes 23 per cent. of the available gas in gas engines.

In the Austrian coke works, the coke ovens yield 86,000 cubic metres of gas per hour, of which quantity the coke ovens themselves absorb 62,000 cubic metres, so that 24,000 cubic metres are available. Of this quantity 5,700 cubic metres, or 24 per cent., are utilized in gas engines, whilst the remainder is used for boiler heating.

The most complete application of electricity to the driving of rolling mills will be shown to you in Teschen, where, as is well-known, not only the finishing, intermediate and roughing trains, but also the reversing rolling mills, are driven by electric motors. It must be recorded that as early as 1897 in Servola, Triests, the Krainische Industrie-Gesellschaft at their blast furnace plant installed an electric ship loading crane, on the American Brown system, to serve a blast furnace with daily output of 250 tons.

It will also be brought to your notice that the Austrian steel works engaged in the manufacture of alloy steels of great value, especially tool steel, have also lately adopted the new electric processes.

Thus we find that the Poldihütte have adopted the Kjellin process, the firm Gebrüder Bohler & Company are introducing the Ch. A. Keller electric arc process, and the new Styrian cast steel works of Danner & Company employ the Héroult process; the Kärntnerische Eisen- und Stahlwerks-Gesellschaft have also decided to adopt the Héroult process at their works in Ferlach.

You will find many other things which will repay your attention, and will show you that the Austrian producers of iron have spared no trouble to maintain the position of their works at a high degree of technical equipment. It must, however, be repeatedly remarked that the Austrian ironworks can never neglect existing conditions, and I must ask you when judging our plants to continually bear in mind the special conditions, which are that the Austrian iron industry does not possess sufficient coke, that it must be brought from great distances, at a great expense, to where the ore is found, or the reverse, that the ore must be transported in a similar costly manner to the coke ovens, and that the output which the home market requires is proportionately small, so that manufacture in bulk and a specialization of the rolling mill equipment appears to be entirely out of the question.

The lack of specialization in many cases prevents an extreme supersession of manual labor and the application of arrangements to attain this object, which appears to be less necessary in Austria than in those countries where wages are high and where the necessary labor is wanting.

If, in the description given above of the Austrian iron industry of twenty-five years ago, you may seem to detect some note of quiet resignation, so I believe that industry looks forward to further future extensions with hopeful confidence, the more because I believe in the prediction, which the past-president of the Iron and Steel Institute, Mr. R. A. Hadfield, made in his brilliant address in the year 1905-1906, that within a measurable time the world's production of iron, owing to the lack of iron ore, will be unable to satisfy the demand. Mr. Hadfield gives the amount of iron ore in sight at 10,000,000,000 tons, a supply which, at the rate of consumption observed during the last twenty-five years, would be exhausted in about forty years. There is no danger that in forty years the world will suddenly be without iron, for the discovery may confidently be expected of many, at present unknown, deposits of iron ore in the undeveloped districts of Eastern Asia and Africa; it is, however, certain that the increase in production of pig iron must attain a limit within a measurable distance of time.

These conditions may similarly be experienced in Austria at a not very distant date. If you will allow again twenty-five years to elapse before your next visit, which I am far from wishing, then many important deposits of ore in Austria and Hungary will be exhausted, for instance those Bohemian deposits of ore which the blast furnaces of the district charge together with ores rich in phosphorus, so that they will be obliged to fall back to other existing deposits, which, owing to their low percentage of iron and high percentage of silicon, cannot at the present time be smelted with economy. In the south of the monarchy, in Bosnia, there are still undisturbed deposits of ore, and the Styrian mountain of ore certainly represents an almost inexhaustible source of supply, but all these auxiliary sources can only serve to keep the Austrian iron industry at a certain level, without rendering any considerable rate of increase possible.

On the other hand, the consumption of iron increases progressively, so that I consider that the time is not very remote when the Austrian iron industry must renounce its share of the supply of the world's market, while afterwards—according to my opinion after scarcely twenty-five years—foreign iron will be imported to satisfy the demands of the home market.

If the producers of iron of the rest of the world in the coming, as in the past quarter of a century, should so considerably enlarge their homes and build up palaces, Austrian ironmasters must moderate their pretensions and keep their dwellings within modest dimensions. They will, however, at all times endeavor to keep them swept and garnished, so that all who dwell in palaces can nevertheless at all times enter them with pleasure, and they themselves will take no less pride in their homes than the dwellers in palaces.

A very minute amount of cobalt as chloride or sulphate, when added to a large excess of boiling strong solution of potassium hydrate or sodium hydrate gives a blue color which is destroyed by dilution. Nickel salts in larger proportion give a blue of different quality, which becomes reddish when heated.

The alumina contaminating the silica left by the ordinary evaporating to dryness with hydrochloric acid, can be rendered soluble in hot hydrochloric acid by igniting the precipitate for two or three minutes. If the ignition is too intense or too prolonged the alumina becomes again insoluble.



## A NEW BLUE-BLACK IRON PAINT AS A PROTECTIVE COVERING\*

By F. J. R. CARULLA (DERBY.)

In the preparation of iron and steel rods for wire drawing and galvanizing, as also in the preparation of plants for tinning, etc., the iron is kept for a time in a bath of acid to remove the scale. The acid used may be sulphuric acid, when a solution of sulphate of iron ("copperas") is produced; or hydrochloric acid may be employed, when a solution of chloride of iron is obtained.

A number of methods have been devised to utilize these solutions, and it is the object of this paper to bring before you the one which appears to be the most valuable when chloride liquors have to be dealt with.

The acids named are not absolutely neutralized by the use that they are put to, so that the liquors are still active and have to be "killed" before they are subjected to any operation for the recovery of the iron and of the acid in any form.

The sulphate "waste pickle" liquors, as they are termed, are killed or neutralized by the addition of scrap, producing a neutral solution from which copperas in the solid form is obtained, these liquors being one of the main sources of this material. When hydrochloric acid is employed ferrous chloride is produced, which is not so tractable a salt as the sulphate, owing to its great solubility; and, besides, the demand for it is insignificant when compared with that for sulphate.

The chloride liquors are consequently generally dealt with by adding some base, which, combining with the chlorine, will precipitate the iron as an oxide, and that which naturally suggests itself is lime. This has been employed; but the calcium chloride produced being also a very soluble and deliquescent substance with little use for it, the process can only be resorted to as a necessity. Certainly the calcium chloride solution might be run away, but a better use might be to employ it for watering roads and preventing the dust arising from the passage of motor cars, a use to which this salt is said to have been successfully applied. Potash and soda have also been suggested and employed as bases for the precipitation of the oxide of iron, but the product obtained has obviously a value much below that of the materials employed. To turn caustic soda into common salt cannot be a very profitable process, nor yet to use potash and obtain chloride of potassium.

The idea occurred to Dr. C. F. Wülffing, for some time a resident in the Swansea tinplate district, that ammonia might be employed to effect the precipitation in question, seeing that the value of the ammonium chloride is greater than that of the ammonia employed.

The great drawback to such a process naturally is that the volatile nature of ammonia requires special attention to be given to the apparatus employed, which must necessarily be closed, and every possible means of escape of the ammonia prevented. Especially is this the case as the liquor has to be blown for a considerable period in the presence of ammonia, some of which the air carries off, and provision has to be made in the plant not to lose this ammonia.

The necessity for this blowing or oxidation arises from the fact that Dr. Wülffing's main object is to obtain a black oxide of iron, which is only produced after long exposure to the air blast. This oxide, which is obtained

as a beautiful blue-black color, is quite insoluble in water, and when passed into the filter press sleeves a clear solution of ammonium chloride which is evaporated and allowed to crystallize.

The blue-black precipitate is magnetic, showing it to be  $Fe_3O_4$ , and is a valuable addition to the list of pigments that can be employed with advantage for the protection of structural ironwork.

By similarly treating the chloride liquors with other bases a black color can be obtained, but it is not of the extreme fineness possessed by the substance when ammonia is employed. It is also necessary to consider that absolute chemical purity is unattainable whatever method may be employed. If the process be attempted with lime, some of this, which is a most undesirable impurity, remains behind, the color produced being, besides, of a poor quality. With ammonia, on the other hand, the black oxide is left with a trace of a double salt, which Dr. Wülffing regards as  $NH_4Cl, FeCl_2$ . This acts beneficially on the paint, although ammonium chloride by itself would not do so. Structures that have been painted with this blue-black oxide of iron (boiled linseed oil being used in the preparation of the paint) have kept fresh though exposed to the weather for nearly two years, still showing a varnish-like surface.

The Sharon Chemical Company, Limited, to whom Dr. Wülffing has assigned the English patent, are putting up a plant in Derby which will probably be working when this paper is read. The writer may avail himself of the opportunity granted to authors to make a more or less lengthy addition to this note should occasion arise after the plant is started.

## EXCHANGES

*Mines and Minerals*, September, has a paper on "Montana Gypsum Deposits." The refined gypsum products sell for about \$8 per ton. From analyses quoted, Montana gypsum appears to be of exceptional purity.

*The Mining and Scientific Press*, September 14th, refers in its editorial columns to Mr. J. J. Hill's control of the Crow's Nest Pass mines. It makes the sweeping statement that Mr. Hill has the coking of coal of the Northwest under his thumb.

*The Iron and Coal Trades Review*, August 30th, contains an article on "The Housing of Workmen." The writer attributes to Germany the credit for originating most of the devices for improving the conditions of workshops. However this may be, there is a decided improvement in the style and comfort of modern English workmen's dwellings. The Brodsworth Main Coal Company, operating near Doncaster, recently offered a prize of £100 for the best design of a model village, consisting of 500 cottages, club house and shops, to cover an estate of 70 acres.

*The Iron and Coal Trades Review's* (September 6th) remarks on coal conditions and prices are timely. It is pointed out that the coal owners are not, as such, responsible for either the rise or the fall of prices. It is entirely a question of the "higgling of the market." For two years the demand for coal has been increasing in excess of the increase of supply. No coal owner can make the public purchase an ounce more coal than they want, nor an ounce less. The coal trade has many allied interests, and one of these—the great railway carrying interest—as we have pointed out in one or two recent issues, is taking care to secure as large a slice as possible of the higher prices that are being paid for coal.

\*Paper read before the Iron and Steel Institute, September, 1907.



## BOOK REVIEWS

THE MANUFACTURE AND PROPERTIES OF IRON AND STEEL, BY HARRY HUSE CAMPBELL, FOURTH EDITION, FULLY REVISED; THE HILL PUBLISHING COMPANY, 505 PEARL STREET, NEW YORK; 640 PAGES, ILLUSTRATED. PRICE \$5.00.

When, half a dozen years ago, the first edition of the "Manufacture and Properties of Iron and Steel" appeared, it was at once recognized as a standard. The fourth edition brings us a book different in many minor respects from the first, but retaining in perhaps more convenient shape all the marrow of the preceding edition. "By constant additions," the author prefatorily remarks, "the book had grown too big to be convenient, so that every line has been gone over to eliminate unnecessary phrases or words . . . On the other hand, much new matter has been added . . ."

The fourth edition has a number of pages less by 222 than the second edition. But the loss in bulk is amply compensated for by the added compactness and by the absence of matter of only temporary value.

Part I., as an introduction to the main principles of the metallurgy of iron, serves its purpose thoroughly.

That section of Part II. which describes the blast furnace is carefully written. A startling amount of information is compressed within its forty-seven pages. As this, to the young metallurgist, is one of the most important chapters, its value would have been increased had it included a simple method for calculating blast furnace burdens. However, as it stands, this chapter is wonderfully profitable reading. The author, being himself pre-eminent among American steel metallurgists, has been able to use much tabulated data, derived from experiments at his own works at Steelton, Pa. And the reader is at once impressed with the fact that Mr. Campbell is writing with a "first-hand" knowledge of his subject.

Most instructive is Part III., wherein are collected short sketches of the iron industries of the leading nations of the world. Again the reader has the benefit, to a certain extent, of the author's personal acquaintance with the foremost ironmasters of Europe and with many of the industrial centres referred to.

Regarded as a general text-book of the iron and allied industries, this volume stands unapproached by any book that we know of. The task of covering so much ground in such limited space is a Herculean one. The very need of such careful condensation points to the opposite need. Mr. Campbell's excellent book might well be supplemented by a series of books taking up each chapter, in regular order, and expanding upon each. The technical world, incidentally, is in particular need of practical books upon such subjects as the blast furnace and coal-washing.

CHEMICAL REAGENTS—THEIR PURITY AND TESTS. A NEW AND IMPROVED TEXT-BOOK, BASED ON AND REPLACING THE LATEST EDITION OF KRAUCH'S "DIE PRÜFUNG DER CHEMISCHEN REAGENTIEN AUF REINHEIT." BY E. MERCK. AUTHORIZED TRANSLATION BY HENRY SCHENCK, A.B., (HARVARD). D. VAN NOSTRAND COMPANY, 23 MURRAY STREET, NEW YORK, 1907, VIX., 250 pp. PRICE \$1.50.

A convenient hand-book on the testing of chemical reagents has long been needed. Chemists, employed in industrial laboratories, are too prone to accept the label of

the manufacturer as a guarantee of purity. And, even when they begin to suspect the absolute freedom of reagents from contaminants, they are often at a loss to apply tests at once rapid and complete. Not infrequently the inexperienced chemist does not know what impurities to search for in each reagent, and he must perforce exhaust a great many possibilities before he finds what he is looking for. Time is money in modern laboratories. Therefore any hand-book which is devised to save time for worthier objects is acceptable.

The book before us is evidently the product of a long experience. All of the principal reagents, inorganic and organic, are included in alphabetical order. Tests are given for the typical impurities of each and the distinguishing chemical and physical qualities of each are enumerated. An excerpt will illustrate the arrangement followed. Opening the book at random we come upon a paragraph headed "Bromine Water," which reads thus:—

## BROMINE WATER.

A saturated, aqueous solution, containing about 3 per cent. of Br.

## TESTS OF PURITY.

*Sulphuric Acid.*—Add 0.5 c.c. of hydrochloric acid and barium chloride solution to 50 c.c. of bromine water, and boil the liquid until the bromine has been completely expelled from it. The precipitate of barium sulphate should separate on standing one hour.

*Bromine Content.*—Let 10 c.c. of bromine water run into a solution of 5 grammes of potassium iodide in 100 c.c. of water, allow to stand half an hour in a stoppered flask, and then titrate with decinormal sodium thiosulphate solution. 1 c.c. of decinormal  $\text{Na}_2\text{S}_2\text{O}_3 = 0.007996$  gramme of Br., log. 90287.

Thus a ready method for testing for the chief impurity of bromine water is described, along with a determination of the strength of the reagent. The knowledge of these methods and the use of them will not only give the chemist confidence in his work, but will make for economy. Bromine water is a reagent which the chemist is apt to use far too liberally, thereby wasting material and much time. When the strength of reagents is definitely known it is possible to regulate quantities so as to effect a great saving of time in boiling and evaporation. Moreover, anything that tends to a strict standardization of chemical methods tends also to eliminate error and sloppiness.

Tables of atomic weights, corrected up to 1906, and of normal and decinormal solution equivalent are given on the last pages. An index is also included.

## PERSONAL AND GENERAL

Mr. Alex. Longwell, of the Coniagas Mine, has taken a residence in Toronto for the winter.

Mr. Graham Fraser has recently visited Victoria and other points in British Columbia.

Mr. W. K. MacNeil, M.A., has returned to Cobalt after a few weeks' holidays. Mr. MacNeil has charge of the laboratories of Evans & Laidlaw.

A Prospectors' and Mineral Interests' Exchange has been organized in New Liskeard. The object of the organization is to protect the interests of buyers and sellers of mining claims. The membership fee is five dollars. One of the objects of the exchange will also be the elimination of middlemen's profits and of brokers' options. J. R. Lawless, New Liskeard, is president, and V. E. Taplin, of the same place, is secretary.



## CORRESPONDENCE

## Klondike—Cobalt.

To the Editor, CANADIAN MINING JOURNAL:—

I can still remember the fierce outcry in the Klondike district against the imposition of any royalty on gold mined there. The leaders in this opposition to the tax were Conservatives. It was therefore amusing and instructive to me to see the Conservative Government of Ontario impose a royalty on Cobalt silver, and to note the strong objections on the part of the Cobalters.

The imposition of this tax in Klondike and in Cobalt was due in a great measure to the boasts and to exhibitions of vast wealth by the owners of mines themselves. It is only necessary to say that Mr. Wm. Ogilvie did not even recommend the imposition of any tax (although blamed for it); the Government at Ottawa saw to that. In a like manner we may be sure that it was the Government at Toronto which moved, with reference to Cobalt. And each Government was and is right in doing so. As the only Canadian editor in Dawson for years, I bore the brunt of the defence of the royalty, and I have had no reason to change my mind. More especially as the Dominion Government protected the poorer miners by exempting productions of \$5,000 and under, yearly. The royalty on the mine's production was, under pressure, modified to a general export tax of 2 1-2 per cent. on all gold exported from Yukon territory, and there it remains.

But the anti-royalty cry hurt the Government very much in Yukon, and the tax was denounced as "un-British" by its opponents. As a matter of course the product of many of the richest mines in the Klondike went into alien hands, and was taken out of Canada. Again other vast sums went into the hands of blackguards, gamblers, prostitutes and such; and the man who vehemently denounced the tax would in many cases throw away ten times the amount on wine, women and gambling. It was also useless to point out that British Columbia imposed a mineral tax.

It must be kept in mind that while an agricultural country goes on forever, a mineral country has only a limited life, especially where the deposits are of great richness. But when the population dwindles in sympathy with the decrease in production, the Government must continue, schools, public buildings, roads, law and order must be maintained from an insufficient revenue.

The Dominion Government has spent about all the revenue from Yukon in roads, public buildings, telegraph lines, police protection and such. In the matter of roads the chief blame was that their construction was not started earlier; but although tardy in beginning, the Government has (according to the evidence of the United States Senatorial party who visited Yukon and Alaska) redeemed itself with great credit. Let us hope the Ontario Government will do as well; and being so much nearer the field, it may not delay the construction of roads. The law and order enforced in Yukon has been pointed to with pride, and is a vivid contrast with that now maintained in the Western States and Alaskan mining camps.

Let me suggest two ways in which a portion of the fund collected from the tax on silver may be used to best advantage. First, by generous rewards to persistent, as well as to successful prospectors. There is where every Province in Canada fails miserably, and it is one of the keys to success in developing mineral wealth. And in addition to these rewards, life annuities should be granted to hard-working, persistent and intelligent prospectors whose good work is apparent, even although

they may make no big discoveries themselves. In the Klondike it was the determined and intelligent prospector who although he found the wealth, did not participate in it, while the man who was not even a prospector stumbled on a small, but the richest part, of the gold fields, and made a fortune. The majority of successful pioneers and prospectors are financially improvident, and are utterly careless of old age provision. They are generous, and even if they profit by their discoveries, the proceeds slip through their fingers. Again, as in Robert Henderson's case, when he had outlined and discovered both the Indian River and Klondike gold fields, he was, by a quibble in terms at the recording office, deprived of his well-earned wealth. The fact that the Government acknowledged its mistake years after has not been of any benefit or a real reward. It is perhaps on a par with the grim irony of a Province voting a tardy little annuity to the dying daughter of a long dead discoverer; neither of whom profited by that discovery.

Secondly, the establishment of good homes for aged and disabled prospectors and miners, as in British Columbia. When a pioneer or prospector feels assured that he will not have to end his career in abject poverty, or by the leaden route, he can and will cheerfully devote the best years of his life, and all the vim of youth and middle age to his valuable work for the Province, and for Canada.

The matter in the above letter was written six months ago, but it was declined then by leading Ontario journals. It may be of interest to a mining journal which does credit to Canada.

Yours,

HENRY J. WOODSIDE.

Ottawa, 16th Sept., 1907.

To the Editor, CANADIAN MINING JOURNAL:—

I noticed an article on "Springhill and its Collieries," by W. D. Matthews, in your issue of 15th Sept. In this Mr. Matthews states: "It is generally conceded, however, that the Cumberland Railway & Coal Company has the best of it. Outside of their holdings it is doubtful if the remainder possess any great value."

I wish to contradict this statement. The Springhill seams are certainly among the best and thickest at the present time, but to claim them as being the only valuable seams in Cumberland County is, to say the least of it, presumptuous. How can Mr. Matthews claim exclusive value for their holdings, which in many instances are either sandwiched in between or in close proximity to holdings in active operation by other company, and whose seams are just as good in quality, if not better, than those at Springhill. Furthermore, I was not aware that a coal basin existed at Springhill. I was always under the impression, and am still, that they are part and parcel of the Cumberland coal basin and on an equal footing, in this respect, with the rest of the mines whose good fortune it is to be operating in this large and valuable coal field.

Trusting you will give this space in your valuable JOURNAL, and with apologies, I am yours very truly,

ROBT. ARCHIBALD.

Eastern Coal Company, Maccan, N.S.

Mr. H. E. T. Haultain passed through Toronto on September 20th, having completed a tour of certain American centres in the interests of the Canada Corundum Company, of which Mr. Haultain is the general manager. Mr. Haultain visited consumers of corundum in Wisconsin, Illinois, Indiana, Kentucky and Tennessee.



## SPECIAL CORRESPONDENCE

## NOVA SCOTIA.

GLACE BAY.—Glace Bay has been more or less *en fete* during the past week in honor of the visit of the National Trades and Labor Congress of Canada, at the invitation of the Provincial Workmen's Association. To welcome, and incidentally to impress the visiting delegates the P. W. A. arranged a rather interesting parade, which was held on the evening of the 10th. The various P. W. A. lodges turned out in force, and all the "boys" of the Coal Company's fire brigades were there in blue and white. About three hundred of the miners in the parade carried lighted safety lamps, which must be growing in favor. Two large floats carried enormous blocks of coal, at which two men worked, one with hand-pick and the other with machine-pick, to show the old way and the new, a la the Ingersoll advertisement. One of the leading spirits of Ironside Lodge wore the Draeger breathing apparatus, and seemed to enjoy himself. We hardly understand, however, why he chose to ride, and he looked an odd "rescuer" sitting in a carriage! The new town fire engine, the "John Leaman," was there under a full head of steam, with a mine tub full of coal in its immediate rear. The coal was No. 6, guaranteed the genuine article, and the fire engine bore the legend: "Modern fire engine, burning No. 6 coal!" This was a somewhat significant item of the procession, as showing the temper of our Glace Bay people in the matter of the aspersions that have been cast upon the fair name of their coal seams, and we think it was rather a sly dig at a neighboring city that piques itself upon its fire brigade. The parade was a most unqualified success, and was witnessed by a well-dressed and orderly crowd of about fifteen thousand people. Such a gathering points to a growing spirit of local patriotism and pride in our mining industry that augurs well for the district as a whole, for, split up into hostile camps as we are by race and sects and politics, it is not often that a united and general effort is so enthusiastically carried out.

Most of the visiting delegates spoke the French language only, and the proceedings of the conference were carried on in both French and English, with asides in Gaelic we are told. One of the merchants in town displayed two greetings. One read: "Comment ca va" and the other ran "Camar ha sibh dhu." Such a juxtaposition of the language of courts and diplomacy with that primeval tongue that lingers in Cape Breton arouses a train of thought that leads one far afield from the dust and grime of our collieries to the old-time friendship of Scotland and France before Louisburg fell and the Bastille became a tradition. It is a far cry from the court of St. Louis to the Glace Bay Hotel, and one would hardly think there was any of the glamour of romance and history about a P. W. A. gathering in Glace Bay. Yet there is. This island is rich in historical tradition and in an old world tongue and literature that carries us back to Fingal and Ossian and the mists of Gaelic tradition. We wonder why the young Cape Bretonian is ashamed of his Gaelic speech. He has no reason to be, and there are many reasons why he should be proud of the fact. The Welsh miner does not speak the tongue of the Sassenach, nor does the French-Canadian. But to be practical, we understand that the P. W. A. intend to affiliate with the Upper Canadian organization before referred to. Well, stranger things have happened.

The P. W. A. will hold its Grand Council meeting at Halifax on the 17th. There are several things for them to discuss. The three years' agreement with the Dominion Coal Company expires at the end of this year, and it will in all probability be renewed. The agreement has worked well, and save the stoppage of No. 1 on the question of working with non-unionists, there has been no hitch in the relations of the Coal Company with their men since the contract was signed.

The Grand Council of the P. W. A. will also, we understand, take up the question of old age pensions for miners. The Nova

Scotia Legislature at their last session appointed a committee to "examine into and advise upon the advisability of adopting some scheme of providing old age pensions for workmen, and particularly for such workmen as have either by themselves or in conjunction with their employes, established benefit or relief societies, etc." The Commission will sit in Glace Bay on the 25th inst. to take evidence and examine witnesses. It is composed as follows: Chairman, Walter Crowe, barrister, of Sydney; Hon. Robt. Drummond, of the *Mining Record*; Stephen B. McNeil, Grand Master of the P. W. A., and Wm. Hodge, of Springhill. It will be seen that the Commission is a very representative one. We commend to the Commission a careful study of the constitution of the Provident Society known as the Knappschafts-Verein in the collieries of Westphalia in Germany. Under the German law membership in this organization is compulsory upon all mine employes. The funds are contributed in the proportion of one-third each by the Government, the workpeople and the employers, and the benefits are sick relief, death bounties and old age pensions.

The output of the Dominion Coal Company for the first fortnight of September is small, owing to the fact that it contains three Sundays and Labor Day, but during the latter half of the month its is expected to materially increase. The labor conditions are improved, and from now to the close of navigation the output will reach 15,000 tons a day or thereabout.

During August the shipments were very large, being over 365,000 tons for the month. The huge banks that were accumulated last winter have practically disappeared.

The reconstruction work at the Hub Mine is now practically completed, and everything is ready to hoist coal. It is not probable, however, that any great amount of work will be done this season owing to the scarcity of labor. It is the intention of the management to install a modern electrical endless haulage system at once, and when the Hub begins to hoist coal again it is expected to obtain well over the thousand tons per day. No person looking at the modern layout of the Hub Mine to-day would recognize the smoking chasm which was all that was left by the fire last December.

The Coal Company are advertising for tenders for the construction of seven miles of railway to connect their Sydney and Louisburg line with their proposed new colliery at Barrachois, and it is said that considerable developments are contemplated in that neighborhood. As yet, however, the Coal Company have not made any statement to this effect.

We understand that considerable developments are expected at the old Gowrie mines at Port Morien. Mr. B. F. Pearson, of Halifax, accompanied by Dr. J. A. Henderson, of London, Eng., visited the colliery on the 7th inst. and inspected the plant. Mr. Nicholas Richardson, of Newcastle, England, is the newly appointed manager, and under his supervision the management are installing additional boiler power, new hoisting engine, etc. For some time past the mine has been practically idle, only enough coal being hoisted to keep the pumps going, and the promise of new for the old mine is welcome to the Port Morien people.

## ONTARIO.

BRUCE MINES.—The party of British journalists who, at the invitation of the Ontario Government, whose guests they now are, crossed the Atlantic on the *Lusitania*, visited Bruce Mines on September 18th under the guidance of the Hon. Frank Cochrane. The party numbered sixteen, all representatives of leading English journals.

They were met at the station by Mayor Knight and a company of leading citizens. A breakfast was served at the Exchange Hotel, at which speeches were made by the hosts and responded to by the visitors. Mr. T. Hayes-Sheen occupied the chair. His



address was a strong presentation of the advantages and claims of Bruce Mines. He referred to the indefatigable efforts of the Hon. Mr. Cochrane in advancing the mining interests of Ontario, and, also, to the good work done by Mr. W. R. Smythe, the local member. With Mr. Cochrane's consent Mr. Hayes-Sheen announced that, under the auspices of the Local Government, a preliminary survey was being made to define a railway route to connect Bruce Mines with the C. P. R. main line.

This line, later on, is to be projected northwards towards James Bay.

The Hon. Mr. Frank Cochrane spoke briefly of the desire of his Government to further the development of the vast natural resources of Northern Ontario.

Both Mayor Knight and Mr. W. R. Smythe made short speeches. Representatives of the *Morning Post*, the *Tribune* and the *Standard* made happy responses.

After breakfast the visitors were shown over the Bruce Mines plant.

#### BRITISH COLUMBIA.

**THE KOOTENAYS.**—The coke question still remains an ardent issue in this district. While there has been more or less improvement in the situation during the past two weeks, a majority of the smelters are running "from ear to furnace," and if there should be any marked interruption in the scant supply it would undoubtedly mean the closing of some of the plants. Nothing has been heard of Mr. Tolmie's findings, although he has gone thoroughly over the ground. However, it is hoped that fuel conditions will steadily improve, and that the various mining and smelting concerns will have a bounteous supply of fuel stored in their bins as a reserve before old Boreas puts in his appearance and renders transportation a problematical matter.

Shipments from Rossland camp are necessarily still curtailed. Le Roi Mine is on the shipping list again and are shipping 1,500 to 2,000 tons per week. Consolidated properties are shipping from 2,500 to 3,000 tons per week. Le Roi 2, Limited, are shipping several hundred tons per week. The lessees of the Nest Egg have shipped two cars of ore and have realized a profit from the same far in excess of their expectations. The White Bear Mine shipped three car loads of ore, about 105 tons, and a car of concentrates, during the week just ended. The concentrates represent 350 tons of second-class ore milled. It is pleasing to learn that this property is now paying its own way and returning a small sum each month to its treasury.

Hearsay has it that A. I. Goodell, of the Northport smelter, has handed his resignation to Le Roi management. Mr. A. G. Larson, superintendent of the mine, has gone south on a holiday for a month, but it is said that he has been proffered a couple of choice positions and, owing to some little friction in Le Roi affairs, may accept one of the offers made. It is too bad that a meritorious

concern like Le Roi should be continually laboring along under a load of trouble. The mine pays liberal tribute to those who hold the reins of its government and still seems to be almost powerless to unburden itself; at least to any considerable degree. The management of this concern no doubt will have to exercise a sane and far-seeing policy if they would lighten this load and divert part of the revenue from the property to the purses of the shareholders.

At Northport there are three furnaces being operated in the smelter. Trail smelter is running at about half capacity, principally owing to the scarcity of fuel. The Boundary smelters are all running along fairly well, with the exception of the plant of the British Columbia Copper Company, which was a little short of fuel last week. Nothing of signal interest developed in the Boundary mines since last writing. As with the Rossland mines, the usual development work and shipping was done, as well as possible, under existing conditions.

The shareholders in this country have just received their cheques for the British Columbia Copper Company's last dividend. The Granby has just declared another dividend of \$405,000. These, with the Consolidated making regular divisions of profit quarterly, and other propositions showing up on the list from time to time, place this district in a far better position, from the investor's point of view, than that which it occupied a few years ago.

Railway construction is active in the Boundary and Similkameen districts. They will have excellent transportation facilities in that section in the very near future.

At last it is authentically stated that J. J. Hill and Great Northern interests have acquired a large interest in the Crow's Nest Pass Coal Company, and that the Granby Company have invested about \$700,000 in Crow's Nest stock. There are rumors of changes in the mine management, many denials from various quarters, but the suggested changes would be welcome to the interests in this country if a sufficient supply of fuel would be the result.

Naturally, the prevalent agitation against Asiatic labor is a question of importance and interest to the people here. Several organizations have passed resolutions condemning the uncontrolled admission of Oriental laborers to Canada, and British Columbians generally are vehement in the stand they take against the Asiatic hordes being allowed to swarm over this country. It is contended that there is no justice in permitting the Oriental to despoil the future, as well as the living, white race of the opportunities and prerogatives that are theirs by birth and education. Without actually going through the experience, it is almost safe to say that the admission of thousands upon thousand of Asiatics would have a pernicious effect upon the white laboring class, of a few decades hence more particularly. While the rioting at Vancouver is not countenanced by the every day law-abiding individual, it is hoped by all that the affair will serve to culminate this matter and that a decisive move will now be made by the Government towards a settlement.

## GENERAL MINING NEWS

#### NOVA SCOTIA.

**LONDONDERRY.**—The blast furnace of the Londonderry Iron & Mining Company was blown in on September 7th. The furnace has been partially relined under the direction of William Scurrah. During the last three months the entire plant of the Iron Company has been put in excellent shape. The "blowing-in" was an event of great local importance.

**HALIFAX.**—The Provincial Workmen's Association has emphatically protested against the Industrial Disputes Act. The objections raised are based upon three points:—1st, That much delay is experienced in putting the Act into operation; 2nd, that witnesses summoned before the Board do not receive sufficient remuneration,

60 cents per day being the fee paid; 3rd, that the advice of the P. W. A., as a body, had not been asked. The organization is also taking up the matter of the low wages paid to outside laborers at the mines.

**PORT MORIEN.**—It is expected that the North Atlantic Collieries Company will commence shipping coal early in October. Repairs on the shipping pier, on the towers of the aerial cableway and on the chutes are being pushed with vigor. The dwelling houses are completely repaired.

The Nova Scotia Steel & Coal Company has decided to grant an increase in wages to the engineers, firemen, conductors and brakemen. The engineers will receive 27½ cents per hour; firemen, 20



cents; brakemen, 19 cents; conductors, 22½ cents. A comparison of the new with the old rates stands as follows:—Conductors—Old rate, 25 cents per hour; new rate, 27½ cents per hour. Firemen—Old rate, 20 cents per hour; new rate, 17½ cents per hour. Brakemen—Old rate, 19 cents per hour; new rate, 17 cents per hour. Conductors—New rate, 22½ cents per hour.

**PORT HOOD.**—The Port Hood-Richmond Railway Coal Company installed a Sullivan straight line air compressor early in September. It will be used to operate the pumps and the coal-cutting machines. The old compressor will be repaired and kept in commission. The company has determined, with the assistance of the Provincial Workmen's Association, to eradicate heavy drinkers from their employ. Those who fail to work 22 days in the month will be dismissed, unless due cause can be shown for their absence. In spite of shortage of labor, the mine is raising 400 tons of coal per day. An output of 1,000 tons daily is counted upon next year.

#### ONTARIO.

**COBALT.**—Six carloads of ore have up to the present been shipped from the Cobalt Townsite Mine. The main shaft is down over 100 feet, No. 2 shaft is down 50 feet, and about 620 feet of drifting and cross-cutting has been done at the 50 foot level. Fifty men are now employed and the number will be increased.

The shaft of the Big Pete Mine is now 170 feet. The ore is from two to three feet in width. The vein is vertical and the pay chute dips at sixty degrees in the vein. The company is installing a concentrating plant of 100 tons capacity. The plant consists of one 10 by 20 Blake crusher; one set of 42 by 14 roughing rolls; one set 32 by 12 medium rolls and one set 32 by 10 fine rolls. From the coarse rolls the material passes through screens where the size between three and eight mesh is removed and sent to two-compartment jigs. The under size from the eight mesh screen goes to a twenty mesh screen. The over size from this goes to a three-compartment jig, the undersize going to a hydraulic classifier. The tailings from the two-compartment jigs go to the medium rolls, and are then crushed and elevated to a twenty mesh screen, where the fines are removed and the oversize goes to three-compartment jigs. The tailings from the three-compartment jigs pass through the fine rolls, where the material is crushed to twenty mesh. All material after passing the twenty mesh screen goes to a hydraulic sizer of two compartment, each compartment giving a different table product. The overflow from the sizer goes to Callow settlers and from settlers to vanners. In all cases the oversize from screens is returned to the rolls until it passes the twenty mesh screen. The company experimented with four carloads of ore before deciding upon the necessary machinery. Any additional treatment, required in the future, will be along the lines of pan amalgamation. The company is now installing a larger hoist and a 1,500 foot compressor. The entire plant will be in operation during October.

**COBALT.**—The concentrating plant of the Cobalt Central Mine will very shortly be in operation. Low grade ore has been stacked in quantity sufficient to keep the concentrator running for some weeks, and the company will attempt to keep a large reserve always on hand.

The Buffalo Mine is making strong progress. The full complement of men are working and the camp quarters are to be enlarged.

The Silver Bar Mine, which has been lately in the control of Rinaldo McConnell, of Ottawa, and J. E. H. Barnett, of Renfrew, passed into the hands of J. P. Killorin, of Duluth, Minnesota, and E. P. Stone and associates of Saginaw, Mich. The reorganization of the company took place in Ottawa Saturday. E. P. Stone was elected president and managing director. Charles McRae, of Sudbury, is secretary-treasurer. The head office will be removed from Ottawa to Sudbury. A new engineer has been appointed to thoroughly overhaul the machinery and have operations commenced as soon as possible.

The Coniagas Mines, Limited, is appealing to the Ontario Railway and Municipal Board against an assessment of \$100,000 fixed by the Town of Cobalt for the purpose of levying an income tax. The proprietors claim that they are not liable to taxation on income.

Letters received by the T. & N. O. Railway Commission from their mining engineer, Mr. A. A. Cole, announce the discovery of promising quartz veins five miles north of Temagami station. On one property that was being developed for molybdenum, free gold was found.

The report that La Rose Mine has been sold to an English syndicate is being persistently circulated. Although shipments have been light, yet La Rose is in fine condition. Cross-cutting and drifting have been vigorously pushed. A large quantity of ore is blocked out on the second and third levels.

The Coniagas concentrator is now operating. It will have a capacity of 100 tons of low grade ore per day. The slimes from the ore will be caught in settling tanks.

**PORT ARTHUR.**—Five carloads of silver concentrates, valued at \$40,000, have been shipped to United States smelters by the Hanson Consolidated Mines at Port Arthur. During August this company milled an average of 50 tons of ore a day, the total being 1,500 tons for the month.

**WABIGOON.**—Inspector E. T. Corkill recently visited four actively operating mines in this district—the Laurentian, the Paymaster, the Victory and the Detola. Mr. Corkill has been quoted as being favorably impressed with the progress of the camp.

**SAULT STE MARIE.**—The rail mill of the Superior Corporation re-opened on September 9th. It had been closed down for two weeks. No. 1 blast furnace is now relined. The ore supply is looking more promising.

September 16th and 17th the visiting British journalists spent at Sault Ste. Marie. After visiting the pulp mills and other points of interest on Monday evening and Tuesday, a dinner was tendered them on Tuesday evening at the International Hotel. About 100 prominent citizens were among the guests. After leaving Sault Ste. Marie the following itinerary was adhered to:—

Wednesday, September 18th.—Morning, Bruce Mines—Ontario Copper Mining and Smelting Company. Afternoon, Blind River—Inspection of Eddy Brothers' lumber plant and other mills. Evening, Espanola—Spanish River Pulp & Paper Company's plant.

Thursday, September 19th.—Morning, Crean Hill, property of Canadian Copper Company. Afternoon, Victoria Mines—Mond Nickel Company's mine. Evening—Sudbury.

Friday, September 20th.—Copper Cliff—Visit to the celebrated Creighton mine and smelter, property of the Canadian Copper Company. Evening—Sudbury.

Saturday, September 21st.—Trip over C. N. R. into Hutton Township to the Moose Mountain Iron Mine. Evening—Off to Temagami.

Sunday, September 22nd.—Resting on Lake Temagami, situated in the largest of Ontario's pine forest reserves.

Monday, September 23rd.—Cobalt—Visit to various silver mining properties. Evening—Hayelbury, prettily situated on Lake Temiskaming.

Tuesday, September 24th.—New Liskeard, the gateway to the great Clay Belt. Evening—Return to Toronto.

Wednesday, September 25th.—Luncheon at the Speaker's Chambers, Parliament Buildings, Toronto, at 1 p.m., to meet His Honor the Lieutenant-Governor and representative newspaper men of the Province.

#### ALBERTA.

**COLEMAN.**—Mr. A. C. Flumerfelt, president of the British-American Trust Company, the International & Alberta Coal & Coke Companies, located respectively at Coleman and Lundbreck, Alberta, associated with Andrew Laidlaw, of Spokane, and H. N.



Galer, vice-president and general manager of the International and Alberta Coal Companies, has completed negotiations for the purchase of 7,000 acres of coal land, located four miles north of Lethbridge on the east banks of the Belly River, directly opposite the Diamond mine, now being developed. The purchase price is stated to be \$350,000. The company to develop the property will be called the Royal Collieries Coal Company.

LUNDBRECK.—Overground improvements are being made at the collieries of the Galbraith Coal Company. About \$20,000 will be expended. A tramway 1,700 feet long, loading bunkers and a modern hoisting plant are to be constructed.

#### BRITISH COLUMBIA.

An English syndicate has acquired 360 acres of coal lands on Vancouver Island, four miles from Nanaimo. The lands adjoin the Dunsmuir coal mines. The vendors were the West Wellington Colliery Company, and the consideration was considerably over \$375,000. Prospecting with diamond drills is being vigorously carried on.

BOUNDARY.—Last week the new electric compressor, which was ordered some eight or ten months ago from the Allis-Chalmers-Bullock, Limited, by the Crescent Mines, Limited, arrived in Greenwood, and is now being installed as rapidly as possible at the company's mine, being of seven drill capacity. Power will be furnished by the Greenwood City Waterworks Company.

One carload of concentrates will shortly be shipped from the Cariboo-McKinney.

As eight furnaces are now in commission at the Granby smelter, about one car of blister copper is being shipped daily.

The mines of the Granby Company are working at full capacity. Five hundred and fifty men are employed.

Since the British Columbia Copper Company took over the Lone Star mine, nearly 1,600 feet of development work has been done. Most of the work has been in ore. In the near future a diamond drill is to be shipped to the Lone Star.

On September 7th there were eleven furnaces in blast at Boundary's three smelters, six at Granby, two at the British Columbia Copper and three at the Dominion Copper. This is one more than the previous week and it indicates an easing of the coke situation.

VANCOUVER.—Reports have been received of the discovery of coal measures on the mainland of British Columbia in the Harrison Lake country. The exact locality is known only to the prospectors themselves. If coal is there in quantity, it will be easily shipped by a direct water route to Vancouver City.

Under the name of the Hewitt Mining Company, a group of Eastern American capitalists has got control of the Hewitt mine. The company has a capitalization of \$800,000, divided into 80,000 shares of \$10 each. The properties are the Hewitt, Lorna Doone, both considerable shippers, Rincon, Rincon Fraction, Mole, Crow, Tranquility, Lorna Doone Fraction, Panobscot and Prior, all crown granted. In addition the company has acquired the Silver Wedge group of the three claims on the same vein and the Reid and Tenderfoot on the Wakefield vein. An option has also been taken on the Wakefield group of 12 claims and one the Wakefield mill of 120 tons daily capacity, which at present is treating the ore of the Vancouver, near the Hewitt, operated by the Le Roi No. 2 of Rossland. From the Wakefield over \$300,000 worth of ore has been shipped from two claims, none of the others having been worked. From the Reid and Tenderfoot a recent shipment of a car of 32 tons of ore to the Trail smelter gave returns of 83.5 ounces in silver and 36 per cent. lead. From the Hewitt and Lorna Doone have been shipped since July, 1904, to March 22 of this year, 1,780.3 tons of ore having a net smelter value, after deducting freight and treatment, of \$73.99 per ton. The Davys lease has netted the lessor \$50,000, two-fifths of which was during the first six months of the year.

LADYSMITH.—On No. 6 level, No. 2 slope of No. 2 Extension mine, six men were seriously burned by an explosion of gas. The men had just reached their work when the explosion occurred. Although it was a very heavy explosion, its effects were local.

NELSON.—Several new mines have become shippers during the past week. The progress on the Hewitt is satisfactory. A good body of ore has been struck in No. 3 tunnel. The smelters are getting back into normal working shape.

PHOENIX.—The pay rolls of the mining companies operating near Phoenix amounted to a smaller sum in August than usual, owing to the coke shortage.

#### YUKON.

Dawson, Y. T., Sept. 12.—One of the most gigantic placer deals in the history of the world was made here when 200 mining claims on Dominion Creek were purchased by corporate interests. Records of the transfers have been filed in the gold commissioner's office in Dawson.

It is understood that all the paying portions of the Dominion Creek will be taken over, aggregating perhaps 350 to 400 claims. Frank W. Morrison, as trustee, has secured 125 of the claims, and Peter Rost has secured the remainder. The new owner is a rich California company.

The ground just bought on Dominion Creek extends from number 10 above Upper Discovery to 223 below Lower Discovery, a distance of 20 miles. Dominion is the longest paying creek in the Klondike camp, and has yielded many fortunes. It is the richest stream on the Indian side of the high divide, and the first stream on that side to be bought by the big corporation. Granville camp, which comprises the lower few miles of Dominion Creek, has been purchased recently, presumably for the Morrison people. Indian River is 30 miles long, and also is the extension of Dominion, which is staked from end to end. Gold Run, Sulphur, Eureka, Quartz and other rich creeks have been organized to a large extent, and also may be bought.

The Guggenheims have now more than 1,700 men on their payroll in the Yukon. They are pushing operations vigorously.

Hydraulicking has been much interfered with on account of the very dry summer. In fact very little hydraulicking has been carried on at all. Dredges, however, to the number of seven, are in commission, and five more are being assembled and made ready for next year's work.

The Yukon River is lower than ever known. Steamers have difficulty in getting to Dawson City. As a result it is predicted that there will be a shortage of provisions in Yukon this winter.

The output of gold this season will not exceed \$3,000,000.

## MINING NEWS [OF THE WORLD

### GREAT BRITAIN.

For the first six months of 1907, the Dolcoath Mine reports 51,000 tons of rock crushed, 799 tons of concentrates sold and 64 tons of slimes. The rock tonnage is greater than during the preceding six months and the concentrates and tailings less. The higher prices obtained, however, compensate for this decrease.

### UNITED STATES.

CALIFORNIA.—From the Tuolumne district comes the report that the Black Oak Mine, formerly owned by eastern people, has been purchased by a Nevada syndicate. It is to be worked on a large scale.

MICHIGAN.—The Michigan Smelting Company, near Houghton, made a record recently. A furnace charge of 2,000,000 pounds of copper was successfully tapped and poured.



MEXICO.

MONTEREY.—Another terrible mine fire occurred at the Esperanza mines, in which 27 miners were killed.

SOUTH AFRICA.

CAPE COLONY.—Exports of diamonds from South Africa for 1906 have been estimated at \$46,287,655. A tax of 10 per cent. on raw diamonds would mean \$3,400,000 a year to Cape Colony. This tax is practically double the previous 5 per cent. income tax, which it supersedes.

The gold output of Rhodesia South reached 55,000 ounces in June and nearly that figure in July. Many of the larger plants are being materially added to.

Commercial Paragraphs

The Chemists' and Surgeons' Supply Company of Montreal have recently supplied McGill University with fifty-five record microscopes for their pathological department.

Conveying and Transmission for August has been received. It is published by the Stephens-Adamson Manufacturing Company, Aurora, Ill. Among other illustrations are some of their "S-A" metal apron conveyors.

Mining and milling interests throughout the country will be interested in knowing that the Boston Consolidated Copper Company's 3,000 ton mill is nearing completion and will go into service at no distant date. Particular interest attaches to this mill by reason of the fact that the Boston Consolidated Company made such exhaustive tests of various types and makes of equipment before deciding upon the installation of Nissen gravity stamps, which they purchased of Fairbanks, Morse & Company. The mill, when completed, will be the largest gravity stamp mill in the world, and is expected to show some very remarkable results.

Fairbanks, Morse & Company, of Denver, recently placed on the market an improved air hammer drill, which they manufacture under the name of Sinclair Drill, H. L. Sinclair being the patentee. This improved drill is an all-steel machine, as are all Sinclair drills, and is equipped with air feed column, being quite similar in construction to the standard Sinclair air hammer drill. It has, however, a drilling capacity which is double that of the standard hammer drill, and has frequently demonstrated an average drilling capacity of 8 inches to 10 inches per minute in the hardest granite obtainable in Denver. The manufacturers report a very strong demand for these machines, and have completed arrangements for largely increased output.

Company Notes

A quarterly dividend of one per cent. has been declared on the common stock of the Dominion Coal Company, Limited, payable October 1st, 1907, to shareholders of record at the closing of the books on September 20th, 1907.

The annual meeting of the Granby Company has been called for October at the New York office, when the reports for the company's fiscal year, ended June 30th last, will be made public. Notwithstanding the great drawbacks of fuel and car shortage last winter and spring, curtailing operations at mines and smelter to a considerable degree, the report is expected to make a favorable showing.

At meetings of subsidiary companies of the Amalgamated Copper Company, in October, dividends of all constituents will be reduced from 40 to 50 per cent. it is expected Amalgamated Copper directors will declare a dividend of about 1 per cent. for the quarter, as compared with 2 per cent. in previous quarter. Anaconda dividend will be \$1 or \$1.25 a share for the quarter, as compared with \$1.75 in the previous quarter. Boston and Montana about two

months ago declared quarterly dividend of \$2 a share and ten dollars extra. Dividends at the meeting next month will probably be 50 per cent. less. These reductions, as is well known, will be due to the demoralized condition of the copper market.

STATISTICS AND RETURNS

The output of the collieries of the Crow's Nest Pass Coal Company for the week ended September 20th was 21,905 tons, or a daily average of 3,651 tons. For the corresponding week of last year the output was 19,586 tons, a daily average of 3,264 tons.

British Columbia ore shipments, week ending September 14th:—

Following were the shipments and smelter receipts in South-eastern British Columbia districts for the past week and year to date:—

Boundary, 33,349, 840,585; Rossland, 3,344, 187,168; Eastern Columbia, 2,932, 97,724; total, 39,625, 1,125,477.

Smelter receipts: Grand Forks, 19,827, 446,933; Greenwood, 5,487, 235,983; Boundary Falls, 6,031, 133,270; Trail, 5,677, 164,769; Northport, 1,489, 67,838; Marysville, 600, 22,600; Nelson, 11,360. Total, 99,111, 1,062,733.

CROW'S NEST OUTPUT.

The output of Crow's Nest Pass Coal Company for the week ended September 13th was 22,962 tons, a daily average of 3,827 tons. For the corresponding week of last year the output was 19,493, a daily average of 3,242 tons.

COBALT ORE SHIPMENTS.

The Temiskaming & Northern Ontario Railway Commission report the following ore shipments from Cobalt for the week ending Saturday, September 14th:—

	Lbs.
Foster Mine .....	62,950
Silver Queen .....	120,000
Buffalo .....	60,00
La Rose .....	43,800
Total .....	286,750

Departmental returns show that the following were the coal exports from the Crow's Nest Pass, which were passed by the custom house at Nelson for the first six months of the current year:—January, 33,290 tons, value, \$76,405; February, 31,955 tons, value, \$63,919; March, 51,905 tons, value, \$105,874; April, 13,934 tons, value, \$27,898; May, 9,276 tons, value, \$19,692; June, 28,236 tons, value, \$56,059.

Coke from Crow's Nest Pass passed by Nelson custom house for export for first six months of the year was:—January, 3,313 tons, value, \$13,333; February, 3,716 tons, value, \$18,258; March, 7,132 tons, value, \$32,519; April, 5,821 tons, value, \$13,407; May, 950 tons, value, \$4,121; June, 3,083 tons, value, \$13,869. July and August returns are not completed. Totals for fiscal year ended June 30, 1907, are:—Coal, 282,598 tons, value, \$590,117; coke, 22,907 tons, value, \$108,398.

Following are the ore shipments and the smelter receipts in Southeastern British Columbia for the week ending September 7th and year to date:—

Shipments—	Week.	Year.
Boundary .....	22,463	807,116
Rossland .....	4,616	183,724
East of Columbia River .....	2,682	90,165
Total .....	29,761	1,081,005



Smelter receipts:—	Week.	Year.
Grand Forks .....	12,549	434,106
Greenwood .....	3,941	230,496
Boundary Falls .....	4,930	120,239
Trail .....	4,848	159,092
Nelson .....	26	11,340
Northport .....	1,694	67,319
Marysville .....	600	21,600
Total .....	28,588	1,044,192

Dominion Coal Company's outputs, 1906 and 1907:—

	1906.	1907.
January .....	231,606	252,248
February .....	225,716	225,988
March .....	310,220	212,831
April .....	296,417	316,384
May .....	323,777	327,269
June .....	325,991	319,560
July .....	318,291	314,559
August .....	331,716	325,930

Dominion Coal Company's output, September 1 to 15:—

No.	Tons.
No. 1 .....	18,360
No. 2 .....	24,330
No. 3 .....	11,540
No. 4 .....	17,770
No. 5 .....	25,950
No. 6 .....	8,300
No. 8 .....	9,030
No. 9 .....	13,200
No. 10 .....	3,730

Total .....

Shipments .....

The shipments of coal by the Nova Scotia Steel & Coal Company compare as follows:—

Shipments August, 1907 .....	81,590
Shipments August, 1906 .....	74,873
Increase August, 1907 .....	6,717
Shipments 8 months, 1907 .....	404,880
Shipments 8 months, 1906 .....	410,598
Decrease 8 months, 1907 .....	5,718

#### COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp, and those from January 1 to date:—

Buffalo—Week ending Sept. 14, ore in pounds, 60,000; since Jan. 1, ore in pounds, 1,738,830.

Foster—Week ending Sept. 14, ore in pounds, 62,950; since Jan. 1, ore in pounds, 319,306.

La Rose—Week ending Sept. 14, ore in pounds, 43,800; since Jan. 1, ore in pounds, 1,102,102.

Silver Queen—Week ending Sept. 14, ore in pounds, 120,000; since Jan. 1, ore in pounds, 772,157.

The total shipments for the week were 286,750 pounds, or 143 tons.

The total shipments since Jan. 1, 1907, are now 17,628,210 pounds, or 8,814 tons. In 1904 the camp produced 158 tons, valued at \$136,217; in 1905, 2,144 tons, valued at \$1,473,196 in 1906, 5,129 tons, valued at \$3,900,000.

#### METAL, ORE AND MINERAL MARKET.

Aluminium No. 1 grade ingots—45 to 47 cents per lb.  
Antimony—9 1-4 to 11 cents per lb.

Arsenic, white—7 1-2 to 7 3-4 cents per lb.  
Barytes, crude—\$11 to \$15 per ton.  
Bismuth, metal—\$1.50 to \$1.75 per lb.  
Cadmium, metal—\$1.35 to \$1.40 per lb.  
Carbons for drills—\$75 to \$85 per carat.  
Carborundum, powdered—8 cents per lb.  
Chromium, metal pure—80 cents per lb.  
Cobalt, f.o.b. Cobalt Ont., unrefined—25 to 40 cents per lb.  
Corundum—7 to 10 cents per lb.  
Feldspar, ground—\$12 per short ton.  
Flourspar, lump—\$10 per short ton.  
Graphite, domestic—\$50 to \$150 per short ton.  
Gypsum, lump—\$4.50 per long ton.  
Infusorial earth, ground—\$15 to \$30 per ton.  
Lead—4.75 cents per lb.  
Manganese, pure metal—75 cents per lb.  
Mica, ground—\$50 to \$80 per ton.  
Mica, scrap—\$10 to \$15 per ton.  
Molybdenum, pure—\$1.70 per lb.  
Molybdenite ore, 90 per cent. pure—\$4.50 to \$5 per unit.  
Nickel, metal—45 to 55 cents per lb.  
Platinum, ordinary metal—\$28.50 per ounce.  
Platinum, scrap—\$23 to \$24.  
Pyrite, 38 to 45 per cent. sulphur, lump ore—10 1-2 to 11 3-4 cents per unit.  
Quicksilver—\$40 to \$41 per 75 lb. flask.  
Sulphur—\$23 per long ton.  
Talc—\$18 to \$25 per ton.  
Tungsten, pure metal—\$1.28 per lb.  
Tungsten ore, 60 per cent. pure—\$9 per unit.  
Tin—37 3-4 cents per lb.

#### MARKET NOTES.

Spelter.—Again the price of spelter has dropped. New York, 5.15 cents per lb.; London, £21. 5s.

Lead.—The American Smelting & Refining Company has reduced the price of lead to 4.75 cents per lb. This price obtains firmly in New York. London, £19 15s. for Spanish lead.

Tin.—The tin market has jumped up and down over a wide range. New York prices are steady at 37 3-4 cents per lb. London, £167 15s. for spot.

Copper.—Copper is unsettled at 15 cents to 16 1-4 cents for lake, 14 3-4 to 15 1-5 cents for electrolytic. Activity is expected in the near future. London, £66 15s. for spot standard.

Silver.—Sept. 5, 68 1-8; Sept. 6, 68 1-2; Sept. 7, 68 1-2; Sept. 9, 68 3-8; Sept. 10, 68 1-8; Sept. 11, 67 3-4; Sept. 12, 68; Sept. 13, 67 3-4; Sept. 14, 67 3-4; Sept. 16, 67 7-8; Sept. 17, 67 5-8; Sept. 18, 67 5-8.

Mexican dollars, 52 1-2 cents; sterling exchange, \$4.854.

Pig Iron.—Pittsburg—Bessemer pig, \$22.90; No. 2 foundry, \$22.25.

Iron Ore.—Bessemer, old range, \$5; Bessemer, Mesabi, \$4.75; non-Bessemer, old range, \$4.30; silicious, non-Bessemer, \$2.50.

Quicksilver—\$40 to \$41 per 75 lb. flask.

#### New Dividends

Nipissing Mines, Limited, have declared the regular quarterly dividend of 3 per cent., payable October 21st. The directors of the Nipissing Mining Company, the operating concern, declared a lump sum divided of \$180,000, payable to the holding company, the Nipissing Mines Company. Nipissing cash and cash assets totalled \$805,000, as compared with \$775,000 on July 1st.

Granby Consolidated has declared its regular quarterly dividend amounting to 3 per cent. on the outstanding capital shares of the company. The dividend is announced as 2 per cent. regular and 1 per cent. extra. As there are 135,000 issued shares of the par value of \$100 each, this dividend, like the last six declarations of the company, amounts to \$405,000. This dividend, No. 8, is payable from the New York offices on September 30th.