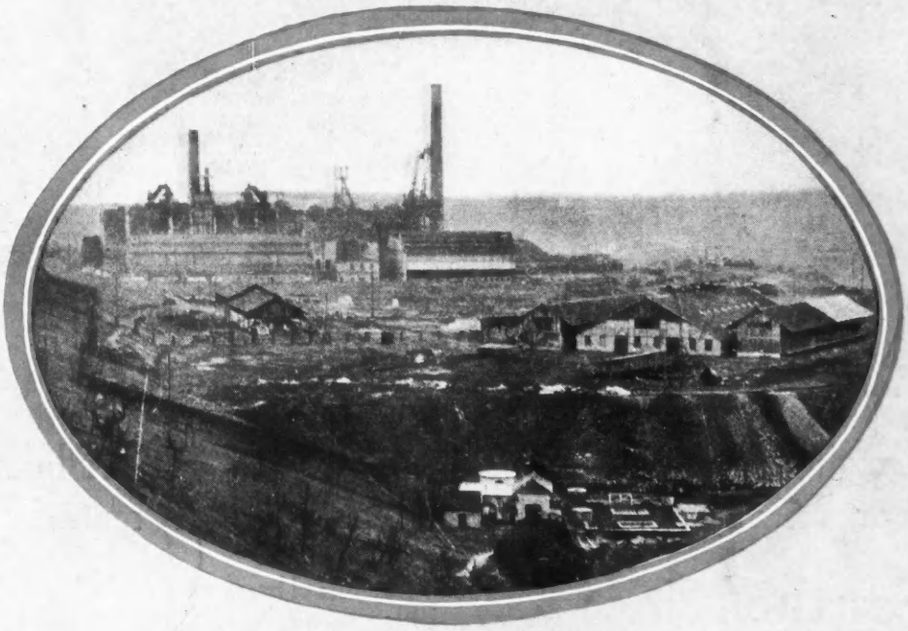
ENGINEERING AND MINING JOURNAL

McGraw-Hill Company, Inc. Price 20 Cents

January 3, 1920



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Volume 109 | New York and San Francisco, January 3, 1920 | Number 1

Bolshevism versus America

Some great things happened in America during December. The deportation of the anarchists on Dec. 21 was noted last week. Of towering importance was the action of the American Federation on Dec. 13, in outlawing bolshevists, I. W. W.'s, and all other enemies of America.

The Federation means business, and we give it our hand on this issue. The Cummins railroad bill, which passed the Senate, retained the anti-strike clause.

In the Old World, among the ignorant, bolshevism is spreading. In Russia the bolshevists' army are driving back their opponents; they are making headway with their propaganda in Asia, and in Bulgaria elections have resulted in favor of the bolshevists. Among primitive millions many listen to the promise of wealth, or bow to the sword and torture of the Russian savage.

But America, the citadel of liberty, law, and order, is awakening.

The Magnesite Tariff Bill

MAGNESITE has two principal uses: as a refractory in metal furnaces, including lead, copper, and steel, which absorbs 90 per cent of the product; and for a cement for flooring and other purposes, which absorbs 10 per cent. For the former purpose it is thoroughly calcined, or "dead-burned," and is used directly (as "grain magnesite) or made up into bricks. For refractory purposes a certain quantity of iron, sufficient to form a cement for the refractory, is desirable, but lime and silica are undesirable; also a crystalline structure is preferred. For flooring, where a pure color is desired, the iron-free white variety (which is non-crystalline or amorphous) is selected.

Prior to the war magnesite for refractory purposes came from Austria, and the industry was originally in the hands of a German-Austrian monopoly or combination. Magnesite for flooring and cement purposes came from Greece. About 1906 the makers of refractories in the United States found it difficult to secure supplies from the German-Austrian combination, which was, however, selling freely to England and elsewhere. To break this monopoly, one of the great American refractory makers—the American Refractories Company, of Pittsburgh—went to the Austrian source, bought mines, and, at a stated cost of $2,000,000, erected a calcining plant, and henceforth imported the calcined ore direct, manufacturing it into bricks at Baltimore. Other refractory makers purchased either through the American Refractories Company, or the German-Austrian syndicate, whose monopoly had thus been broken.

Several years before the outbreak of the Great War, veins of magnesite were discovered in many localities in California, and mining was begun. These were mainly of the pure-white amorphous variety, like that from Greece, used in the cement or flooring industry; but some of it could be and was used for refractory purposes. Its chief market was on the Pacific Coast, but some found its way east. The California magnesite occurs in veins in serpentine rocks, and in many localities.

Early in 1916 there was found in eastern Washington a quite different type of magnesite, occurring in great sedimentary beds, and apparently originally a dolomite altered by magnesian waters. This is of the crystalline variety, and not free from iron; can be mined quarry-wise very easily, and occurs in enormous quantity. Enterprising Western mining men took up the mining and marketing of this magnesite, which was of the same general type as the Austrian, and suitable for refractory purposes.

The outbreak of the Great War, and the shutting off of Austrian supplies, with consequent war prices, gave a tremendous impetus to Western magnesite mining—first in California and then in Washington, as the more newly found deposits got equipped and under way. The California production for 1913 and 1914 was around 10,000 tons each year; rose to 30,000 in 1915, to more than 150,000 tons in 1916, and to over 200,000 tons in 1917; and Washington, which had no production prior to 1916 and barely entered the field in that year, came in suddenly in 1917 with over 100,000 tons. Prior to the discovery and development of the Washington ores, a great deal of Canadian ore was imported for refractory purposes, although not so suitable (on account of higher lime content) as the Austrian or the Washington material. Magnesite suitable for flooring purposes, like that from California and Greece, occurs in Vene-

zuela and Lower California; but was embargoed during the war, on account of the shortage of shipping.

The size and accessibility of the Washington deposits, insuring an abundant supply, led to their being equipped for a large production. The principal operation, that of the Northwest Magnesite Company, has erected its own calcining plant, with a capacity sufficient to provide for the entire refractory consumption of the country. It entered into an arrangement with the largest American refractory company—the Harbison-Walker Refractories Company, of Chester, Pa., whereby the latter was constituted its selling agent. Although the Northwest Magnesite Company has no monopoly of Washington magnesite, and still less of Western magnesite in general, its costs, as stated by itself, are less than those of any Western company whose costs were presented at the House hearings at Washington; and this, together with the fact that it is the only company of large capacity fully equipped for mining, dead-burning, and shipping economically, enables it to produce more cheaply than any other. In general, California and Washington magnesite have thus far been in competition to only a limited extent, as previously explained, the former being used mainly for refractory purposes; but as to costs there will be no comparison, the California vein deposits being at a great disadvantage.

The armistice stopped the progress and the marketing of the Western magnesite ores, as there ensued a cessation of buying, pending developments as to the European situation and the ascertaining of the price of Austrian and Greek magnesite. Imports from Canada had continued (duty free) throughout the war, and, with the cheaper freight rate, had competed successfully with the Pacific Coast material; but, being of inferior quality, could not prevent the rapidly increased sale of the latter. The Western producers, especially those of Washington, were now confronted with the future competition of the Austrian ores, which have the advantage of a cheaper transoceanic freight rate as compared with the long transcontinental haul, for the chief market is on or near the Atlantic seaboard. To offset this advantage, they asked Congress for a protective tariff; and accordingly Bill No. 5218 has passed the House of Representatives. This allows a tariff of one-half a cent a pound ($10 per ton) on the crude magnesite; three-fourths of a cent a pound ($15 a ton) on calcined and dead-burned magnesite (the calcined or caustic-burned material for flooring purposes, and the dead-burned[1] for refractory purposes); and on magnesite brick three-fourths of a cent a pound and 10 per cent ad valorem. At present there is no tariff on the raw or burned material, and 10 per cent ad valorem only on the bricks, to protect the American manufacturer. This tariff, it will be noted, will operate not only against the Austrian sources (which, it is stated, may perhaps now fall within the territory of Jugoslavia or some other friendly republic), but against the Greek, Venezuelan, Lower Californian, and Canadian sources of supply. The tariff first asked for was three-quarters of a cent a pound, or $15 a ton on the crude ore, and one and one-quarter cents, or $25 a ton, on the burnt material; but this was amended in the House to $10 and $15, respectively, on the motion of Mr. Moore, of Pennsylvania. Before the war, Austrian calcined magnesite was delivered on the Atlantic sea board for around $16 a ton. If this pre-war price held, therefore, the tariff would be nearly 100 per cent, and domestic (Washington) producers in competition would have to sell their calcined product at the Eastern points of consumption under $31.00. But pre-war conditions are a thing of the past: they will not return for years, if ever. The only present prices that came out in the testimony before the House hearings were figures of $30 per ton for the Austrian and $50 for the Grecian material, so that the Washington producer must, under the proposed tariff, sell his product at around $45 to compete, and the California his product at around $60. What the future will bring forth none can tell.

What can our Western producers sell for? The freight rate from the mine to the Atlantic seaboard is around $16. The direct operating costs of the Northwest Magnesite Company are stated at $16.50. This apparently is higher than it should be; it includes a mining charge per ton of burnt magnesite of $6.16, which works back to a charge of $2.68 per ton of crude ore. A glance at our photo of a working face of this mine or quarry in our issue of Oct. 11 (p. 604) will show that the mining cost of this material should be lower, and even that the 75c. a ton claimed by an official of the U. S. Smelting, Refining & Mining Co. at the House hearing (p. 158) to have been the original estimate, might some day be realized. Also, the treatment or calcining charge is stated at $9.41. The manager, if the transcript of the hearings is correct (p. 130), states that the cost of calcining (dead-burning) in the East is $5; and the West should be able, apparently, therefore, to reduce the before-mentioned costs.

In California, the Porterville Company reported to the hearings a crushing and calcining cost of $6.38; the Tulare Mining Company of $4.99; the Western Magnesite Company of $8.61; and the Whiterock of $7.29. But, taking the stated direct cost of $16.50, and adding freight, a minimum rock-bottom basis for sale price of $32.50 is established; and enough more must be obtained to pay general charges. The total cost, including depreciation, is given at $19.94. Depletion, which is also figured in, we may omit: it is proper for tax purposes, but not for operating costs. With freight the total cost in the East would be about $36,[2] or $6 more than the imported Austrian article. The California producers of caustic-burned white amorphous magnesite ap-

[1]Caustic-burned magnesite is burned to the point where it contains 3 to 4 per cent carbon dioxide; dead-burned, as the name indicates, is burnt till the carbon dioxide is entirely eliminated.

[2]The present quotation for magnesite of $32.50 a ton, at Chester, Pa., (Harbison-Walker Company) shows that the stated costs are indeed too high.

parently could undersell the $50 a ton quoted for the Grecian magnesite.

For the American producers of magnesite for refractory purposes to compete with the Austrian material on the Atlantic sea board, a tariff is therefore apparently necessary; even if the cost in Austria and Washington were identical, the difference in freight to the point of consumption would constitute an unsurmountable obstacle to the domestic producers. Without a tariff, the Western producers could still hold the Western market, amounting to roughly 10 per cent of the domestic production. According to the report of the Tariff Commission, before the war, the line of equal price establishing the respective territories of the Grecian and Californian article, was invariably west of the Mississippi.

With the proposed tariff, Austrian magnesite, at its assumed present quotation of $30, would be advanced to $45, which would allow the domestic producer (the Northwest Magnesite Company) to compete successfully with an indicated profit of, say, $8 to $9 a ton, or around 50 per cent on the operating cost. For points west of the Atlantic sea board, of course, this profit would be greatly increased.

This statement applies to the Northwest Magnesite Company, which can produce more cheaply than any of the rest, as stated by its manager in a letter submitted at the hearings (p. 110). In this letter he states that the California producers cannot make dead-burned magnesite and will not be in competition with the Washington product, a conclusion which was also positively stated by officials of the American Refractories Company. As regards the Washington industry, only one competing organization appeared (the American Mineral Production Company.) In the operation of this company it is necessary to sort the ore. The company has no calcining plant, and its total costs are very high, amounting in 1918 to $39.24, with no depreciation or depletion. These costs include a charge for mining, $28.19 per ton of calcines, which compared with the stated Northwest Magnesite Company's figure of $6.16 per ton, shows the unlikelihood of competition. With freight, the product of the American Minerals Company would cost $55—in the East a prohibitive figure, even with the tariff.

California magnesite, as we have seen above, and as stated elsewhere (as by Mr. Phalen, of the Bureau of Mines[3]), is not, on the whole, competitive as regards quality for refractory uses. The costs for some of the California mines (as submitted to the House Committee) are given as follows: Porterville Magnesite Company, $27.43 (no depletion); Tulare Mining Company, $23.91 (no depletion or depreciation); Western Magnesite & Development Company, $24.16 (no depletion or depreciation); and White Rock mine, $27.48 (no depletion). The costs plus freight to the East would vary from $40 to around $43.50; and in the East they could be undersold by the Northwestern company which would, in any event, find itself compelled to do this should the price of Austrian magnesite drop to anywhere near the pre-war figure of $16.25. Even with a drop from the nominal price of $30 for Austrian magnesite, quoted in the hearings, to $25, all producers, except the Northwestern company, whose costs were presented at the House Committee hearing, would be out of the Atlantic Seaboard market, while the Northwestern company could still sell. As a matter of fact, at the present time there is no Austrian magnesite on the market, and the price of domestic magnesite remains fixed at $32.50 per ton f.o.b. Chewelah, Wash., the shipping station of the Northwestern company.

In short, it appears that there is some foundation in the statements of opponents of the tariff at the hearings, that the Northwest company is so placed that it is essentially a natural monopoly, in that it can undersell competitors, and so control, under the tariff, the whole refractory business; and that it is prepared to do exactly this is shown not only by the statements of its manager, cited above, but by the equipment with a plant having a capacity practically equal to the entire American consumption[4]. This natural advantage is no fault of the owners or management, who are to be congratulated on possessing such a property.

In the matter of magnesite ore used for purposes other than refractories, the California product is of better quality, although experiments are being made with the Washington material with a view of using it for this purpose also; but for uses where a pure-white material is necessary, there should be some market for those California producers whose costs are low enough to allow them to compete with the foreign article.

Before the war, as stated by the report of the Tariff Commission to the House Committee, the difference in costs between the European and American magnesite was such, and ocean rates were so low, that the former was delivered at the Atlantic seaboard at approximately the same price that Western magnesite could be delivered at the Pacific Coast. As Atlantic freight rates were exceedingly low, this did not indicate a very great difference in costs at the mines. For the Western product to compete in the East, therefore, a tariff equal to the freight would have to be imposed, in order to give an "even break"; and this is practically what is actually proposed by the House ($15). The flooring manufacturers (who are opposed to the tariff) are nevertheless on record as stating that a tariff of $10 would give an "even break" with the Grecian.

The advisability of the proposed tariff is a delicate question, but we are disposed to favor it. Against it is the tax of, say $2,000,000 per annum distributed to the ultimate consumer, increasing by its mite the cost of living; the present necessity, due to the world's financial condition, of importing whatever we can from Europe, so as to restore credit and ex-

[3]"Some of the California product contains naturally a small per cent of iron oxide, and this iron-bearing magnesite was used for refractory purposes during the war, but under normal conditions neither Californian nor Grecian magnesite has been used for refractory purposes to any considerable extent." (P. 216 of hearings.)

[4]Statement of producers, p. 21 of House committee hearings.

change, and establish our now inactive European markets for copper, lead, phosphate rock, and our other mineral products; and the loss of the desirable commercial intercourse with Canada and Venezuela. In its favor is the important argument of the establishment of a competitive American industry which should eventually bring about lower costs and be able to operate under a lower tariff than the high one suggested. The tariff proposed would give those who cared the opportunity of purchasing foreign magnesite, perhaps at a somewhat higher but not prohibitive price. The balance of evidence among consumers presented at the hearings favored the foreign products as regards quality; but it is doubtful whether this may not be taken in part as the usual prejudice in favor of a known and standardized metal.

In the hearings the situation was clear that the contest was largely between two chiefly interested parties or groups—the Northwest Magnesite Company, with a working arrangement with the Harbison-Walker Company, and the American Refractories Company, with its Austrian mines and calcining plant; and some (but not all, we are glad to say) of the witnesses on both sides were disposed to put value on sentimental arguments: the one side claiming reward for its patriotism in establishing an American industry which proved opportune during the war; the other for breaking a Teutonic monopoly before the war. Both are good examples of American enterprise, but both were, very properly, established purely for sound and private business reasons. The tariff transfers the advantageous position previously occupied by the American Refractories Company, by virtue of that company's Austrian mines, to the Harbison-Walker Company; and on this account the American Refractories Company strongly opposed it.

The principle of conservation of minerals and metals to which we alluded in a recent editorial has not, we believe, any application here; for the Washington reserves are large, those actually exposed being sufficient for twenty-five or thirty years. Moreover, there is a substitute for magnesite in the form of dolomite, of which, in 1917, approximately 680,000 tons was used, making 340,000 tons of the burned product; and the supplies of this are inexhaustible. Washington reserves of magnesite are not equal, however, to those of Austria; nor those of California to Greece: the reserves of Austria, according to the Geological Survey, being sixteen times those of Washington, and those of Greece seven times those of California.

New Year Resolutions

WHAT would life be without the clean page, the fresh reborn morning, the New Year? Just as the devotee welcomes the Sabbath, when he may slip off his sins, and start out lightened and courageous, so it is given to mankind to come to the knees of Mother Nature and Father Time, receive forgiveness, and pledge better behavior with the New Year. "The Journal" welcomes the opportunity, even though, like other New Year votarists, it reserves the privilege of breaking over.

It resolves to be original—not to edit with shears and paste-pot (excipio excipiendis—as one of Scott's pedantic Scotch characters always qualifies—"I except that which must be expected"). We have a considerable staff—the list of editors we publish at the head of this page is not camouflage, but bona-fide, hard-working individuals with a record; and we have the ability of the whole mining industry at our command. If we decide on a shears-and-paste policy, you will know it by the disappearance of our staff; one good two-fisted clipper, with a couple of stenographers and a messenger boy, could on that system get out a "Journal" which would fool some of the people some of the time; and the economy would enable us to offset the high cost of living; but we do not think you want the same stuff which you see in the Transactions of the Institute, in the bank circulars, or New York newspapers dished up cold to you in "The Journal." The authors like it, but you do not.

It resolves to be independent, broad, and tolerant, definite and courageous, and to wear no man's livery; but to love and serve equitably the whole of the complex and noble industry which it has the ambition to reflect and advance. It resolves to be conservative, and not to try to pull down a poor structure unless at the same time it starts a better one. It loves popularity and thrives on support, but humbly requests its clear-sightedness and amiable friends to kick it hard for its soul's good. If it cannot please you because it cannot approve of the means necessary to do so, it prays for backbone enough to tell you to go where you belong.

Conscious, though with humility, of its past sturdy journalistic record, it will try to shed renown on its future also, and prove itself worthy of the elevated traditions which it has had written on its pages by Rothwell, Raymond, Rickard and Ingalls.

It has had its troubles recently, and is still in trouble, as the congestion in its New York home is such that the definite date for its return is not yet set. It loves and tries to win the favor of San Francisco; but New York is the mining center of the Western Hemisphere and competes with London for that of the world. It wants to go home; and being edited from New York and published in San Francisco is a stunt. In spite of that, it resolves to be a little better every week, even though living in a trunk.

For one thing, it has always been a weekly newspaper of the mining industry, but has acted as if ashamed of it. It now proclaims it frankly, and will try to live up to the responsibility. Barring mechanical difficulties (excipio excipiendis) it will try to be up to date. It will spend all the money necessary in telegraphing news rather than camouflaging or publishing ancient history. The markets and certain other elements of this issue have been telegraphed from New York. Our correspondents have been instructed to use the telegraph.

"The Journal" will not be shackled by precedent. "It is the custom" as a conclusive argument is heard most freely in the most backward countries. In Turkey and Mexico "Adet dir" or "Es costumbre" settles everything. Let us respect the past, but remember on that basis evolution would have been impossible, and we would now be frogs in the mud, or less.

The list of good resolutions is long, like all New Years lists; and "The Journal" will not confess further.

Did you suspect that "The Journal" was a personality, capable of being drawn, like Uncle Sam or Father Knickerbocker? That personality will determine its character; it will sit for a portrait when an artist can be found. It has never seen its picture or a clear reflection, but it hopes that the artist will make it a lithe smooth-limbed pioneer—a mining engineer—miner's boots, Stetson hat, belt, flannel shirt—no gun, but the good-humored twinkle in the eye that derides obstacles.

The Importance of Manitoba

A WRITER in a Winnipeg newspaper recently called Manitoba "the Cinderella of the Canadian sisterhood" in alluding to the manner in which the province has been slighted by the Dominion Geological Survey. To strengthen the case against Ottawa, he accused the Survey of duplicating work of the provincial authorities in Ontario and British Columbia. However just the accusation may be, for we do not presume to sit in judgment, it is certain that Manitoba is deserving of more attention from the mining world, and recent events lead one to think that the province is going to get it.

Contrary to newspaper reports, we are informed that at present things are very quiet in the northern part of the province. Developments of note are pending, however. The important properties of the region are the Flin Flon on Flin Flon Lake and the Mandy mine at Schist Lake near by, both being close to the Saskatchewan boundary. Recent reports of discoveries of gold at Copper Lake, situated further east, attracted much attention, but the importance of these has not been confirmed.

The Flin Flon low-grade copper deposit is by far the greatest in the province and one of the largest on the continent. Extensive diamond drilling has shown it to contain about 20,000,000 tons of ore running 1.7 per cent copper, [illegible] and $1.40 gold. The ore also carries zinc. Hayden, Stone and Co. have held an option on this property until this month, and the privilege will probably be extended in order to permit them to do some sinking. The property cannot be worked, however, unless a railroad be built. The construction of such a road, 100 miles long or more, it is said, will be undertaken by the Canadian Northern Ry. or by the Provincial government if the erection of a smeltery is guaranteed.

The Mandy mine, owned by the Tonopah Extension Mining Co., has been shipping high-grade copper ore. Construction of the proposed road will permit the working of the lower-grade portion of its deposit, if a satisfactory process for the separation of the zinc blende from the chalcopyrite is found, until which time the mine has been closed down. Other copper showings are being prospected in the Athapapuskow Lake district. In the Herb Lake section, where the first gold was found, the Rex and Northern Manitoba prospects, which were shut down by labor trouble about a year ago, are prepared to resume work. Various mineral occurrences in other sections have been scarcely prospected as yet.

Most of the prospecting in this region has been done during the last five years, at a time when prospecting was everywhere necessarily curtailed. Now that men and money are available for such work, much may be expected from northern Manitoba, especially with the advent of the railroad as well as companies prepared to undertake systematic exploration on a large scale.

Congressional Attack on the Copper Producers

IN our Washington news this week we give an account of the attack by the Graham Committee on Military Affairs, on the copper producers of the United States, charging them with excessive profiteering, by means of their strong business organization and their intimate relations with the Government. This charge is vigorously defended by various members.

The Congressional debate is plainly a political one, the Republicans making the profiteering charges and the Democrats denying them. Frankness compels us to say that neither party, although doing the best it can, is really expert on the subject.

This is the first time, to our knowledge, that the conduct of the copper producers during the war has been esteemed anything but helpful and patriotic. When criticism arises which is hasty or engendered by political motives, the remedy is to turn on the searchlight and show the facts. We have accordingly asked Walter Douglas, president of the Phelps Dodge Corporation, to write an article refreshing our memory with the circumstances, in order that these may have a wider publicity; and this article we will publish in the Jan. 10 issue.

Our Own Face

WITH this number we inaugurate a new policy concerning the front cover. The present cover, and we hope, all future covers, will be intended to reflect the character and individuality of "The Journal." A front page is like the countenance of an individual, like the show-window of his shop. Busy people like a good look at one or the other, and form swift conclusions as to whether or no they desire further acquaintance.

It is costing us a substantial sum to buy our front cover for the "Engineering and Mining Journal," instead of letting someone else buy it; but we propose, in addition to showing our own face, to spend more money, and make that face as clean and clear

WHAT OTHERS THINK

The Tungsten Industry

Of late I have had an opportunity of discussing with Western producers, American consumers, importers, bankers and others, the present situation in which the tungsten industry finds itself, and I took occasion to submit my observation in the form of a letter to one or two of those especially interested, who have strongly advised me to give this letter the widest publicity. I find that the situation cannot be more serious than it is at this writing. I do not like to be too pessimistic, yet it would appear that we will have to do some quick thinking and acting if we want to save the situation.

It is probably fully realized that I have at no time made any bones about my feeling on the fundamental question of having a tariff on raw materials. I do not believe in it, and would very much rather see free trade on ore and metals. The many conversations, however, that I have had, combined with the full reports that have reached us by letter and cable from Europe, are such that I feel it is most urgent to bring the seriousness of the situation before the American tungsten industry. From an entirely American point of view, I believe that the industry is up against a fight for its life. Everything seems to combine at this moment to impede a revival of the trade, which appears to be sliding back all the time, and though at this moment only the mines of the United States have been put out of business, I can foresee the closing down of the tungsten converter and ultimately of the tungsten steel industry unless steps for protection are taken actively and immediately.

It is no longer a question alone of the Chinese ore. It is true that the abundance of the Chinese ore was the first cause of giving the industry a serious shock. Now, however, in addition to the continuance of a comparatively heavy production in China (this, of course, is partly affected by the stoppage of production in other quarters), the depreciation of currency in Europe adds to the difficulty of our trade. Assuming that England, France, and Germany, buy in the primary market, say in China, Bolivia, or elsewhere, all on the same level, and that freight to the home port is identical, the price, so long as it is figured in so many grams of gold, would be naturally equal in all four countries, and so it undoubtedly is until a sale is started; then, though the English pound in gold is $4.85, the pound is not dealt in in gold, but in exchange, in these days, and the heavy depreciation that has taken place in the foreign currency places the English seller in advantage at this writing 20 per cent over the American. With France the depreciation is even bigger, and the biggest of all is the depreciation in Germany. The Germans can at this instance buy Chinese wolframite at £32 6s. per unit a long ton c.i.f. Rotterdam. Though her wages for labor and general costs have gone up, they have not increased in anything like the proportion of the depreciation. The laborer is still paid in marks, rent and general cost are paid in marks, and the finished product can be shipped here even cheaper than the British or French product when all three of them buy on the same basis of £32 6s. c.i.f. European port.

Now, £32 6s. per long ton is at the present rate of exchange only $5.85 per unit of short ton, a price which at no time has been possible for this country, as the rate of exchange between Europe and China and this country and China is to the advantage of Europe. In addition, freight is more advantageous to Europe than here. We thus find ourselves in a position of having to fight for our very life on ferrotungsten, tungsten powder, and even steel, and no tariff, unless it takes the rate of exchange situation into consideration, will remedy these ills. In proof of the contention made above, I should say that I have had word from France, England, and Germany, bearing out my statement, but I believe that aside from the information received by word or letter, the actual fact of every steamer arriving from Europe bringing ferrotungsten and tungsten steel would be sufficient proof of what I have contended.

In addition, I have been assured by the chairman of one of the large English steel corporations, and I have checked up independently, that this company bought within the last six weeks approximately 1,500 tons of tungsten ore at around 30s. a unit, or, at today's rate of exchange, $5.85 per unit a long ton c.i.f. Liverpool, a price which is almost $2 a unit below the price quoted here.

I am reliably informed that this corporation, which was formed by the thirty biggest steel makers in Great Britain, which have a combined capital of £387,000,000, or approximately $1,500,000,000, is out to capture the quality steel business of the world. As long as the American manufacturers attempt to run up against this foreign situation single handed and independently, I cannot but see the gradual stoppage of the tungsten-converting business, to be followed by inroads into the steel-alloy business later on.

I have written very fully, as I am under the impression that a large proportion of the trade here, which never has done international business, sees this serious situation in the same way that it appears to me. I may be too gloomy, and I do hope my fears are exaggerated or unjustified. This letter is written mainly with a view to elicit the opinion of those interested, as perhaps by discussion and cooperation something might be done to avert what looks to me an inevitable disruption of the industry.

When it is considered that, from what I hear, most of the houses converting tungsten during the war have either actually shut down or curtailed their

business to the narrowest limits, and that others who have been in the trade are really and seriously considering whether their energy had not better be directed to other purposes before it is too late, I think it is time that something is done, and I do hope that this letter will be brought to the notice of others interested in the industry and that efforts will be made to ascertain whether some kind of an arrangement cannot be entered into whereby the industry as a whole may form an association for the protection of its interests, for gathering of statistics, and, if possible, even for the purpose of sending a party to Europe to study the conditions over there, in order that we may know what we have to fight.

Of course, the exchange situation does not affect tungsten alone—it affects all of the industries; but it seems to hit the tungsten industry harder, on account of the heavy stocks in this country.

It is desirable to have the views and suggestions of those concerned at the earliest opportunity, as to how the trade can co-operate to alleviate these conditions, and these suggestions are submitted to the trade as a whole, with a view to enlisting co-operation of all sections of the country.

Charles Hardy.

New York, N. Y., Dec. 17, 1919.

China Awaits American Capital to Develop Its Resources

There are a great many good prospects not far in the interior of China, but satisfactory means of communication and capital for development are lacking. Chinese capitalists are rather backward in investing in mines. Therefore, I hope that some of the American mining investors will consider putting some of their money in properties in China.

Americans possess the advantage of being sincere friends to China, so I strongly believe that we Chinese prefer American capital to develop our resources over that of any other country. Prominent Chinese realize that the development of China's resources is of no small importance to our nation's vitality. The present offers great opportunities for American capitalists. There is a bit of international complicacy about investing in China by residents of foreign countries, but I believe we can get around that.

A. K. Cham.

Hong Kong, China, Nov. 17, 1919.

Final Solution of Labor Difficulties

Over two years ago appeared in the "Journal" an article discussing the increasing labor unrest and asking for an expression from other readers as to the reason for this and suggestions for the solutions. At that time we were being told on all sides that the only solutions were to increase the wages, reduce the working hours, and generally recognize the working man's rights. I answered this with an article which the "Journal" printed under title of "Against Temporizing With the Saloons." The title was not quite representative of the article, for only one contributing feature of the social unrest was that the saloon was a breeding place of socialistic and anarchistic doctrines. The essence of the article was that so long as we permit false propaganda to be taught, and do not counteract it by propaganda of the other sort, so long will this social unrest continue to grow. I claimed that as soon as the nations of the world had finished their war of national squabbling, would come the real test of what the socialists term "Capital Against Labor," but which I prefer to term Organized Labor Against the Public.

The battle is on. The public is getting pounded on the head by strikes and increases of wages for all branches of organized labor, until it must sit up and take notice, willingly or not. We are coming to open our eyes to a different line of suggestions for the solution of this labor unrest. Periodicals are no longer afraid to publish articles which they would have been afraid to print two years or more ago. The "Journal" hits the nail on the head in its Oct. 4 issue in its article entitled "The Need of Propaganda Among the Uneducated." Here it says, in better language than I could command, what I tried to say two years and more ago. We must fight Nihilism with propaganda, and we are now whipping it with this. We must continue to use the whip until it is driven out as a dangerous element from society. They who need this education are not the strikers. They would be foolish, under existing conditions, not to strike. The wonder is that they have not used this weapon more than they have. Those to blame for all these strikes are the indifferent, short-sighted public, which temporizes with this sort of thing.

No one blames the knights and princelings and chiefs of less civilized times for organizing a following, and using it for their own advantage and the advantage of their following. This practice culminated with the Great War and the League of Nations, but no sooner has this form of organized exploitation been destroyed through its own perfection than we find ourselves harassed by another form of organized looting. During the past two years we have made strides in coming to appreciate the true situation into which we have allowed ourselves to be carried, through our own indifference. Next we pass through a period of action. We must get away entirely from our popular conceptions of the "Rights of Labor" of the past, which so many periodicals have been proclaiming to their readers.

As a working man who has worked as miner in mines throughout North America, as well as a machinist and electrician in Eastern factories, and able to number scores of other working men as my good friends, I feel justified for speaking as with authority on this matter.

No one today dares to say that laboring men have no right to organize and to strike. The strike is considered their sacred right, just as long ago every knight was supposed to have his armor and retinue with which to maintain his "rights," and as the nations of the world yesterday all had huge military equipments to maintain their "rights." Strikes must continue so long as they are allowed, or at least so

long as it is easier to gain that way than by steady work. Some day we shall come to recognize that any strike is a criminal conspiracy against the public, and will be treated as a form of revolution; a conspiracy, as was made criminal by our Sherman Act. If this act had been allowed to stand as it was enacted, that would have been the solution of the strike. We were not ready for such drastic action then, so now we must be educated up to it.

Everyone will ask how labor's just rights are to be protected if the right to strike is denied organized labor. The answer is that if a man is not being treated right he can quit his job and go elsewhere, but two or more employees cannot conspire to injure their employer's business by leaving simultaneously. This is protection enough, and all the protection he is entitled to, in fairness to the public. It is the rock-bottom condition which we must get back to before economic conditions can become stable. So long as strikes are tolerated it will be a profitable business to combine and conspire to force the public to favor the organized class as against the rest. So long as we rely on arbitration and such methods, we are up in the air and there must be everlasting discontent and discord. Only when we finally get back to the old-fashioned law of supply and demand for labor, as well as for other commodities, shall we be on a firm foundation, and the sailing will be clear.

The employer who does not treat his employees well will lose them. Not immediately, but by degrees. New labor will not come to him, and gradually the old hands will drop off, or he will get only a poorer class, and the better men will go where conditions are better. During the past few generations the farm has not been in a position to treat its employees as well as the city, so the enterprising sons have migrated to the city. This is partly due to the farmers not being able to organize and force better prices from the public. With natural conditions restored, and the strike made a criminal feature, the farm and the small independent man will come back to their own. All will have an equal chance. Merit will be rewarded for what it is worth. Incentive will be given to action. The working man who wants to get ahead will not be held back by the less enterprising comrades. The price of living will be reduced by reduced cost of production.

If we do not like strikes and the high costs of the products of organized labor, and if we are not satisfied with this sort of unrest, then let us take notice whom we vote for at the next election. Organized labor looks scrutinizingly at the candidates. Must every candidate for election coddle to the "Laboring Man" and his "Rights" to be elected? Yes, so long as the public is indifferent.

Arthur O. Christensen.

Beaufort, S. C., Dec. 1, 1919.

Mechanical Excavator Wanted for Gravel Containing Boulders

Will you kindly ask your subscribers through your paper if they can tell of a mechanical method of breaking out a lime or other gravel which is 25 to 50 per cent stones and boulders up to 2 or 300 lb. and is fairly hard picking? A steam navvy would be all right if the ground was soft, but it is too hard for it, and the boulders would block it. The ground is too soft to drill, as when the operator hits a stone it will turn.

There is a good opening in this country for 7-lb. double-ended picks and handles; light shovels (split handle); one-piece buckets for carrying gravel and shaft work, light and strong; sieves of all sizes and wire mesh up to ¾ in.; light cranes, oil power and hand power; piping up to 2½ in. drill steel and sheet iron and galvanized iron roofing. This is on diamond diggings alone, and the mines require all sorts of mining material. The Japs are getting a good trade here.

W. H. Williams.

Waldecke Plant, via Kimberley, South Africa, Sept. 8, 1919.

Mexican Issue Must Not Be Sidetracked

The contents of your letter addressed to Mr. Perez Castro have given us great pleasure as we see in your statement given therein the security that you will treat in your paper all questions related to our country with impartiality and justice.

It is our personal opinion that scientific papers should not touch political questions, and this rule has really been followed in all publications of such character in Mexico; more so since facts have proved that the political troubles in Mexico have only very slightly and during very short periods affected the mining companies.

It would be very desirable that the managers of the mining companies, which have been working nearly without interruption during the last nine years in Mexico, should declare honestly whether their companies have suffered serious losses caused by our revolutions; but, anyhow, we respect your opinion of treating political questions in your paper.

We agree with you in that the North American people in general bear no illwill toward Mexico and wish to return this proof of cordiality by impressing upon the minds of our neighbors the conviction that however difficult our interior situation may be, our condition is improving notoriously day by day, and is much better now than it was a year ago, and that the difficulties which we are trying to settle are of such character that it is impossible that the will or power of one man or group of men solve them definitely in a short time, as they are caused by transcendental questions.

Hoping that we will soon have a new opportunity of writing to you and giving you more concrete data about the situation of our country which you might wish to know, we remain,

L. Perez Castro, Mem. Am. Soc. C. E., P. O. Box 1394, Mexico City.

J. Vasquez Schiaffino, C. E., P. O. Box 1204, Mexico City.

S. Sulguis, M. E., El Oro 11, Mexico City.

Mexico City, Oct. 30, 1919.

By The Way

Bunker Hill Shaft Unsafe

We read the above headline with great dismay in a recent edition of the "New York Sun." Surely, we thought, some sudden movement of ground must have occurred to frighten even the New York press concerning the engineering of a great and well-operated mine. "Engineers say"—went on the news item—yes-yes-go on—you interest me strangely—"the monument must be reconstructed and rebuilt"—what has the claim monument to do with the shaft? Read on—"The approach to the monument is a disgrace to the states" Hey? But hold—we missed the first inconspicuous line, "Bunker Hill Monument is falling apart." The dispatch came from Boston.

Oil Fields and Pullman Cars

The relation between pullman cars and oil fields is usually limited only to the accommodation the cars afford oil operators, promoters, stockholders and "suckers" in traveling to and from their properties. It seems now, however, that there may be a much closer connection if the plans of the associated chambers of commerce of the North Texas oil-field towns are carried out. The crowded condition of the towns, due to frequent booms and the immense amount of operations being conducted, is well known to all who have had to visit these towns. To relieve this condition, the Pullman Company was requested to send in the cars that were taken off the regular runs during the coal shortage, and permit their use as rooming houses. Whether or not this will be carried out before the resumption of the regular train schedules at the end of the coal strike is a question.

Names and Claims

"Modesty of nomenclature is not a prominent feature in the mines," wrote Mark Twain. But if extravagance once ran riot in the naming of newly staked claims a reason can readily be found for it in the exuberance and optimism of the locator, for no prospector was ever a pessimist. But the names of mining properties are often more fantastic than extravagant. Here royalty is most popular. One notes the Copper Queen, the Chloride Queen, and the Indian Queen, and as for kings there are more of them in American camps than in all of Europe. As one glances over the "Mines Handbook" almost anything, it seems, will serve for christening a claim. The same may be said of oil companies. "A good name is more to be valued than fine gold," quoth Solomon, and all good business men will agree. The name of a successful firm is a valuable asset. Occasionally a fledgling attempts to do business on the strength of its hitherto unheard-of name. Thus the Money Oil Co. of Temple, Tex., advertises, "Shares are now $10 each. Liberty bonds taken at face value. A single share may be worth $200 in less than six months. One thousand dollars that was invested in the Texas Company fifteen years ago is now $60,000, besides handsome dividends paid in the meantime. We expect to do better in much less time because we are already the Money Oil Co. of Temple, Tex."

War Over Core Drilling

A recent controversy between stock brokers as to diamond drilling and its proper field and results enlivened the columns of the "Boston Post" this fall. The cause and result of this strife are not known to us. The parties involved were certain brokers dealing in Hecla Divide stock and a mysterious "mining expert," who took for his text "The Fallacy of Core Drilling." Announcing the receipt of assay results showing free gold discovered in core drilling on the Hecla Divide property, where only silver was expected, the brokerage house of John E. Allen advertised as follows:

> The news is so good it is beyond our predictions and expectations. The unexpected find of fine free gold showing in the core, 10 feet below silver values—the approach of the drill to what is believed to be an intersection of veins—the tendency of the drill to prove up an important extension of the proven mineralized area of Divide—they show beyond all question the value of the core drill in the Divide formation.

Excerpts from the "mining expert's" statements run thus:

> Boring from underground points by diamond drills is done in many mines in search for parallel known orebodies, or to locate the walls of known wide orebodies, but I do not consider it practical to core-drill with no given point or object in view.
>
> I have followed with a great deal of interest the drilling on Chino property and this, as everyone knows, who has followed mining, is a so-called sugar bowl formaion. Over a million dollars was spent drilling Chino but not one cent would have been spent drilling Chino unless it was to prove out the extent of known orebodies.
>
> The promoter always chooses the lines of least resistance, and in the past and in the present, it is the most natural thing for anyone promoting a company, who is using core drilling to announce that they have struck ore. I do not wish to deal in personalities; I did not nor do not intend to, but it seems to me that a certain promoter, financing some core drilling has found ore pretty quickly in an unproven field in their first drill hole after my articles started.

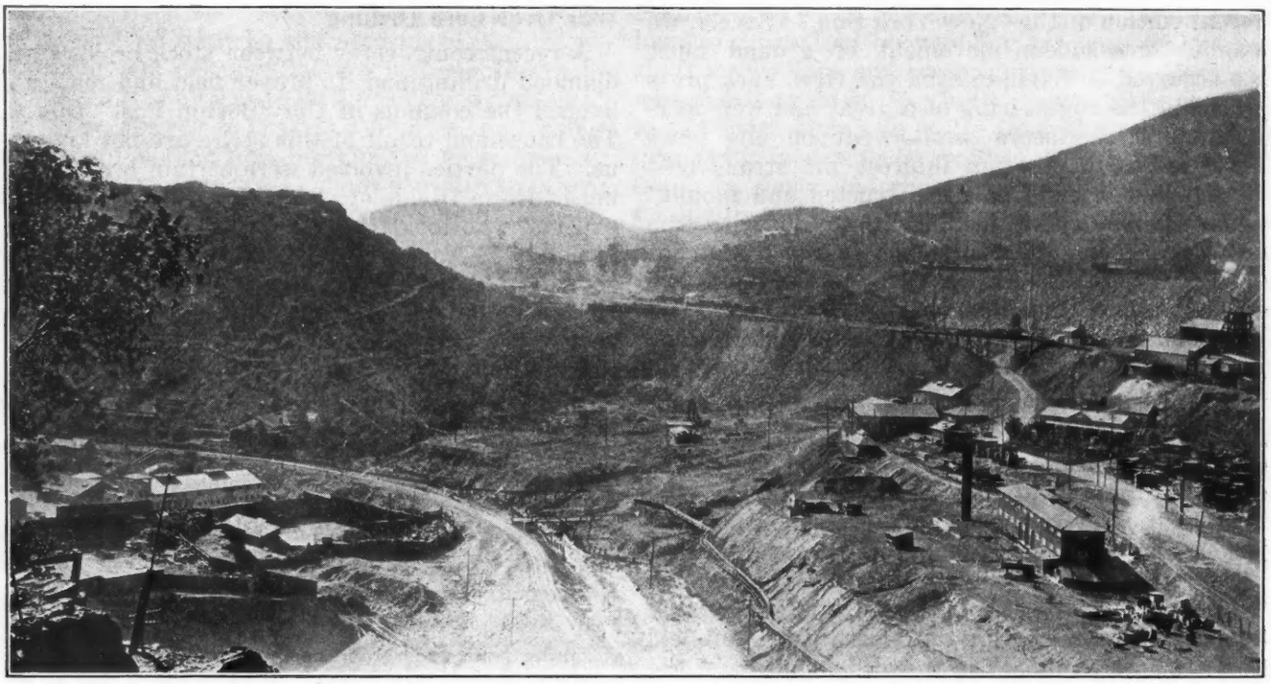
Another broker entered the controversy with the following:

> We can say confidently the core drilling treatises which have been running in these columns are the advertisements of Thomas W. Lawson.

The allegation as to this identification was neither admitted nor denied. Our attention was called to this debate, which continued for some time, by a prominent machinery house, who said in their letter:

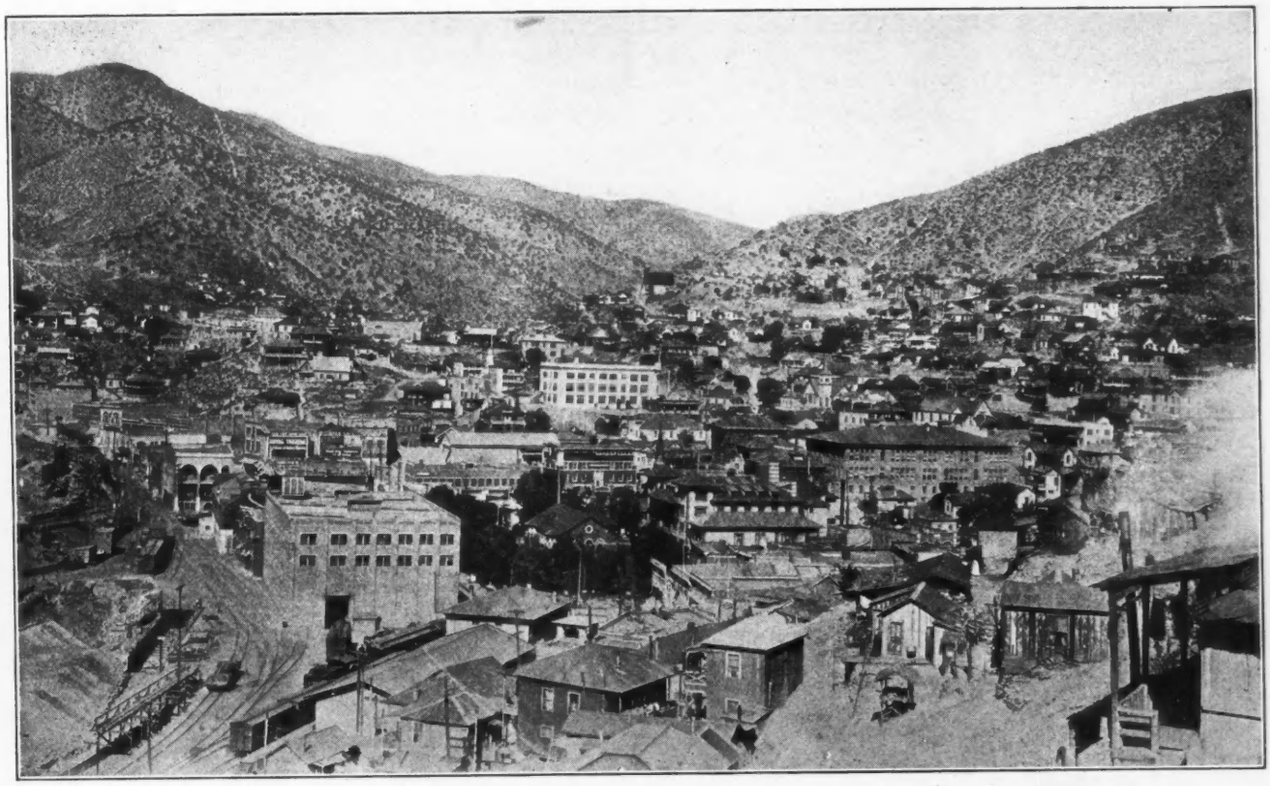
> We all know that the Devil can quote scripture for his own purposes, and that stock brokers can pervert legitimate mining methods to defraud investors. On the other hand, the assumption of "mining expert" that the diamond drill is never used to prospect for "unknown orebodies," is a trifle unwarranted, considering the many millions of dollars that have been spent in developing new districts with the diamond drill.

Arizona Mining Camps

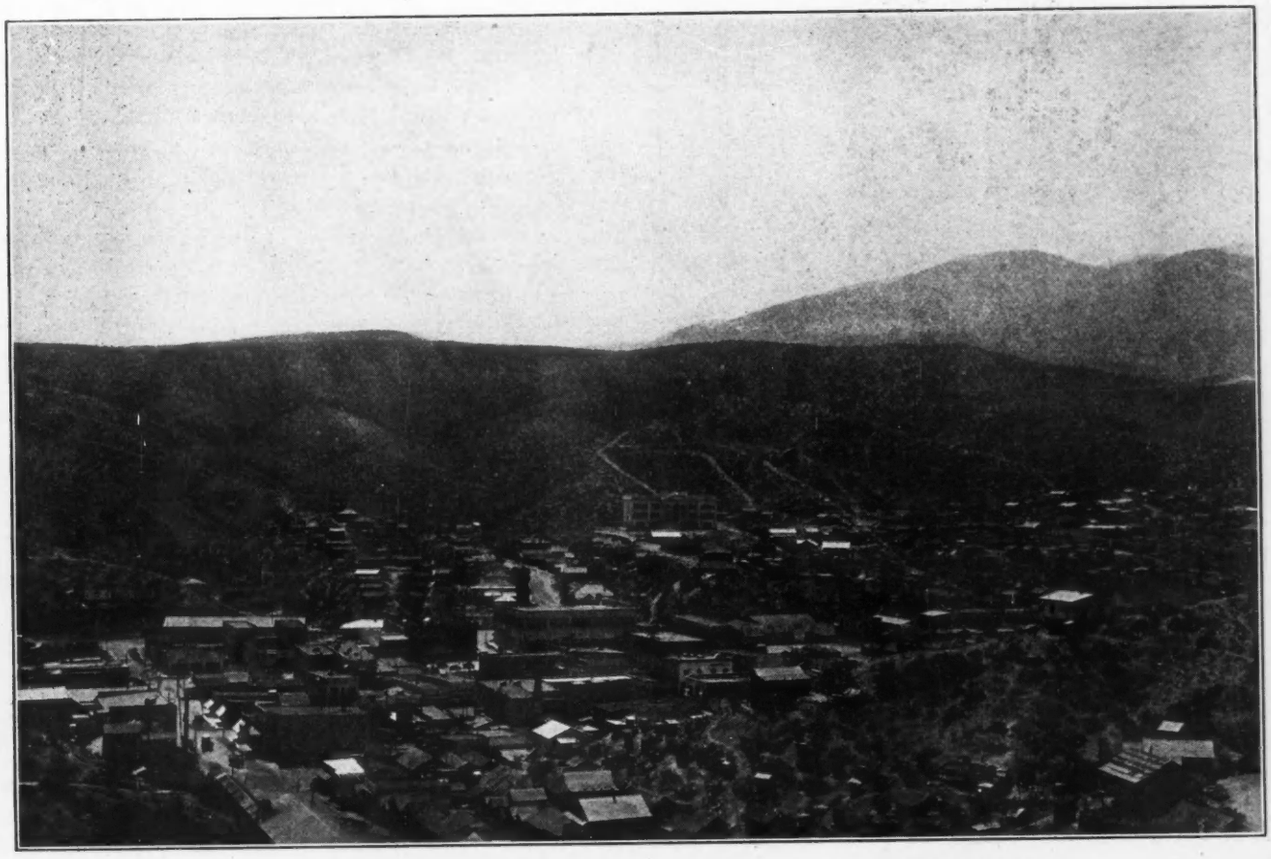


MINING PROPERTIES OF THE COPPER QUEEN AND SHATTUCK ARIZONA AT BISBEE

SURFACE PLANT AND MILL OF THE MIAMI COPPER CO., MIAMI, ARIZ.



CITY OF BISBEE, ARIZ.



LOOKING SOUTH ACROSS MIAMI FROM THE MIAMI COPPER COMPANY'S PROPERTY

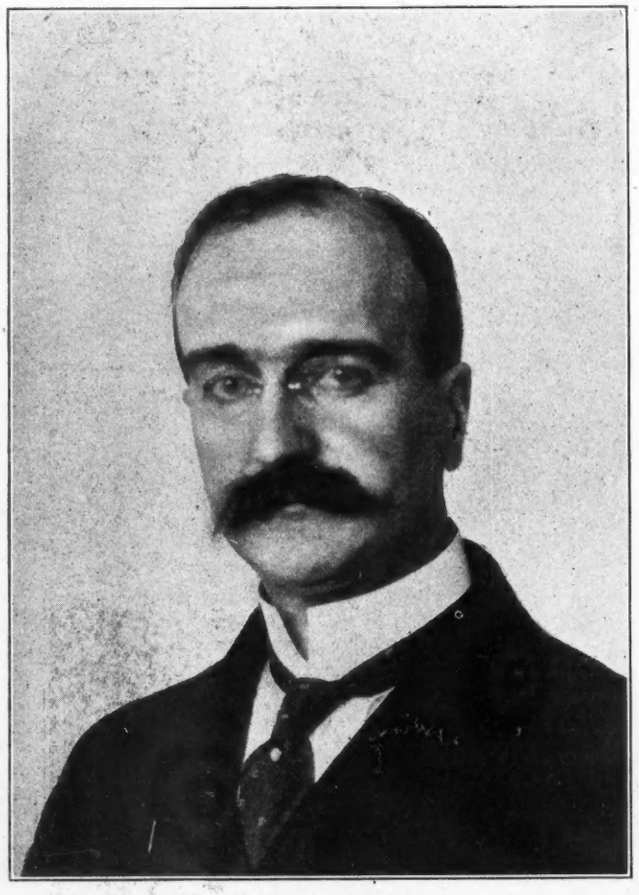
The Mineral Industries of France

Despite the Restitutions of the Peace Treaty With Germany, the Country Faces a Serious Shortage of Coal—Importance of the Expeditious Development of Reciprocally Advantageous Commercial Intercourse

BY MAURICE ALTMAYER
Formerly Attached to the French High Commission, Washington, and now on the Staff of the Banque de Paris.
Written exclusively for *The Journal*

A THEORY has been advanced that the perilous condition under which humanity is now laboring is the result of man having prematurely thrust upon his limited field of action the immense potential energies stored up by nature, before he was fully prepared for their understanding and ultimate utility.

The enormous reactions let loose on the comparatively small surface of the earth where human life evolved were bound to make it a battleground in the face of unorganized and unintelligent effort. A large proportion of mankind, in its present state, seems more adapted to live an agricultural life, which the surrounding physical conditions tend to make more fitting for the average. A small portion, however, has rushed into the vortex of progress during the recent period of man's evolution into what may be called "An Era of Industry." This new period, with all its marvelous achievements, was made possible by the unlimited forces nature has placed at our disposal, of which, however, we have not fittingly availed ourselves by studies proportionate with the prolonged and slow advance of intelligence in the world.



MAURICE ALTMAYER

Though it is not the object of this article to dwell upon such philosophical considerations, nevertheless, they may serve as a suitable introduction to the study of the mineral resources of one of the world's most prominent communities. Let us pass in brief review some of the principal mineral wealths of France and examine how their future may bear upon the industrial and agricultural prospects of that country.

Coal and Coke

In accordance with our preface, let us speak first with that mainspring of success at the present time—that is, "His Majesty King Coal," the leading factor for general progress of a nation. In second place, but with a brilliant future, shall come his valuable partner, "Hydraulic Power," from which later on the largest resources may be expected.

It is well known that prior to the Great War France's coal output amounted approximately to 41,000,000 tons. The requirements were about 61,000,000 tons, so that 20,000,000 tons had to be imported. Most of this tonnage came principally from England, and the rest from Germany and Belgium.

The main center of production in France is in the departments situated in the North, and they produced three-quarters of the output. This rendered France very vulnerable. Germany, which had planned during forty years to make a war of organized "Weltenergie," did not hesitate to capture this territory, increasing her share of potential and depriving France of 25 per cent of her coal power. Thanks to strenuous efforts, her remaining 15,000,000 tons, that is 10,000,000 in the uninvaded North and 5,000,000 in the rest of the country, were gradually increased, until in 1918 nearly 30,000,000 tons was thus produced. At the same time, however, Germans were systematically and scientifically destroying the French mines in prevision of their ultimate withdrawal. These coal fields will not be again in full working order before eight to ten years—some experts say even more. It is calculated that, owing to increased wants over the period of reconstruction, France will be short about 40,000,000 tons of coal annually for some years if her prosperity is to grow on the same footing as that anticipated from the unmolested industry of her chief neighbor.

The much-spoken-of basin of the Sarre can just supply the extra 7,000,000 to 8,000,000 tons that were necessary, before the war, to returned Alsace-

Lorraine. It is only fair that these districts should continue to be supplied, as they were before the war, from territories geographically and economically connected. Prior to the war statistics show that Alsace-Lorraine required more than 11,000,000 tons. Unfortunately, the Peace Treaty did not allow the whole occupation of Westphalia. In this manner a part of its coal output could have been controlled and retained "effectively" as a compensation for the systematic destructions of the coal fields of Northern France.

Effect of Coal Shortage on the Making of Pig Iron

We shall see, further, how the pig-iron situation will be affected, as the principal shortage lies with the supply of coking coal. Taking 1913 figures, the position can be summarized in the following manner:

FRENCH COAL PRODUCTION

Output before the war	41,000,000
Returned Lorraine's output	3,800,000
Total	44,800,000

COAL CONSUMPTION

Pre-war consumption	61,000,000
For returned Lorraine	11,000,000
Increased requirements	13,000,000
Total	85,000,000

This table shows the 40,000,000 tons deficit, assuming that the destroyed regions are at pre-war normal output. Some authors, as explained in a very complete and extensive report published by the French Ministry of Commerce, contemplate the possibility of reducing the shortage to 37,000,000 tons. But the latest developments of the world's restricted coal production do not provide much ground for hope in regard to provisioning France.

During the war, on the contrary, thanks to the Allied co-operation, we read in the report mentioned that the following aggregate quantities were imported:

	Tons
1915	40,000,000
1916	42,500,000
1917	47,400,000

Presumably, as Great Britain and the United States had to stop practically all large exports, these figures are going to dwindle to almost nothing.

France will not only have to face the calculated deficit of 37,000,000 tons, but also the accrued shortage due to the present reduced production consequent to shorter hours, as well as the total lack of production of the destroyed regions. It is doubtful, also, whether even reasonable redress in fuel will be obtained unless it be enforced.

The question of the coke situation, being tied to the pig-iron industry, will be taken up under that heading.

Hydraulic Power

Of all the European states, France has apparently the largest share in hydraulic power. The amount that can be obtained from the mountain districts aggregates about 8,000,000 hp., one-half being situated in the Alps and the rest divided between the Pyrenees, the Massif Central, the Jura, and the Vosges. Before the war, about 750,000 hp. was in use; 350,000 being employed for producing power and 400,000 for electrochemical and electrometallurgical work. During the war about 450,000 hp. was installed and 350,000 hp. in progress, so as to be ready to run during 1919-1920. Next year it may be safely expected that 1,600,000 hp. will be available.

An additional supply is expected from the fall of rivers such as the Rhone and the Rhine, totaling another million. But all this will take time, and, to be in a position to pull through during the next few bad years, one sees France should receive considerable assistance to help her industries if she is to make proper headway. Rapid progress in her industrial function would naturally entail a resumption of good economic conditions, which would be at once reflected upon her exchange. Thereafter, matters would naturally adjust themselves and the world would benefit by such circumstances.

Iron Industry

The iron industry will be, by far, the gem of France and its rich development a reward which will but partly redeem the severe and unjust material losses sustained by her people and her land at the hands of "Kultur." France produced, before the war, about 22,000,000 tons of iron ore. Germany extracted 36,000,000 tons, including what came out of annexed Lorraine. With the whole of this province restored, France will have a capacity of more than 43,000,000 tons of ore under pre-war conditions.

Lorraine Ore Reserves

In regard to ore reserves in sight, Lorraine alone stands for about 5,630,000,000 tons, one-third of which is siliceous ore, the other two-thirds being basic. This does not take into account either the Normandy or the Anjou undeveloped resources. Possibly the latter may correspond to a still much larger tonnage. Much hope is laid upon future trading in these ores with Great Britain on the basis of an exchange of ore for coal and coke. However, this iron ore, which is a 52 to 55 per cent hematite, with, say, 0.6 per cent phosphorous, involves basic treatment, and some considerable modifications in the orientation of the British steel works must take place if these works are to adapt themselves to carrying on the basic process. Further fields of iron ore are said to have been ascertained in Savoy and Dauphine.

Naturally, all this wealth in iron ore, which is France's main asset, cannot be properly exploited if the required amount of coke is not available. The making of pig iron from only one-half of Lorraine's output, which is over 21,000,000 tons, would entail a consumption of more than 12,000,000 tons of coke, and this figure does not account for any future development in Normandy or Anjou. It is, therefore, evident that, with a view to helping France during the next few years, coal and coke must be imported from the countries of their fortunate producers in considerable quantities and under reasonable conditions.

Handicap of Heavy Freight Charges

If we figure on coal being sent from the United States at the prevailing rates of, say, about $30 per ton for c.i.f. delivered to French ports, such price would be prohibitive for the iron industry. Any quantities which might be imported for domestic use, even under such adverse conditions, would release

in France a corresponding tonnage for her industrial purposes. The stumbling block, however, is the cost of freight, which figures in the above price at times as much as $22 to $23 per ton. Therefore, the freight question regulates this issue, as it does many others. The sound provisioning of France will largely depend, once normal conditions of output have been resumed everywhere, upon reasonable and adequate freight facilities.

A well-balanced resumption of the French industry, and France's renaissance, is tied to the manner in which prompt supplying of coal and coke shall be organized. Thus the French iron trade may be fostered in conjunction with American aid to mutual advantage. Working on the same basis as anticipated in the development of an iron ore trade with England, large freighters could be made to take ore to the United States and return with coal and coke. This system of operating the transfer of coal should substantially alleviate the burden of the fuel purchase and thus avoid always hitting a convalescent exchange, an item which should be safeguarded in every possible way.

Iron Ore Resources of French Colonies

In all the above considerations nothing was mentioned regarding the iron-ore resources of the French colonies. Very important beds of ore have been exploited in Algeria, and others of great magnitude have been wilfully neglected, owing to anti-progressive politics during many years of stagnation. In 1913 Algeria exported 1,366,000 tons of ore.

Tonkin and certain African colonies are known to possess much ore yet undeveloped. In the future it is expected that France alone will have at least 17,000,000 tons of ore available for export. In addition to this, 1,250,000 tons of pig iron, plus 2,000,000 tons of steel, mostly made by the basic process, could be exported.

It may be said that the success of electric steel has been most satisfactory in France during recent years, the production always increasing until 1918, when it reached 60,000 tons.

Ferro-Alloys Industry

Before ending this short resume something should be said of the important industry of the ferro-alloys connected both with iron and the general use of electric practice for most of these products.

A good many ferro-alloys are produced successfully in France, principally in the electric furnace. The making of ferromanganese, for instance, has been a valuable asset to electric-furnace practice, as has the use of molten ferromanganese prepared in the electric furnace for the treatment of steel.

The French Electrometallurgical Works of Savoy and Dauphine have a world-wide reputation in regard to the making of all sorts of ferro-alloys, such as ferrosilicon and ferrochrome, particularly the low-carbon quality, for which there was a great demand during the war. Ferrotungsten of different grades, ferromolybdenum, ferronickel and others used in connection with the making of high-speed steel and armor plate, are turned out in increasing quantities. Some promising export trade has already taken place in regard to these products. Though France must import most of the ore wanted for making these ferro-alloys, she is well provided in regard to chrome ore and nickel ore, having in 1913 nearly 40 per cent of the world's supply of the former and more than 17 per cent of the latter.

Under the stimulus of war needs, tungsten was found in France to the extent of 200 to 300 tons per annum, and Tonkin offers excellent prospects for this valuable metal, which may release France from purchasing abroad large amounts of tungsten ores. The French plants making a specialty of using the electric furnace, and the companies or groups of companies engaged upon these operations are now assuming a leading importance. A parallel might be established between these industries and those of the Niagara Falls district in the United States and Canada.

The French companies have spread their activities abroad. In this manner important French interests are established in Norway, where quite a number of materials, such as nitric acid, nitrites, cyanamide, ferro-alloys, and aluminum works are using the water power of that country. These plants have proved a substantial asset during the war for the supplies of raw materials of that description to the Allies.

A short review might be given of the principal other metals in which French industry has great interest for its future.

Copper

Copper is one of the main materials France must purchase abroad, mainly from the United States. However, French companies control some output in Lower California, in Servia, and in South America. Some French colonies have also copper ores in promising amounts, principally in Africa. In speaking of the fields in which co-operation with American financial and technical aid might prove of great value, due consideration should be given to studying the means of developing French copper resources. Sales of copper to France in 1913 amounted to 103,000 tons, which came mostly from the United States. During the period of reconstruction it may be assumed that the requirements would increase to 125,000 tons of metal, which is now worth about $440 per metric ton. The purchase of this material at the present rate of exchange of nearly 10f. to the dollar would require more than one-half billion francs, which at present would have to be covered by credits. This burden, coming in addition to the enormous payments to be met for other large purchases, such as for cotton, wheat, oil, and other needed commodities, to name only some of the principal ones, would render France's financial situation very precarious.

All these costly transactions would contribute to lower the exchange, and any plan that will release France from getting too many supplies of that description from abroad will be to the ultimate benefit of those interested in her complete economic restoration. In the case of copper what is meant to be

conveyed is that it would be far more interesting at present to see France supplied out of her own mines and plants, if such could have been built and made to produce along American methods and with American machinery, giving large outputs as well as with the collaboration of technical men in an industry in which the Americans have proved their mastery. The example of the Katanga proposition in the Belgian Congo is highly instructive, and might promote in the French neighboring fields promising undertakings along the lines submitted above.

In fact, any scheme which will consolidate the general economic position of France in developing any branch of her industries or in trading will materially improve the situation of the countries who have lent her considerable capital. Small profits exerted from a buyer in an imperiled state do not weigh much as compared with the benefit derived from the strengthening and, in the end, the ultimate cure of a prospective excellent customer. There is no doubt that such considerations are receiving the competent attention of eminent men on both sides of the ocean, and that steps are being considered to bring about those valuable connections that should promote satisfactory results.

Lead

France is in a good position in regard to lead. First, she produced about 30,000 tons, against a consumption of 108,000 tons, in 1913. Furthermore, the Spanish output, to a large extent, is produced by a group of companies with a majority of French interests. Therefore, as the Spanish output, which can be brought up to 180,000 tons, could be partly diverted to France to satisfy her requirements, this condition of affairs would be satisfactory, as part of the profits would ultimately revert to French shareholders.

The French colonies afford excellent prospects. Out of 85,000 tons of lead ores available for France, Algeria, and Tunis together supply 70,000 tons. It is thought that France, later on, may expect to obtain altogether 135,000 tons of lead ores, from which 80,000 tons of metal can be extracted. As to any balance needed, Spain can supply it to advantage.

Some of the French lead plants and refineries are up to date, and information has been given out that one of the leading French companies has taken expert advice from American specialists in the design of lead works, an example well worthy of reflection.

Zinc

The zinc situation in France can be gaged from pre-war figures. In 1913, France consumed 78,000 tons of zinc and produced nearly 68,000 tons. Any surplus can be obtained from Belgium, which has a large refining capacity and a well-organized import trade of zinc ores through Antwerp. A setback occurred in that country during the war, but conditions will be resumed rapidly both in France and in Belgium, as the zinc interests, which often work with those of the lead industry, will see that operations are carried out normally as soon as possible.

A bright future for zinc ores may be anticipated, thanks to the resources of the French colonies. Algeria, and Tunis have been steadily improving their resources, and Tonkin is likely to bring a considerable contribution to the tonnage of zinc ores exploited under French control. Although this ore can be better exported from Tonkin to the nearer centers of treatment than to France, a certain amount may be brought to the motherland for reduction, whereas the larger bulk of the tonnage extracted will be treated on the spot. It is anticipated that France will consume, later on, about 130,000 tons of zinc per annum, out of which from 100,000 to 110,000 tons will be obtained from ores extracted from French-owned mines.

Aluminum

France is in an exceptional situation in regard to aluminum, owing to the extensive bauxite ore beds situated in the south of France. In 1913 she produced 309,000 tons of ore, of which 168,000 tons was exported. Nevertheless, France could manage to produce 21 per cent of the world's aluminum output.

The impetus given to the aluminum industry because of the many applications of this metal which were developed during the war makes France very confident in her valuable resources concerning this industry. The companies which control it are of comparatively recent formation and have built it on modern lines and in a thoroughly modern spirit of enterprise. Their experienced directors and engineers are extremely active and prompt to lead the way in regard to any possible technical improvements or economical developments in matters of general export policy.

As previously explained, with regard to ferroalloys and the other industries of the electric furnace, the aluminum group is an important factor of prosperity, as its influence spreads over many branches of the chemical industries as well as those supplying agriculture with the materials favoring production of the soil.

Phosphates and Potash

Mention should be made of the resources of France in regard to mineral fertilizers, of which there is a large reserve at hand, both at home and in the French colonies. Phosphates are obtainable principally from Tunis, whence much is exported abroad, America being a large customer for this material.

As to potash, the undeveloped mines of Alsace will provide in the near future large quantities for export. This question has been ably and thoroughly set forth in an interesting report published under the direction of the Bureau of Mines in Washington by Frank K. Cameron, entitled "The Alsatian Potash Industry." This contribution fully explains the question of potash in France and the wealth it will give to this country.

Conclusions

The above particulars and considerations give but a rapid glance at some of the vital problems which are facing France in this period of crisis. The article is merely an attempt to describe to the American reader a few of the means at her disposal to resume her position and rank in the world's activity toward progress and better times.

When, after this critical period, all liberal nations decide to pull together in a concerted and organized effort, France, with the friendly and foresighted help of the United States, surely will rank among the very first, more gloriously than ever.

Wolfram Mining In China

Attempts at Government Monopoly and Extortionate Taxes Retard Development—Militarism Throttling Industrial Progress—Sources of Supply, Production and Analyses

BY C. Y. WANG
Hankow, China

Written exclusively for *The Journal*

WOLFRAM was known to exist in China before the Great War, but had not received its due attention until its demand as a prominent war metal in Europe and America gave impetus to the Chinese people in its search. Companies, or, rather, in most cases, combinations of a few individuals, sprang up like mushrooms. Their representatives swarmed the interior, one agent trying to outbid the other, in bargaining with the miners, who are mostly farmers using their spare moments to work for this mineral. There are a few cases of properly incorporated companies trying to do some serious work in opening up some quartz veins, which operation, however, was not as profitable as buying from the natives.

Governments Attempts to Control Output

The military government of the Southern provinces, as well as the Peking government, got wind of the profit accrued from this new industry, and both were tempted to get something out of it. The Northern government, that is, the Peking government, declared it a government monopoly, but as such it has had only a nominal existence, and the Southern government, that is, the military government, finding a strong opposition from the people to the granting of monopoly to a few privileged individuals, who had tried hard to manœuver the undertaking to their own self-interest by bribing the official class, found it worth while to impose a heavy tax to replenish the empty treasury.

Meanwhile, various military leaders, always on the lookout for more money, stretched out their tentacles, and through their subordinates, wrung taxes from any wolfram cargo passing through their so-called spheres of action. This high-handed action, although provocative, can be excused as a military exigency; but it is depreciation, pure and simple, on the part of the official class to make the procedure of obtaining the transportation permit, without which the cargo is liable to seizure, long and tiresome. Without money to stimulate the officials, influence with some military upstarts, time to waste, and the patience of a Job, one would better try to hunt tiger in New York City than to try to put a hand in this industry. This serves as an example as regards the condition of mining, as it exists today in China.

The root of this state of affairs lies in militarism; and if one wants to see an illuminating aspect of it let him come to China. China needs a thorough clean-up; and I believe the time has come for it, for popular feeling against the military hierarchy which forms a standing obstacle to all industries, above all, that of mining, is running high.

The following are the wolfram-producing districts:

Hunan Province—Yu Shing, Yee Chang, Tze Hing, Pun Hsien, and Lin-mo.

Kiangsi Province—Ta Yu, Nan Kang, Sheng Yen, Nan On, and Shung Yee.

Kwangtung Province—Lok Chang, Yung Yuen, Wai-chow, Sining, and Chung Fa.

Chili Province—Chin On, Fu-ning, and Lin Yu.

The wolfram production for 1918 was as follows:

	Tons
Hunan	1,138
Kiangsi	2,200
Kwangtung	1,000 (?)
Chili	200 (?)
Total	4,538

In Kwangtung Province, the average purchase price at the mines was $20 to $40 (Mex.) per picul (16.8 piculs to 1 ton of 2,240 lb.) of between 60 to 65 per cent WO_3. To this price must be added $14 (Mex.) per picul for various taxes and transportation charges to Canton. Export duty from Canton to foreign ports was about $100 (Mex.) per ton.

At present, owing to the slump in the market, the price in Canton varies from $18 to $22 (Mex.) per picul. Obviously, at the present moment, the industry is at a standstill; and not until there is improvement in the market and the suspension of the too-exacting military taxes will there be hope for further revival of the mining of wolfram. As it is, no one can make anything at less than $30 (Mex.) per picul at Canton.

It has been estimated that at the beginning of 1919 there were in stock unsold about 400 to 500 tons of ore in Canton and about 700 to 800 tons in Kiangsi Province.

Most of the workings are in gravels, in soils and in decomposed rocks. In few localities there are workings in quartz veins, the country rock being granite and its overlying rock. The width of the veins varies considerably, from a few inches to a few feet. At the same time, there is great uncertainty as regards the percentage content of the mineral wolframite in the run-of-mine.

All workings are operated by manual labor, and concentration is either done by hand-picking of large pieces or hand-sluicing of the small pieces.

The following shows a few representative analyses of the different grades of concentrates obtained from the different localities:

	—Kwangtung Ore—		—Hunan Ore—		——Kiang Si Ore——	
	1	2	3	4	5	6
WO_3	62.63	70.90	64.4	69.3	64.2	70.9
FeO	10.12	.....	.....	13.2	15.6	13.2
Fe_2O_3	11.14	.....	.....	.....	.....	.....
MnO	9.30	.....	.....	10.5	8.4	11.1
Cu	.....	.03	Trace	None	.....	None
Sn	.....	.34	.18	.....	None	None
S	.....	.03	.....	.03	.2	.04
P	.....	.062	.....	.....	Trace	None
Mn	.....	7.31	9.2	.....	.....	.....
Zn	.....	.....	.....	1.0	Trace	.....
As	.....	.....	.....	.....	None	Trace

Handling of High Explosives in War Time*

Hundreds of Thousands of Tons of Ammunition Shipped from the Port of New York Without Accident—Heroic Service of the Picked Men of the Coast Guard

BY CAPTAIN GODFREY L. CARDEN, U. S. COAST GUARD
Captain of the Port of New York during the Great War
Written exclusively for *The Journal*

NO FEATURE connected with the forwarding of munitions to overseas forces during the years 1917 and 1918 was more carefully guarded from the public than the loading of high explosives. The great bulk of these shipments passed through the Port of New York. Single ships carried cargoes of T N T, picric acid, and smokeless powder exceeding five million dollars in value. An explosion of one of these vessels in New York Harbor would have meant a disaster more terrible in consequences than even the one at Halifax.

The responsibility with regard to the safe loading and expeditious dispatching of all explosives coming forward through New York rested with the United States Coast Guard, and the Coast Guard officer directly charged with supervising and enforcing all rules and regulations for the safeguarding of explosives on water craft is the Captain of the Port.

CAPTAIN GODFREY L. CARDEN

Huge Tonnage of Explosives Shipped from New York

During the period from Dec. 13, 1917, to the end of the fiscal year, June 30, 1919, there was supervised at New York the handling of high explosives in bulk, shells loaded with high explosives, smokeless powder, fulminates, dynamite, ammunition, and various explosive accessories, to a total of 345,602.57 tons. In all, 1,698 vessels were loaded in effecting this movement. Every stage of the process of handling was supervised by the office of the Captain of the Port.

No accident occurred, and not one life was lost.

The total value of the explosives carried on the 1,698 vessels as loaded was $547,953,143.32.

The heaviest single shipment of explosives was by the steamer "Honduras," which cleared for Bordeaux, France, Feb. 26, 1918. This vessel carried a mixed cargo of picric acid, powder, and guncotton of a total weight of 7,849,153 lb. The value of this cargo was $6,915,599.00. The next heaviest shipment was by the steamer "St. Louis," which cleared for Cette, France, on Jan. 18, 1918. This vessel carried a mixed cargo of picric acid, T N T and smokeless powder to a total weight of 8,669,965 lb. The value of this cargo was $5,889,535.00.

Prior to Feb. 26, 1918, or before the Espionage Act provisions in re jurisdiction over territorial waters of the United States became effective, all rules and regulations governing anchorages at New York were promulgated by the War Department. These rules were recommended in the first instance by the Chief of Engineers of the Army, and when approved by the Secretary of War had the force of statute law.

The River and Harbor Act, approved March 4, 1915, made it mandatory for the Coast Guard to enforce such rules at New York, with reference to anchorages, as issued by the Secretary of War. Included in the terms of the anchorage regulations were rules as to the safeguarding of the waters and shipping at New York. These rules bore directly on the handling of explosives.

The functions previously performed by the War Department, as enumerated above, passed to the jurisdiction of the Treasury Department under the terms of the Espionage Act. This was on Feb. 26, 1918. The representative of the Treasury Department charged with the enforcement of the anchorage regulations was designated Captain of the Port for the Harbor of New York and vicinity.

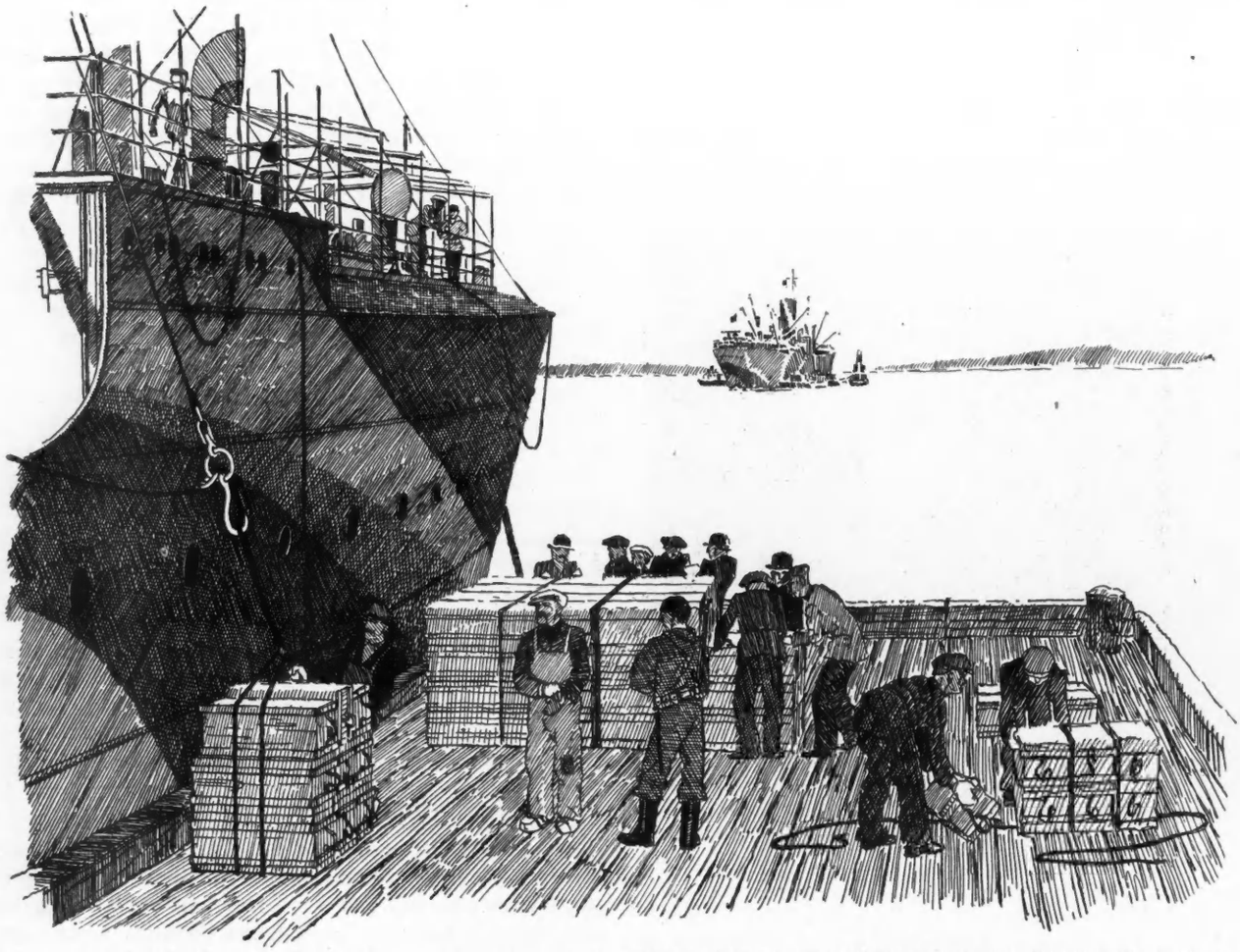
The winter of 1917 was rigorous in the extreme. There was an unusual amount of ice in the harbor; shipping was congested for want of sufficient anchorage ground, and explosives and munitions were accumulating in the upper harbor in dangerously large quantities. These were conditions as they were found on Dec. 13 of that year. The first need was for men and patrol vessels. Practically no personnel was on hand at New York to cope with the big movement of explosives that was coming forward, and immediate patrol measures were imperative in order to clear up a dangerous situation.

The quick response of Coast Guard Headquarters to the request for 100 surfmen from the Coast

*The facts contained in this article are here made public for the first time.—EDITOR.

Guard Life Saving Stations in the Great Lakes afforded the material for a nucleus for the magnificent organization which was later developed. The surfmen—all strapping big fellows of superb physique, disciplined and dependable to an extraordinary degree—swarmed in to the number of 150. They were immediately organized into a company, and later formed the petty officers of the battalion. Active recruiting was begun from the outset and every Coast Guard Life Saving Station from Ogdensburg, N. Y., to Duluth, Minn., was made a recruiting station. The keepers of the station had a wide range of acquaintanceship in their districts, and sought out only young men of good character.

Approximately 65 per cent of the Coast Guard battalion came from northern Wisconsin and Michigan. The copper country furnished about 150 men. From Louisville, Ky., 125 men were taken. The Louisville contingent was enlisted by the Keeper of the Coast Guard station at that place. Every man who enlisted did so for general service; that is to say, for duty in any part of the world. None of the men assigned to the coast service battalion of New York for duty supervising explosives knew in advance where they were going. It was also a fact that before a recruit was deemed fit to do duty on board an explosives ship he had to submit to a severe period of training, starting off with drill of the hardest



SCENE ILLUSTRATING THE TRANSFER OF HIGH EXPLOSIVES FROM BARGE TO STEAMSHIP, SHOWING THE MANNER OF HOISTING NINE CASES AT A TIME. THE WORK WAS ACCOMPLISHED IN ABSOLUTE SILENCE, EXCEPTING THE SOUND OF AN OFFICER'S COMMAND, OR THE CREAKING OF THE TACKLE, OR THE WASHING OF THE WATERS OF THE BAY AGAINST THE VESSELS' SIDES.

In addition, recruiting stations were opened at Chicago, Buffalo, and Grand Rapids, but for the most part the recruits were obtained along the fringe of the Lakes. In all, more than 22,000 men were examined. From this force 1,644 men were selected for the New York Division—this latter number representing the Coast Guard force available for the Captain of the Port in July, 1918. The standard for admission to the Coast Guard battalion was placed very high. The minimum height was 5 ft. 7¾ in. Later, 5 ft. 10 in. was the minimum height essential for entry into the last company recruited.

kind, supplemented by class instruction work in the classroom of the barracks.

The Instruction of Guards

In class the recruit was instructed minutely in the handling of explosives, to the end that he, in turn, when placed over a gang of stevedores would know when to order a stop in any movement. Familiarity with explosives is often a dangerous state of mind. Stevedores were prone to become careless. They had been fortunate enough not to have been mixed up with an explosion. The burden of our instructions to our men, and repeated over and over again

to the older men, and to all concerned was, in effect, "Remember you are dealing with high explosive. Treat it as high explosive, and remember, too, that there is no chance for a second mistake."

But we went farther than this in the handling of stevedores and all concerned at New York: Any man who through carelessness or inattention hazarded the safety of a ship and all on board was in the same category as a traitor to his country. To lose a ship by carelessness was to play the enemy act; and the guards had instructions to deal with any careless person the same as with an enemy. No chances were to be taken.

The general features governing the handling of explosives were set forth in General Order No. 10,

TYPE OF COAST GUARDSMAN EMPLOYED IN CONNECTION WITH THE SHIPMENT OF OVER FIVE HUNDRED MILLION DOLLARS' WORTH OF HIGH EXPLOSIVES FOR THE PORT OF NEW YORK DURING THE WAR, WITHOUT A SINGLE ACCIDENT

which, as commanding officer of the battalion, I issued on Jan. 10. This order remained in effect throughout the war, and its rigid enforcement met practically every situation which arose. That order read as follows:

Jan. 10, 1918.

General Order No. 10

1. Rigid enforcement of the rules and regulations for the anchorage of mines of the Port of New York as approved by the Secretary of War, Dec. 26, 1916, is ordered on the part of every officer attached to the New York Division of the Coast Guard. This order applies with equal force to rules and regulations supplementary to the foregoing with reference to the anchorage ground of the Port of New York which have been, or in future may be, issued by the Secretary of War. Commissioned and warrant officers in charge of enlisted men on anchorage patrol or engaged in the inspection of vessels loading explosives, or in guarding vessels carrying munitions and lying in the prescribed anchorage area, will be held responsible for the strict compliance, on the part of the men of their command, with the rules as laid down.

2. With reference to the anchorage area at Gravesend Bay set apart for the loading of vessels with munitions, there will be a rigid enforcement of the rules and regulations of the War Department, as above approved.

3. Allow no vessel to enter the area set apart for the loading of explosives until that vessel is ready in every respect to receive munitions. In other words, do not permit a craft to occupy a mooring in that area until actually ready to go ahead with the taking on of munitions. The all-important consideration is to expedite the forwarding of munitions overseas, and to permit a vessel to occupy the prescribed area when not fully ready may prevent some other vessel from entering which is in all respects ready.

SCENE ILLUSTRATING THE MANNER OF TRANSFERRING HIGH EXPLOSIVES FROM A BARGE TO A VESSEL IN NEW YORK HARBOR, WITH COAST GUARDSMEN ALWAYS IN ATTENDANCE

4. Make inspections of stevedores and all authorized persons engaged in the loading of munitions before these persons go on board the vessel to be loaded. The precautions as to covering of footwear, not having matches on person, absence of steel hooks or other metals must be attended to before the loading ship is boarded.

5. Before loading commences scrutinize with the greatest care all purchases, whips, gear of every sort, and do not permit any loading to commence until, in the judgment of the supervision Coast Guard officer, all rules and regulations are complied with, and, so far as can be determined, all gear is safe and adequate.

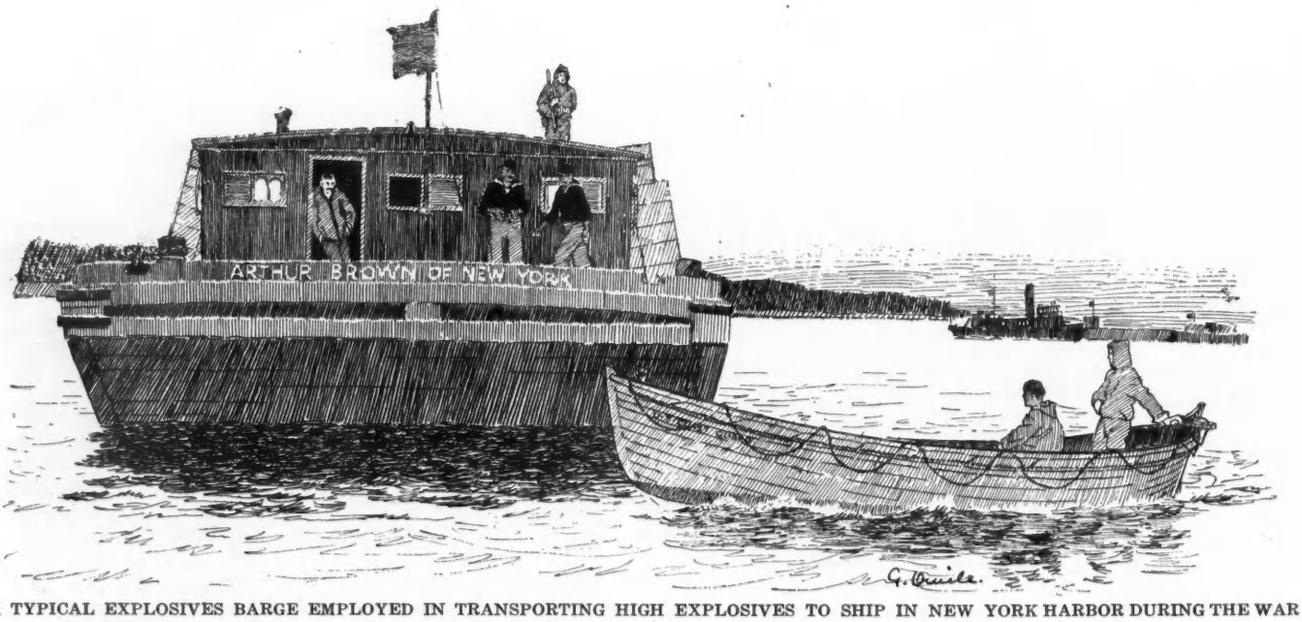
6. Instantly stop loading if any sign of weakness in gear is apparent and do not permit this loading to be resumed until satisfactory gear is established. In every instance err on the side of rigidness in the enforcement of regulations rather than take any chances.

7. Do not permit any loading until a careful inspection has been made of the vessel to be loaded and every precaution outlined in the War Department rules and regulations has been complied with. Be very particular to see that all

members of the crew of the vessel, from master down, are fully complying with the rules.

8. Observing any person who is careless or who in any way interferes with the safety of the loading work; remove that person from the vessel to the patrol steamer and report action. Take no chances with any careless person about. Let these facts be clearly understood in advance by the master, and the boss stevedores, and let the stevedores themselves know, when mustered, that not the slightest infringement of the regulations will be permitted.

9. It is imperative, first of all, that the loading be conducted in every essential with that degree of safety which is prescribed by the rules and regulations, even if the loading must be executed somewhat more slowly than would be possible otherwise. The loss of a shipload of munitions might mean the loss of a battle; it might affect a campaign —results far more wide-reaching than the mere loss of a ship or those on board. Expedition can be rightly accomplished in urging the quick arrival of barges with their loads, but there must be no rushing of munitions on board at the risk of safety.



A TYPICAL EXPLOSIVES BARGE EMPLOYED IN TRANSPORTING HIGH EXPLOSIVES TO SHIP IN NEW YORK HARBOR DURING THE WAR

10. Keep at all times when loading a competent man at each hatch where munitions are entering. This man must keep his eyes constantly on the gear and on the men working the same. Direct him to stop hoisting on board the instant he perceives any sign of weakness of equipment or carelessness in handling same.

11. Inspect frequently, night and day, all vessels in the restricted area above referred to. See that sentries and men on watch are at their posts and alert. Allow no unauthorized person on board, and permit no vessel to come alongside of vessels loading explosives or alongside of barges having explosives aboard without permission of the Coast Guard officer in charge.

12. There must be a commissioned or warrant officer of the Coast Guard constantly on duty aboard each vessel in the aforesaid munitions anchorage area, and if, for any reason, an officer is not available, the deck must be taken by the leading petty officer available. The commissioned officer of the Coast Guard at Gravesend will arrange the watches with due regard to efficiency, but ordinarily it is expected that sentries will be maintained in two-hour stretches.

13. Place instantly under arrest any unauthorized person found on board or attempting to come on board without permission.

14. When a vessel has completed loading, arrange to have her leave the anchorage as rapidly as possible in order that there may be no delay in having her berth occupied by another vessel which is prepared to load.

15. The Division Commander expects intelligent, painstaking effort on the part of every officer and man assigned to this responsible duty. Follow the rules and regulations carefully, and wherever it is possible to better these rules and regulations in consequence of practical observation or experience do not hesitate to make such suggestions in order that the Division Commander may promptly refer the same for authority to enforce if deemed advisable.

16. For the present, officers and men assigned to duty in Gravesend Bay will continue there for a period of not less than three days. When relieved and on return to the Barge Office, make immediate written report covering the duty performed. Make this report full and specific.

Loading Done by Civilian Stevedores

The actual stevedoring of munitions ships was performed by civilians under high pay. No stevedore might work on a munitions vessel without a pass from the Captain of the Port, and, for that matter, no person other than the master and crew of the vessel loading could enter an explosive anchorage area without a pass. To see that this rule was obeyed was the duty of the Coast Guard. It called for the utmost vigilance to insure that no unauthorized craft of any kind passed inside an explosive anchorage area.

All stevedores before going on board a loading vessel were necessarily searched. It was essential that every precaution be taken to prevent through the medium of an enemy agent the introduction of any mechanical appliance on board whereby destruction might be accomplished after an interval of time. No metal might be carried by any person working on a munitions vessel. Feet had to be incased in rubber boots or burlap. All fires were extinguished except those in charge of an attendant, and no work was sanctioned which called for the striking of metal against metal.

In the holds, all constructive work had to be completed before loading began. This was a difficult matter to bring home to many shipowners, who had counted on the loading period to prosecute repairs about decks, and below. Not a hammer was permitted to be struck in the loading grounds.

The very first day following the issuance of instructions, on taking charge more than twoscore

of steel hooks were reported as taken up by the guards. A stevedore who could without qualm drive a steel hook into a metal bound package containing high explosive was deemed to belong to that class of men which had become dangerous through over-familiarity. Both the steel hook and the man were removed.

The average man would not have to be told that smoking in the vicinity of high explosives was interdicted. Yet it is a fact that a foreman of a stevedore gang was removed from one munitions vessel for this very act of smoking. If the foreman of a gang does not hesitate to smoke if he finds a chance, what is to be expected of his men?

The rule was early adopted that before a vessel might enter a loading area she must be trimmed, and lacking only her cargo of munitions. The holds for the explosives were required to be broom-swept clean, and the construction in the hold to comply fully with the regulations. This called for close inspection by the Coast Guard. Having passed the inspection, the vessel, with a full detail of guards on board, proceeded to the anchorage.

The stay in the loading area was akin to a stay in a magazine. No communication was allowed with the shore or with other craft except that incident to the arrival and departure of barges loaded with explosives. As fast as loaded, the vessel was required to quit her anchorage to make room for another craft.

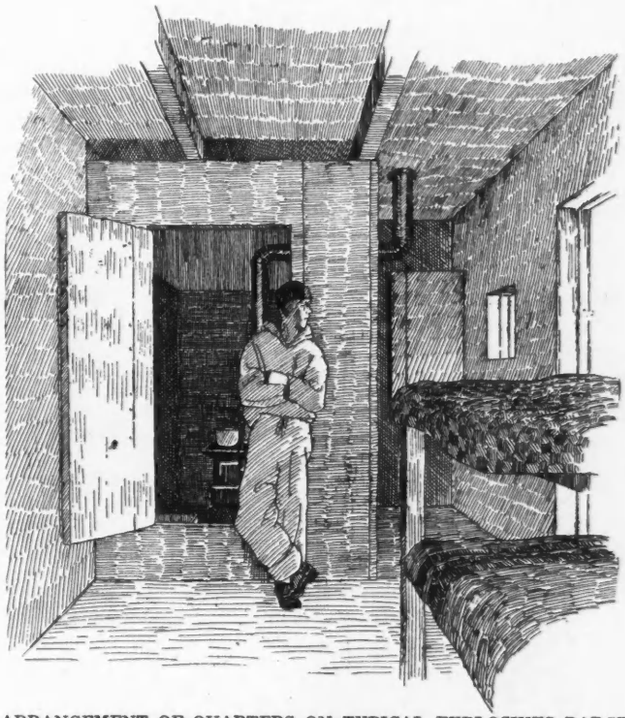
High Degree of Efficiency Attained

Far from being a deterrent, the supervisory work over the loading of munitions served to accelerate operations. There was no loafing, no idly standing about, no talking—only a steady clock-like precision to the work. Everywhere the Coast Guardsman stood sentry over a group of stevedores—on deck, below hatches, and in the fartherest corners of the ship. Let a stevedore drop a package, or handle a barrel or box in a careless manner, and the action that followed was generally swift and drastic. Not a winch could turn on any ship in that loading area until the Coast Guard gave the word, and no port-hole, whip, or other piece of gear might be used until it had been examined and pronounced safe.

Very early in the new period the slings holding thirteen boxes of wet guncotton broke when the load was directly over the hatch. Fortunately it was wet guncotton. Had it been dry picric acid there is little doubt as to what would have happened. It was this occurrence, which I learned took place before I assumed charge, which occasioned close scrutiny of all gear. On finding that this gear, which Coast Guard men had condemned, had surreptitiously been restored, I ordered that all gear when condemned be cut. The effect of this order was the appearance of a plentiful supply of coils of various sizes of manila for recourse whenever our men found it necessary to remove gear.

Quick Loading

Under the supervision of the Coast Guard, vessels were frequently loaded in seventy-two hours and in a few instances in forty-eight hours. These same vessels, it was said, had formerly used up two weeks or even fifteen or sixteen days to accomplish loading. Of course the acceleration in the arrival of munitions at tidewater as the war progressed must be taken into consideration, but there is no doubt that supervision over the work and the munitions was a decided advantage in reducing time. Whether or not this was due wholly to the certainty that the stevedore would lose his pass unless he worked satisfactorily, it is a fact that a new speed and celerity became evident with the appearance of the Coast Guard, and with the further result that there was



ARRANGEMENT OF QUARTERS ON TYPICAL EXPLOSIVES BARGE, SHOWING APPEARANCE OF METAL- AND ASBESTOS-LINED ROOM, WITH COAST GUARDSMAN INVARIABLY IN ATTENDANCE

accomplished the dispatch of large quantities of explosives without loss of life or accident of any kind. Considering the volume of explosives handled and the urgency for dispatch, this, it is believed, is a unique record.

It was a disappointment to many of the Coast Guardsmen that they did not see service overseas. All had enlisted for service in any part of the world, but when the seriousness of the work at New York was understood the command cheerfully undertook to carry on to the end.

Men Win Commendation of the Government

A letter from the Secretary of the Treasury dated Aug. 30, 1918, and read to the entire command, had a wonderfully stimulating effect. Officers and men perceived that their efforts were appreciated in high quarters. The Secretary's letter, addressed to the Captain of the Post, was as follows:

During several recent visits to New York I had occasion to convince myself of the splendid service that is being rendered by the men of the Coast Guard Service in safeguarding the various anchorages for explosives in and around New York Harbor. I realize that there is nothing spectacular in this work, and I can fully appreciate the desire of many of

your men to get into more active fighting service. I wish, however, that you would impress upon them the magnitude of the service which they are rendering their country—a service which means so much not only to the safety of the cities in the immediate vicinity of these anchorages but also to the speedy supply of ammunition so urgently needed by our courageous boys at the front. Please say to them how much I appreciate the service that they are rendering. Make them feel that it is a service quite as important to the winning of the war as their presence in the front line trenches.

W. G. McAdoo,
Secretary.

The explosives loading areas at New York comprised anchorages in Gravesend Bay and at Sandy Hook light. Originally only the Gravesend Bay anchorage existed, but owing to the greatly increased volume of explosives which was arriving,

LOOKOUT, IN HIS STATION OVERLOOKING NEW YORK BAY, WHO OBSERVED, AND CHARTED THE EXACT POSITION OF EVERY VESSEL WITHIN THE AREA DEVOTED TO THE HANDLING AND LOADING OF HIGH EXPLOSIVES

provision was made whereby ships could be loaded in the vicinity of Sandy Hook. There was the further advantage that in the event of an explosion the scene of the disaster would be far removed from populous centers. Here again the disadvantage of civilian stevedores became apparent, as these stevedores had to be conveyed from New York, Brooklyn, or Staten Island in the morning and returned at night. The travel of itself was costly, and, as might be expected, not popular with stevedore employees. The Sandy Hook anchorage was availed of so long as weather conditions in that vicinity permitted.

In the actual handling of explosives the rules were as few as possible, but based on practical experience. All vessels carrying explosives and desiring to proceed to an anchorage provided therefor, were required to obtain in the first instance a pass from the Captain of the Port. Permit to load explosives on barges at railroad terminals was likewise required. In this way there was a control over the actual loading and the movements of vessels at New York. It was also required that all other vessels, especially tugs and stevedores' boats, engaged or used in connection with loading explosives on vessels in anchorage areas, carry written permits.

All barges carrying explosives were required to be in charge at all times of competent persons, and such barges were required to be provided with ground tackle and deck equipment, specified by name, to be approved by the Captain of the Port. For every ten barges or less in number there was required, on the part of the owners, the attendance of one tug.

No smoking was permitted on or near any vessel, barge, or scow carrying explosives, and no person under the influence of liquor might approach such vessels. Vessels carrying explosives were forbidden to carry inflammable liquids, inflammable solids, oxidizing materials, mineral acid, nor explosives liable to spontaneous ignition or to give off inflammable gases, unless the explosives be stored in separate rooms or otherwise so separated as to effectively prevent danger to the explosive from any of these articles or from the vapor thereof.

Where blasting caps, detonating fuses, and fulminate of mercury in bulk were loaded on the same vessel with high explosives, it was required that they be placed in a different compartment, the distance in a straight line, from the compartments containing them, to the explosives to be not less than 25 ft.

On barges carrying explosives of any or all descriptions, in which oil lights or stores are used, it was required that the cabins containing such oil lights or stores be protected by covering wooden walls, partitions, floors, and ceilings with two thicknesses of one-quarter inch asbestos board placed with joints broken and covered with No. 20-gage metal. This precaution must also be applied to doors, and the doors from the cabin into other parts of the boat were required to be provided with substantial springs, making them self-closing.

Stoves in barge cabins must, according to the regulations, be placed at least 18 in. from all partitions, and a sheet-metal shield, 5½ ft. in height, securely fastened to the floor and the wall, was required placed midway between the walls and the stove. The stove must be at least 5 in. from the floor of the cabin, supported on legs or on hollow tile. The stovepipe hole in cabin was required to be 18-in. larger in circumference than the stovepipe. Screens were required for the stovepipes. No artificial light was permitted in the holds. Only flashlights might be carried.

On the loading vessels, care was taken to see that no packages of explosives were rolled, dragged, or slid over each other or over the decks. Boards were laid on the packages for a flooring. In transferring high explosives in bulk, blasting caps, detonating fuses, and fulminate of mercury, from one vessel to

another, they were handled by regulation chute and mattress, or by hand. Where there was a difference in elevation between the vessels, or condition of weather rendered it impossible to use the chute or load by hand, recourse was had to mechanical hoists or to crate or basket. When such crates were used, or when packages were hoisted in by sling loads, care was exercised that all loads were deposited on mattresses.

Where an inclined chute was used, such chute was made of 1-in. planed boards with side guards 4 in. high, extending 3 in. above top face of bottom of chute and throughout its length fastened with brass screws. D-shaped strips or runneds not more than 6 in. apart and running lengthwise of the chute were required to be fastened to the upper surface of the bottom part by means of glue and wooden pegs extending through the bottom part and runners. Where dymanite packages are being handled, the chute must be occasionally wiped down with waste moistened with machine oil. The mattress required on all the vessels which loaded munitions measured 4 ft. wide and 6 ft. long and not less than 4 in. in thickness. In lieu of a mattress, a jute or hemp mat of like dimensions was permissible.

When the chute was used, men were stationed at intervals to check the descent. All ruptured boxes or packages of high explosives were taken beyond the explosives loading area, generally Raritan Bay, and there repaired if such were practicable.

We have taken the responsibility, without consulting Captain Carden, of publishing the following letter here. We hope he will forgive us—*Editor*

Treasury Department, Washington

September 5, 1919.

My dear Captain Carden:

I have examined with the deepest interest the illuminating report which you have presented covering the operations of the office of the Captain of the Port and Harbor of New York and Vicinity for the period from Dec. 13, 1917, to June 30, 1919.

Your report presents a record of achievement of which you and every officer and enlisted man in the Coast Guard may well be proud. I have followed your work and that of the men under your direction with the deepest interest and have been impressed with the difficulty of the task which confronted you. The enforcement of anchorage regulations during the war period was a duty which involved a heavy responsibility and which could not properly be performed except by a man who combined firmness of opinion with exceptional balance of judgment. Upon the proper discharge of these duties depended the safety of many thousands of inhabitants of the city of New York and vicinity. The safeguarding of these public interests had to be reconciled with the necessity of an expeditious lading of high explosives for the use of our army as well as the armies of our Allies. The performance of this task required great patience and did not carry with it the rewards that have come to so many other branches of the military and naval services. For this very reason the obligation of the country to you and to the men under your charge is greatly enhanced.

I desire to take this opportunity to give expression to this obligation and at the same time to request of you to inform all the officers and enlisted men under your command that I am fully conscious of the magnitude of the service which they have rendered and desire to express to each and every one of them the thanks and appreciation of the national government.

Most sincerely yours,

(*Signed*) CARTER GLASS,

Secretary.

Captain G. L. Carden,
Captain of the Port of New York.
Barge Office, New York City.

Employment of Civilians Disadvantageous

With a full appreciation of the skill of many stevedore gangs, the experience gained is against the advisability of introducing a civilian element in which compensation largely, if not altogether, and compensation of very high rate, is an incentive. The men of the Coast Guard shared with the stevedores all dangers inherent to working among masses of high explosives. The service of the former was patriotic, as they had enlisted voluntarily, and yet many of the stevedores, it is understood, earned in one day as much as, if not more than, the equivalent of the half-month's pay of the Coast Guardsman who was charged with the responsibility of seeing that the work was properly performed.

It was because of the numerous delays occasioned by reason of returning stevedores to their homes at night and getting them aboard in the morning—none of which ought to have occurred with the elimination of civilian help—that the recommendation was made that all loading be conducted so far as possible at Sandy Hook, utilizing prisoners-of-war from the Continent, to be placed in camp there—a suggestion which was prevented from further development by reason of the signing of the armistice.

To the vigilance of the officers and men of the Coast Guard may be attributed the absence at this port of any such catastrophe as occurred at Halifax. The potentialities were all here. A providential guidance willed, however, that the munitions should go forward without mishap of any kind.

Metallic Tungsten and Molybdenum Produced by New Process

Those connected with the tungsten or molybdenum industry may be interested in the following item, which appeared in "Commerce Reports" for Dec. 16: "A Norwegian firm, A/S Norsk Staal (Elektrisk-Gas-Reduktion), has worked out, during the war, a general process for reducing tungstic acid into tungsten powder and molybdenum sulphide into metallic molybdenum. It claims that the final products, which are in the form of small tablets, are of the most superior quality, being completely free from sulphur, carbon, or oxygen. It also says that the price for converting the ores into metal is lower than by any other method known by it. It is at present projecting a plant for the reduction of tungstic acid in Norway, and would like to form connections with an American company to use the methods in this country. The firm is at Dronningensgt, 22, Christiania, Norway."

A World Shortage of Phosphate is feared by some English manufacturers of superphosphate, according to the Bureau of Mines. They point to the shortage of phosphate fertilizers in South Africa, which has prevailed for nearly three years, as further evidence upon this point. Steps are being taken there to utilize more fully the Saldanha Bay phosphate deposits.

Mine Bookkeeping

Methods That Have Stood the Test of Experience—Warehouse and Material Accounts—The Wastefulness of Complicated Card Systems—Importance of Compiling Daily Reports of Tonnages and Labor Costs

BY C. B. HOLMES
Chief Accountant War Minerals Relief; formerly Chief Accountant, Chile Copper Co.
Written exclusively for *The Journal*

IT IS A MATTER of comment that so few mining companies keep proper books of account. In other lines of business the need for proper bookkeeping systems is generally apparent at the outset; but in mining the reverse seems to be the case. Though the larger mining companies have adequate accounting systems, it is those companies with from $5,000 to $100,000 invested to which I particularly refer, though even the larger companies often expend large sums before an accounting system is installed, purchasing and shipping to the property large amounts of construction material, and paying freight and haulage charges on same, before a system of warehouse accounts is installed or a warehouseman employed. Then they employ a bookkeeper and a warehouseman and turn over to them a mass of invoices and freight bills. Probably by this time most of the material so purchased has been used, and no account kept of where it was used; the bookkeeper is unable to apply the freight bills and haulage charges to the invoices, and, as a consequence, the correct details of the construction and preliminary development costs are never known. The bookkeeper opens up a set of books and makes adjustments to cover discrepancies.

C. B. HOLMES

Careless Accounting

The following is an extract from an auditor's report on one of the War-Minerals Relief claims:

"No books were kept. Canceled checks and most of the supporting invoices were produced. Aside from what invoices were shown, all my information came from notes on check stubs."

In a year and a half this company had expended about $75,000, its receipts from ore sales amounting to $68,000. This is only one of many instances brought to my attention in the conduct of my work of examining war-minerals claims, where no books of account were kept. In the instance above cited it would be interesting to see claimant's income-tax return, as, eliminating capital expenditures from the total, and allowing for depreciation and depletion, a profit was made on operations.

It should be apparent to any thoughtful business man that expenditures aggregating thousands of dollars should be properly recorded in books of account, if he desires to know whether his operations are profitable. With a proper bookkeeping system, an operator should know exactly what it costs to produce and market his ore, how his profit or loss occurred, and what steps to take to increase his profit or decrease losses.

The Correct Accounting Method

A long and varied experience enables me to make the following suggestions to those about to start a mining operation:

Employ a bookkeeper versed in mining accounts (construction and operation), and, if the operation warrants, an intelligent timekeeper and an experienced warehouseman. Though the timekeeper and material man need not be accountants, it is absolutely necessary to correct cost-keeping that they be instructed in the accounts to be kept, and to what accounts to charge labor performed and material used. They must be just as interested in costs as the bookkeeper, and a conscientious bookkeeper will watch the costs as closely as the superintendent or manager, and be able to point out and analyze increases in costs; and a decreased cost should give him as much satisfaction as it gives the management.

A timekeeper can be trained to his work in a short time, but a good material man is a rarity. He must

of need be acquainted with all classes of hardware, machinery, lumber, paints, oils, electrical supplies, and all essential materials and commodities. He must conduct his warehouse as though it were a retail store. He should realize that he must account for each article charged to him by the main office, and that if he is careless and allows articles to be taken out without a record being kept or a charge made, when an inventory is taken he will be short, and that the costs, which were dependent upon him in so far as material is concerned, will have been wrong.

He Got the Requisition

In this connection I recall an amusing incident that happened years ago. I had charge of the accounts of a smelting plant. The warehouseman was a mild-mannered little fellow of whom everyone was very fond. Anyone could go into the warehouse and take out anything, and not be bothered about a requisition. In consequence, the costs were rather erratic. I convinced him that he was too nice for that job and should be selling lace handkerchiefs. I employed a big Canadian who understood the stock and told him not to let anything get out of that warehouse without a requisition. About noon of the first day he took charge I was called over to the warehouse. A converterman had rushed into the warehouse and grabbed a tuyere and was hastening out with it when my new warehouseman intercepted him and politely asked for a requisition. The converterman remarked "To hell with your requisitions," and again started out. He went on hospital half pay for several days. After that I got pretty correct costs, and some of the laborers would take off their hats when entering the warehouse.

The next step is to employ a carpenter foreman and some carpenters to build an office and a warehouse. While this is being done, there will be time to look for a manager or superintendent.

Charging Material

All material, both construction and operating, should be charged to warehouse or material account and that account credited when the material is put into use. Don't try a short cut and charge some of it direct to construction features and run the rest of it through your material account. I saw this tried on one of the largest plants in the world. A large amount of the material charged direct never found its way into the plant until a couple of years after it was so charged, and in the meantime large amounts of material purchased were piled up with it and charged to material account. The manager had a new warehouseman about every three months. The result was that material already charged once direct was charged again, and the material account credited with material with which it had never been charged, and large amounts of material used in construction were never charged at all. An auditor found an immense warehouse shortage and prorated it. That company does not know today what the different original construction features cost and it never will know.

This illustrates the necessity of employing a competent warehouseman. You are solely dependent upon the timekeeper and warehouseman for correct costs. The bookkeeper simply takes their reports and journalizes them.

Avoid Complicated Details

Don't make the detail of your costs so complicated that your timekeeper and warehouseman, in order to distribute labor and material, must of need be a combination of engineer and expert accountant. I have seen construction costs devised by some engineers which were so complicated that a timekeeper would have to keep a constant watch on a carpenter in order to distribute his time; or, if the card system were in use whereby the carpenter distributed his own time on a card, it would take him longer to decide to what he should charge his work than to do the work itself. For instance, he may be building a small four-room employee's house. Some construction engineer has decided that the following construction detail is indispensable: Excavation, foundation, framing, siding, flooring, trimming, ceiling, roofing, and glazing. This house is being built in Chile, and the engineer thinks this detail will be useful some day in case he has to build one like it in Kamchatka.

Too much stress cannot be laid upon the necessity of the bookkeeper familiarizing himself with the plant. He should understand every detail of the operation, and after cost sheets are compiled be able to analyze the cause of an increased cost.

High Profits No Warrant for Loose Accounting Methods

Many mines, owing to the high grade of the ore, are money makers from the start. The fact that your operations show a profit, is no reason why you should be lax in watching your costs and not have an accounting system which will point out where costs can be improved upon and a larger profit made. Where a mining operation is on a paying basis extravagance is likely to develop and persist.

In most mining companies, about the fifteenth or twentieth of the month, a monthly report and cost sheet is furnished, showing the result of operations for the preceding month. This is of little value as a preventive of abnormal costs, for the reason that a condition may have arisen on the fifteenth of the preceding month resulting in an abnormal cost, and if the management is not advised of that cost until about the fifteenth of the following month, that condition has probably existed a month before it is discovered and remedied.

Daily Report Essential

A daily report should be furnished the manager showing tonnages and labor costs and, wherever possible, supplies consumed. For instance, although explosives are withdrawn from the warehouse magazine in quantities and sent to the mine, it is a simple matter for the mine foreman to make a daily report of explosives used and tonnages broken. I have in mind a case where the operation was open-cut mining. There had never been much attention to powder costs per ton of ore broken. A new foreman came on the job, and by watching this item succeeded in cutting the cost in half. Men were loading holes in soft ground as heavily as in hard. Lots of ground was

broken by loading crevices, and those Slav miners would put six sticks in a crevice where one stick would have done the work.

Operating material in every-day use can be kept account of daily as well as monthly by a proper system of reporting by the foreman and the co-operation of everyone. Oil or other fuel used in firing boilers, cyanide, lime, zinc dust, or other material used in a mill should all be constantly watched to see that not more is used than is necessary, and it should be the duty of the bookkeeper to keep the management supplied with this data, so that leaks can be stopped immediately and not a month after they start. A competent mine accountant, familiar with the operation, can analyze exactly the cause of an increased or abnormal cost, and such a man is worth to the company many times his salary.

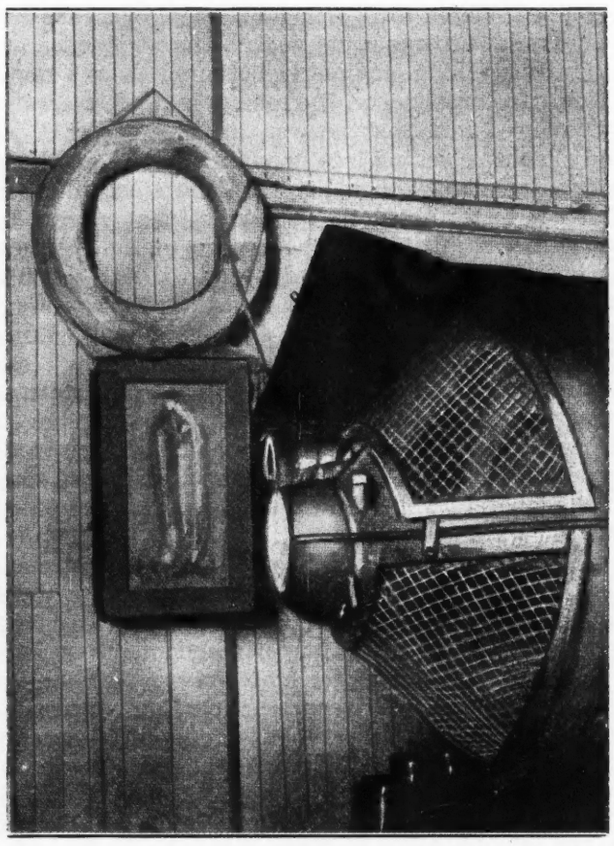
The Bureau of Mines at Washington has in course of preparation and will soon issue a bulletin on mine accounting. This subject has been often dealt with, but mostly with regard to forms for cost sheets, payrolls, time cards, warehouse requisitions and other plant forms, without any explanation of bookkeeping methods necessary for their compilation. The simple system of mining, milling, and smelting accounting I have outlined in this book should enable companies to obtain correct costs and metallurgical data, even though the accountant may have had no previous experience with this class of work. In the compilation of the work my idea was that in starting a mining operation an experienced mine accountant is not always available. The operation may be small and not warrant paying the salary required by an experienced man. However, there may be available a mercantile store bookkeeper. If he will follow the methods outlined, and is an accountant, he should have no trouble in applying his theoretical knowledge to the practical keeping of mine books. The book tells in simple language what I learned in fifteen years, experience in mining, milling, and smelting plants, and takes the reader through a month's actual operations.

Drowning Hazard on Gold Dredges

In the September number of the "California Safety News," issued by the Industrial Accident Commission of California, F. L. Lowell, deputy mine inspector, calls attention to the drowning hazard that exists on gold dredges.

He says: "When a man falls into a pond of water, the incident is looked upon by the casual observer as a good chance for a laugh at the expense of the victim, and such would be the case if the incident ended happily, but it so happened during the latter part of last year that three men lost their lives by falling into the water from gold dredges. In one instance the man had on hip rubber boots and was assisting in cleaning up the riffles, and while so doing slipped on the wet riffles, and fell over the end of the boat into the muddy water. The sand and mud flowing from the sluices filled his boots and thus prevented him from rising to the surface. A grappling hook had to be made in order to search for him at the bottom of the pond, and so much time was lost before his body was brought to the surface that he was beyond human help. In one of the other cases the man received a blow from a wire rope which was under such a severe strain that the deck sheave broke, thus precipitating him into the water. The blow stunned him and he sank to the bottom and was not recovered for some time. In the third instance two men were in an automobile and about to start toward town with a piece of machinery, when the driver made the mistake of putting the gears in reverse, thus backing the machine into the pond and drowning with the other men.

"In instances such as the foregoing it is necessary to get some means of quick assistance to the man in order to prevent him from sinking to the bottom; therefore life buoys with sufficient rope attached are required on all gold dredges. If the man for some reason has sunk to the bottom, and his body can be recovered within a reasonable time, so that artificial respiration can be applied, the patient has a fair chance to recover.



LIFE BUOY AND GRAPPLING HOOK FOR DROWNING PREVENTION ON A GOLD DREDGER

Photo supplied by courtesy of the Accident Commission and published with permission

"In order to make a quick recovery of the body from the pond, it is made compulsory to have a grappling hook, with sufficient rope, attached on all gold dredges. The accompanying photograph shows the cork life buoy and grappling hook and rope in the glass case below, both in a handy place, ready for an emergency."

Standardized Crosscut Rounds

Old-Timers Yielding to High-Speed Machines That Shorten Time of Drilling and Increase Operating Efficiency—Card System Instructs Miner As to the Details of His Work.

BY HOWARD DRULLARD
Written exclusively for *The Journal*

BACK in the days of the single and double hand hammer, a miner in going to his working face was confronted with a different problem of pointing holes each shift. Each hole was pointed to take advantage of walls and slips or an occasional bootleg. The old-time miner, working steadily at one particular face, could point his holes to a better advantage, probably, than the foreman who dropped around occasionally to ask, "How she goin'?" This circumstance developed the precedent that each miner, skilled or unskilled, was the authority on how his particular round was to be drilled. If he pulled the round to the satisfaction of the foreman, all was well; otherwise, he would go "down the hill." Another man was always available to take his place.

The old method maintains in many mines today. The detail of this important phase of mine work is left entirely to the judgment of the miner. The same grade of powder is furnished for blasting a round in a syenite crosscut as is furnished for breaking shattered ground in a stope. The drill column is not placed in a predetermined position, nor are the holes drilled in predetermined order. With the necessity of a higher rate of production, and considering the equipment available, the importance of standardized drill rounds and the use of the most efficient drilling machines becomes most evident.

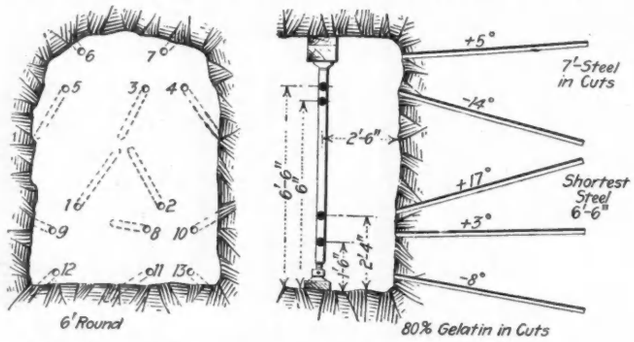
Efficiency of Standardization

The American rock-drill manufacturers have made wonderful progress in producing machines of such remarkable drilling speed that, in practically all cases, any number of holes required to pull a round can be drilled in one shift. A study of drilling operations will show that in drilling a hard face seldom more than 25 per cent of the shift is spent with the machine in actual operation. Norman Braly, manager of the North Butte Mining Co., Butte, Mont., in an effort to further increase the efficiency of his organization, developed standardized methods for every phase of the extensive operations of this large property, with most gratifying results. Not only the drilling operations are standardized, but every other detail of the underground work is standardized.

A "BACK HOLE"

A "TOP CUT"

Space does not permit a thorough delineation, in this article, of all the methods employed; I will merely outline the standardized rounds used in untimbered crosscuts. All other branches of the operations have been worked out in the same comprehensive manner, and a system developed whereby the



Holes	Position –	Height of Arm	Depth–
6-7	Over Arm	6'-6"	6'-1"
3-4-5	" "	6'	6'-3"
1-2	Under Arm	2'-4"	6'-3"
8-9-10	" "	2'-4"	6'-1"
11-12-13	" "	1'-6"	6'-1"

DIMENSIONAL DETAILS OF A STANDARD SET-UP FOR DRILLING COLUMN—SIX-FOOT ROUND

individual effort of each mine worker is registered, and credits are given accordingly. Cross-cut work is given six classifications: soft ground, medium short ground, hard ground, extra hard ground, and the six-foot round. Close supervision of all work is maintained. Each miner is given a card by his shift boss, showing the round to be drilled. Each card is perforated in the middle, the top half being a requisition for powder and the bottom half instructions. The accompanying illustrations show the bottom and top half of the soft ground card, and the bottom half only, of the other cards.

Placing the Drill

Notice first the set-up. The single-screw, three inch by seven foot column, is placed two feet six inches from the breast. This is the correct position, for when the machine is placed on the arm set at right angles to the crosscut it can be run all the way out on the feed screw, and when the end of the screw is reached the chuck end is almost against the ground. A close set-up is most satisfactory, for by this means the strain upon the rotating mechanism of the machine is minimized and vibration and torsional strain are reduced, which means less breakage of drill steel. Another reason for the two-foot-six, set-up is the fact that the column must be placed at this point to attain the proper angles to the holes, and still allow the long drill steel to be placed in the hole.

The column arm is set accurately at the position indicated on the card, and the machine given the proper dip by the use of a small rule equipped with a spirit level and graduated to show angles. This nicety of detail may seem to be a bit delicate, but in practice it is not so, for miners take keen interest in doing their work in the proper manner provided that a standard is established to which they may work, and particularly, as at the North Butte, where individual effort is credited.

All holes except the lifters are drilled above the horizontal. The practice of drilling cuts below the horizontal is another method handed down from the days of hand drilling. In ground that is firm and permits up-cuts being used without the back being shattered, the up-cuts are found more satisfactory than the more commonly accepted down-cuts. Holes above the horizontal drill much faster than down holes, and this is particularly true in ground that ravels, so this method had been adopted.

Detail of Operation

The accompanying reproductions of the cards used illustrate the methods clearly, and little explanation is necessary. The soft ground round is blasted with 35 per cent powder, with the exception of the lifters, in which 33 per cent powder is used, for owing to its slower action a greater heaving effect is produced, and the broken ground is lifted further back from the face than when faster powder is used. Four sticks of tamping are used to each hole, and for this purpose the regular Du Pont tamping bags, filled by machinery with flotation tailings, are used. Tamping of the holes is a detail that is absolutely necessary in obtaining the maximum results from

A "LIFTER"—OIL BOTTLE ON LEFT HAND SIDE

powder; a much better combustion is effected, giving greater breaking power. Much less noxious gas results from the explosion of a tamped hole, because tamping assures a better combustion of the powder.

N. B. 1001—6-12-19—5M

HEADING WITHOUT TIMBER

Date..... **Soft Ground** **Explosives Issued**

Place ..... Boss's No..... Before Lunch.....

Magazine No. ..... Miner's No..... After Lunch.....

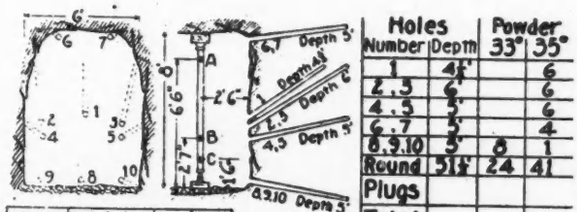
	HOLES		POWDER	
	Number	Depth	33%	35% ..
Round	10	5 1½	24	41
Plugs				
Total				

No. of Primers.....

Tamping.....

Type of Drilling Machine Used.....

Don't issue powder if card is detached.



Holes	Number	Depth	33°	35°
	1	4½'		6
	2.3	6'		6
	4.5	5'		6
	6.7	5'		4
	8.9.10	5'	8	1
	Round	51½	24	41
	Plugs			
	Total			

Holes	Position	Angle	Steel
6.7	A Over Arm	+7°	6'
1	B Under Arm	+35°	5'
2.3	B Under Arm	+30°	7'
4.5	B Under Arm	+13°	6'
8.9.10	C Under Arm	-8°	6'

No. Primers

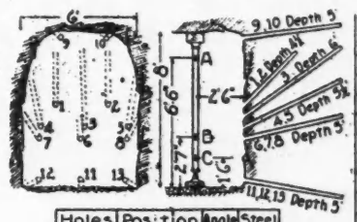
Tamping 4 Sticks per Hole.

Primers to be made of Gelatin Powder.

Use one (1) stick 33% powder and one (1) stick tamping for each foot of plugs drilled. Lower half of this card must be handed back to the miner for the shift boss, upper half must be filled in and handed in to the Card Rating Dept.

UP HOLES

SOFT GROUND



Holes	Number	Depth	33°	35°
	1.2	4½'		6
	3	6'		7
	4.5	5½'		6
	6	5'		7
	7.8	5'		6
	9.10	5'		4
	11.12.13	5'	8	1
	Round	66'	24	61
	Plugs			
	Total			

Holes	Position	Angle	Steel
9.10	A Over Arm	+7°	6'
1.2	B Under Arm	+45°	5'
3	B Under Arm	+35°	6½'
4.5	B Under Arm	+25°	6'
6.7.8	B Under Arm	+13°	6'
11.12.13	C Under Arm	-8°	6'

No. Primers

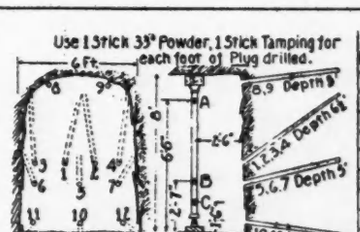
Tamping 4 Sticks per Hole

Primers to be made of Gelatin Powder.

Use one (1) stick 33% powder and one (1) stick tamping for each foot of plugs drilled. Lower half of this card must be handed back to the miner for the shift boss, upper half must be filled in and handed in to the Card Rating Dept.

UP HOLES

SHORT GROUND



Holes	Number	Depth	33°	60°
	1.2	6½'		7
	3.4	6½'		7
	5	5'		8
	6.7	5'		6
	8.9	5'		4
	10	5'	8	1
	11.12	5'	8	1
	Round	66	24	59
	Plugs			
	Total			

Holes	Position	Angle	Steel
8.9	A Over Arm	+7°	6'
1.2.3.4	B Under Arm	+35°	7'
5.6.7	B Under Arm	+13°	6'
10.11.12	C Under Arm	-8°	6'

No. Primers

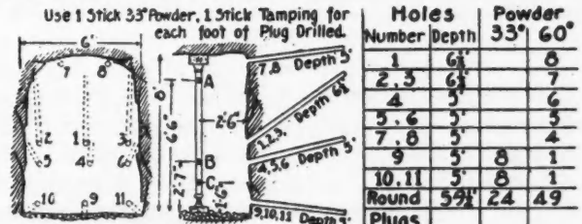
Tamping 4-Sticks per Hole.

In wet holes use 35° Gelatin in place of 33° Ammonia.

All primers to be made of gelatin powder. Lower half of this card must be handed back to the miner for the shift boss, upper half must be filled in and handed in to the Card Rating Department.

UP HOLES

HARD GROUND



Holes	Number	Depth	33°	60°
	1	6½'		8
	2.3	6½'		7
	4	5'		6
	5.6	5'		5
	7.8	5'		4
	9	5'	8	1
	10.11	5'	8	1
	Round	54½	24	49
	Plugs			
	Total			

Holes	Position	Angle	Steel
7.8	A Over Arm	+7°	6'
1.2.3	B Under Arm	+35°	7'
4.5.6	B Under Arm	+13°	6'
9.10.11	C Under Arm	-8°	6'

No. Primers

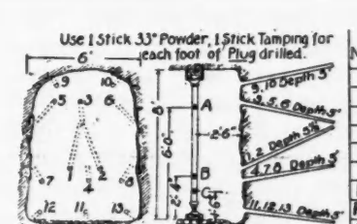
Tamping 4-Sticks per Hole.

In wet holes use 35° Gelatin in place of 33° Ammonia.

All primers to be made of gelatin powder. Lower half of this card must be handed back to the miner for the shift boss, upper half must be filled in and handed in to the Card Rating Department.

UP HOLES

MEDIUM GROUND



Holes	Number	Depth	33°	60°
	1.2	5½'		7
	3	5'		7
	4	5'		9
	5.6	5'		7
	7.8	5'		7
	9.10	5'		6
	11.12.13	5'	8	2
	Round	66	24	76
	Plugs			
	Total			

Holes	Position	Angle	Steel
9.10	A Over Arm	+10°	6'
3.5.6	A Over Arm	-12°	5½
1.2	B Under Arm	+25°	6'
4.7.8	B Under Arm	+10°	6'
11.12.13	C Under Arm	-8°	6'

No. Primers

Tamping 4-Sticks per Hole.

All primers to be made of gelatin powder. Lower half of this card must be handed back to the miner for the shift boss, upper half must be filled in and handed in to the Card Rating Department.

UP HOLES

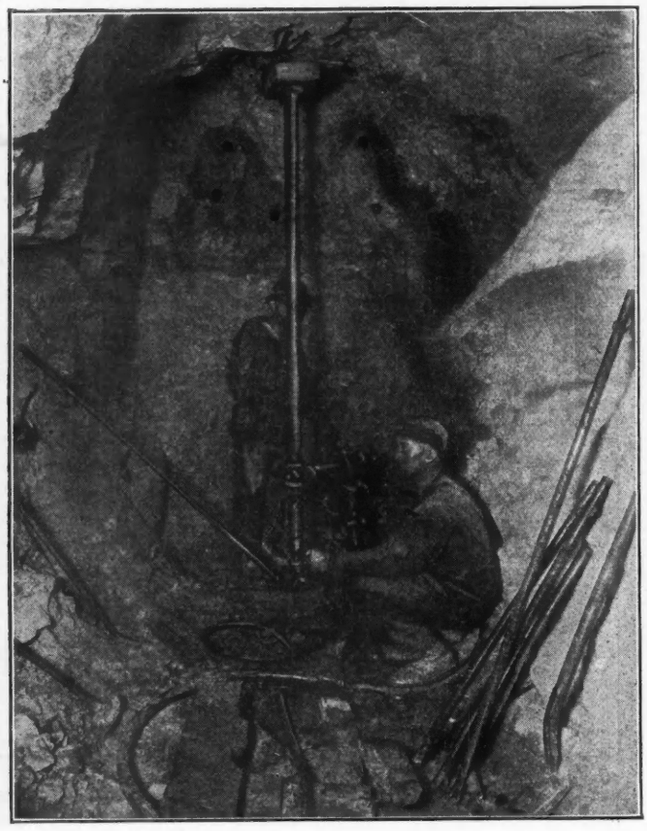
HEADING WITHOUT TIMBER

INSTRUCTION AND REQUISITION CARDS ISSUED TO MINERS WORKING ON DEVELOPMENT HEADINGS

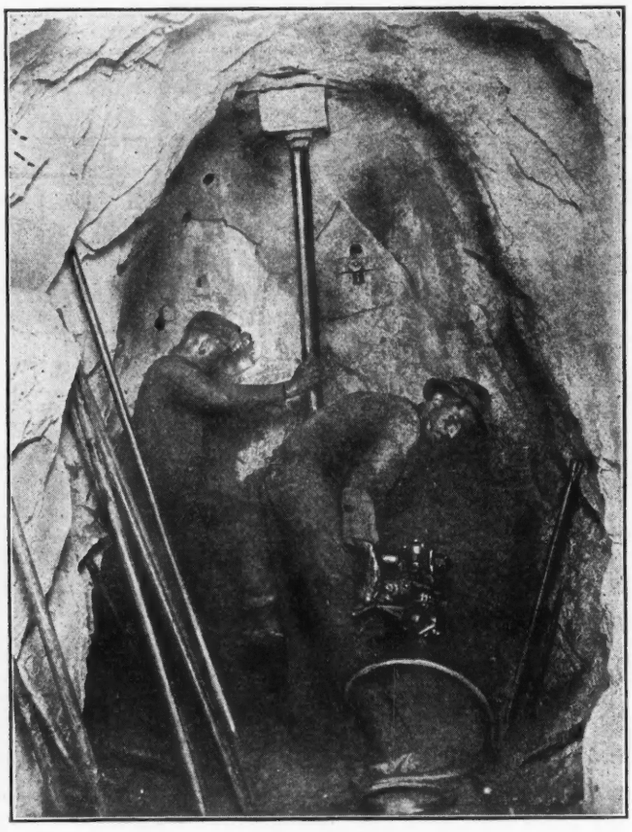
Thirteen holes constitute the round in short ground, holes 1 and 2 being four and one-half foot "easers," drilled at 45 degrees. The top cut hole drilled under the arm set at two feet seven inches from the floor, is drilled to a depth of six and one-half feet. I need not describe the rest of the ground, as reference to the illustration shows the holes clearly.

Breaking Hard Ground

For hard ground, twelve holes are required and 60 per cent powder is used in all holes other than the lifters, in which 33 per cent Red Cross Extra, or 35 per cent Gelatine is used. Holes 1 and 2 are drilled to be as close together at the bottom as possible, and when loaded with 60 per cent powder, explode simultaneously. For extra hard ground, thirteen holes are drilled, holes 1, 2, and 3, forming a diamond cut bottomed close together and exploded simultaneously with 60 per cent powder. Lifters are loaded with the lower-grade powder.



A BOTTOM OR "UP" CUT



A "LIFTER"

Mucking and drilling are done on opposite shifts. The drilling crews set up, drill a full round, tear down, and blast each shift. From five to six feet of ground is broken. The six-foot round is used only where the mucking is good, as ordinarily the five-foot round breaks as much ground as two muckers can remove in one shift.

Today, the limiting factor in crosscut progress is the removal of broken ground, not the drilling operation, for Mr. Braly has found that by the use of the Waugh Turbo drill the depth of the round can be easily increased from one that will break five feet or less to a round that will pull six feet.

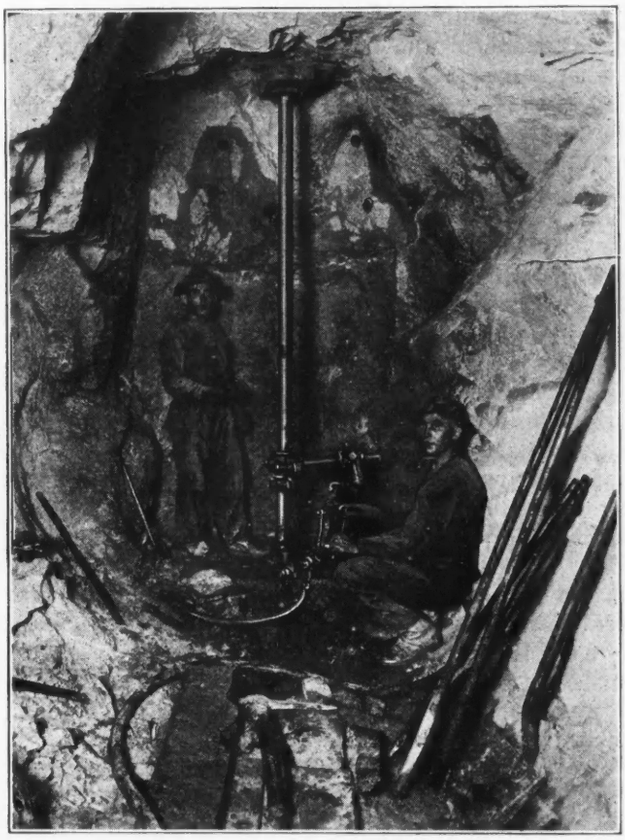
The accompanying sketch of the six-foot round shows the angle at which the holes are drilled printed in the body of the sketch. Eighty per cent Gelatine is used in the cuts, and this high-grade powder, exploding simultaneously in the cuts, cannot ordinarily be resisted by the ground. The force of the explosion is such that the cuts must break, and with this wedge blown out of the very center of the drift, the 60 per cent powder in the remaining holes breaks the ground easily.

Close attention is given to the maintenance and care of the tools used. The miners are furnished each shift with a bottle of oil filled by the magazine man. These bottles are made of a twelve-inch piece of two-inch pipe, capped on one end and reduced down to a half-inch pipe nipple on the other end. A half-inch pipe cap is attached to the bottle by a short piece of small chain. Miners are instructed to fill the lubricators of the rock drills every third hole, and in this connection it is interesting to note that many miners who have not been properly instructed are under the impression that a hammer drill can be adequately lubricated by pouring oil in the air hose once a shift. The modern rock drill strikes from fifteen hundred to two thousand blows per minute, and requires frequent oiling.

Double taper cross-bits with one-eighth inch change of gage are used. The shanks of the drill steel are, each and every one, in perfect condition,

the proper length is carefully maintained, and the hole in the center carefully inspected.

The excellent results recorded could not be obtained were it not for the perfection of the ventilating system. The temperature of the working face



SHOWING HOLE NO. 10 OF THE SIX-FOOT ROUND

is always kept below 87 degrees, and this is remarkable, considering the fact that rock temperatures of 105 degrees are encountered.

Recent Interesting Publications

Flotation—In the November, 1919, issue of the Bulletin of the Institution of Mining and Metallurgy, H. L. Sulman, of Minerals Separation fame, publishes probably the most elaborate paper which has yet appeared on flotation, in its physical aspects. Mr. Sulman first describes the principal methods of flotation which have been developed and reviews the molecular principles involved. The explanation of flotation, he says, may be based on the differences shown by various substances in the degree to which they are wetted by water or other liquids. This degree of wetting may be influenced by the molecular porosity of the solid surface, and indicated more or less quantitatively, by the contact angle made between the free surface of the liquid and that of the solid. The author discusses the molecular constitution of solids and liquids, gravitation and molecular forces, surface energy and surface tension, pressure in bubbles, the dynamical aspect of surfaces, interfacial tension, differential wetting, the hysteresis of liquid-solids-air contact-angles, absorption, the stability of films, the role of immiscible oil, frothing reagents, air and oil emulsions, the action of modifying agents, the degrees of crushing required, theories of flocculation, the differential flotation. Electrical phenomena in connection with flotation are considered of minor importance. Successful flotation, Mr. Sulman summarizes, "depends in bringing about the most advantageous selective adhesions, selective absorptions, and selective flocculations between the complex particles in an ore-pulp." Copies of the paper may be obtained "at a nominal charge," the amount of which is not stated, from the Institution of Mining and Metallurgy, No. 1, Finsbury Circus, London, E. C. 2, England.

Geological Survey Bibliography—The U. S. Geological Survey has issued a list of all the publications of that bureau concerning deposits of the principal metallic and non-metallic minerals. The list is arranged by minerals and will be of interest to all who wish to bring their files of Survey publication on any special subject up to date. The bibliography is published as U. S. Geological Survey Bulletin No. 666-GG and may be obtained free of charge by addressing the U. S. Geological Survey, Washington, D. C.

Power Field Piping—A thirty-six page paper on this subject is published in the October, 1919, issue of the Proceedings of the Engineers' Society of Western Pennsylvania. Engineers interested in the progress of the art, material used, effect of superheated steam, details of construction, drawings and specifications, and general design of power field piping will find a perusal of this paper profitable. Copies may be obtained from the office of the society, Union Arcade Building, Pittsburgh, Pa., for 50c. each.

Possible New Market for Monazite Sand

The alloy ferrocerium has recently been introduced into the manufacture of gray-iron castings, and its applicability as a deoxidizer in the manufacture of steel is now being studied. Dr. Richard Moldenke discussed the subject at the fall meeting of the American Foundrymen's Association. The alloy has a low melting point and is closely related to some of the other ferro-alloys which have been found so useful in recent years in special steel manufacture.

Up to the present, practically the only use of cerium has been in the manufacture of pyrophoric alloys, used for making sparks to ignite carbide lamps, gas jets, and in automatic cigar lighters. The production has probably been not in excess of ten tons per year. It is made from monazite sand, the principal producing countries being Brazil and India.

Byproduct Coke Ovens in 1917, according to official figures, burned only 32,000,000 tons of the 360,000,000 tons consumed in the United States. Over ninety-one per cent was therefore burned without any attempt to recover the valuable by-products, ammonia compounds, naphtha, creosote, pitch, and a number of coal-tar products.

William Hugh Freeland

WILLIAM HUGH FREELAND, who developed the first commercially successful pyritic-copper smelting practice in America, died in Saint Luke's Hospital, San Francisco, on Nov. 22. He was born at Carluke, Lanarkshire, Scotland, Oct. 25, 1864; was educated in Glasgow and first came to this country in 1883. In 1884 he was ranching near San Antonio, Tex. From 1885 to 1889 he was in the ship brokerage business in Quebec. His mining experience began in 1889, when he went to Mexico. He remained in Mexico representing the owners of mining interests in the mountains back of Parral until 1892, when he went with Price's laboratory in San Francisco. There he remained until 1894. During 1894 he was gold mining in Calaveras County,

W. H. FREELAND

where he met Miss Eva Hopkins, whom he married in 1897 and who survives him. In 1895 he was employed by the Mountain Copper Co., Keswick, Cal., as assayer and steadily advanced until, in 1898, he had become assistant manager, having worked up through the positions of mine superintendent and smelter superintendent. In 1898 he resigned to become general manager of the Ducktown Sulphur, Copper & Iron Co., Ltd., at Isabella, Tenn., in the Ducktown copper mining district. In 1900 he became an American citizen.

At Ducktown Mr. Freeland remained as general manager for over eleven years and made his most conspicuous success. He had experimented on pyritic smelting under Herbert Lang at the Mountain Copper Co.'s smelter, he had gathered all available information regarding the Tasmanian practice, and after much further experimenting at Ducktown with both hot and cold blast he finally, in the summer of 1902, demonstrated a successful cold-blast process under Ducktown conditions, and the practice which has since then been the standard in the district was adopted by the Ducktown company. Later Mr. Freeland invented and introduced his charging machine, also still in use by the Ducktown company. During his stay at Ducktown he developed and perfected an organization which enabled the Ducktown company steadily to emerge from a small dividend payer to one of the best profit makers among the smaller copper producers in the country.

In 1910, Mr. Freeland's health not being strong, he resigned and returned to California. In 1911 he purchased ground in San Rafael and erected the charming home, in which he lived until his death. There he gave, as fully as his health would permit, most valued services to local developments for the public benefit, to Liberty Loan campaigns, and other patriotic movements during the war, and from there he was twice recalled to Ducktown to advise with the company in matters of vital policy.

Mr. Freeland combined rare business shrewdness with engineering ability, and it was said, by such metallurgists as David H. Browne and John H. Allen that he knew more practical copper metallurgy than any other man they had ever met. He had great capacity for getting good men about him in his work. He was the soul of honor, was implicitly trusted by all who knew him and, combined with great force of character, underneath a reserve of manner, there existed a gentleness, sweetness, and consideration of others which steadily won not only the respect but the affection of all those with whom he came in contact.

William Young Westervelt.

Davis-Daly Copper Co.

The report of the Davis-Daly Copper Co. for the quarter ended Sept. 30, 1919, states that shaft sinking has been completed to a depth of 2,800 ft., and a station has been started on the 2,700 ft. level. Crosscutting will be started at once to intersect the orebodies encountered on the 2,500 ft. level. Total development for the quarter was 2,257 ft., comprising 864 ft. of drifts, 588 ft. of crosscuts, and 805 ft. of raises.

Tonnage hoisted for the quarter is the largest in the history of the company. Shipments for the period amounted to 21,850 tons, producing 3,231,332 lb. of copper and 126,090 oz. of silver. The average assay of ore shipped for the period was 7.46 per cent copper.

Total ore returns were larger than those of any other quarter, and the cash and quick assets of the treasury amounted to $736,854.49 on Sept. 30, 1919. The company has recently secured the services of James L. Bruce as general manager. Mr. Bruce was formerly general manager of the Butte & Superior Mining Co.

Ordinary Extra-Heavy Piping and Fittings are designed for steam pressures of 250 lb. Material designed for 350 lb. and superheat is in successful use, but is not standard.

THE PETROLEUM INDUSTRY

Mexican Oil Fields Another Source of Trouble

THE oil industry is now feeling the effects of the disturbed conditions in Mexico, which have, in the last three or four years, driven practically all American metal-mining men out of the country. The offensive against foreign oil operators comes at a particularly propitious time from the Mexican standpoint, when the coal strike has caused a fuel shortage which will last all winter, and has resulted in many plants changing over from coal to fuel oil. The oil supply, therefore, already inadequate, will have even greater demand made upon it than formerly. According to 1918 figures, the United States consumption of crude oil is about 60,000,000 bbl. greater than the domestic supply; this excess being taken from storage, and imported, chiefly from Mexico.

In 1918 the Mexican importation amounted to 36,000,000 bbl. of crude, which, although only about 10 per cent of the domestic production, nevertheless, relieved a large part of the shortage in domestic supply. Deprivation of the Mexican supply would be particularly troublesome to the U. S. Shipping Board, with its 500 oil-burning passenger and freight steamers, for most of its fuel contracts are with companies which obtain their supplies from Mexico. In fact, the statement has been made that 90 per cent of the oil used on the Atlantic and Gulf coast is imported from our Southern neighbor.

The Mexican oil policy is just what might be expected of an irresponsible government. The present producing wells are the result of extensive exploration and development, and are located on land legally acquired. The ruling powers in Mexico City cannot, however, resist such an attractive opportunity to recoup their sunken fortunes at the expense of others, particularly when the others happen to be the much-despised Americans. The policy of "Mexico for the Mexicans" is called on to justify their attitude.

After months of intermittent debate the Mexican Senate has passed President Carranza's petroleum bill. Just what the bill, in its present shape, requires, has not been published, but it is in effect an amendment of the much-discussed Article 27, and provides for the nationalization of all oil lands which had not been legally acquired by May 1, 1917, the date when the present Constitution of Mexico went into effect. Former decrees required that no new wells, whether on private property or not, could be drilled without a government permit, the securing of which implied that the Mexican Government held subsoil rights even on private land. To secure a permit it was also necessary to acquiesce in advance to any regulations which the Mexican Government might make in the future, and to pay royalties under the name of taxes. As a result, little drilling has been done. The Mexican Petroleum Company has done none for a year, and some other companies, which have attempted to drill without a permit, have met with armed resistance since Nov. 12, 1919. So far, the State Department at Washington has registered three protests, one on June 18, the second on Oct. 1, and the last on Nov. 18 without being accorded the courtesy of a reply.

Meanwhile the old wells are rapidly going to salt water and the production is dropping off. Senor Bonillas, the Mexican Ambassador, wishes "to enlighten the intelligent American public" through the columns of the "New York Times," by the fact that the potential production of the present wells is about 600,000,000 bbl., but that only 64,000,000 bbl. per year is being taken, so that much more could be removed if desired. The thought may occur that it is altogether likely that the operators, with the present shortage and attendant high prices, are producing as much oil as possible. Speeding of oil wells has decided limits. In some wells the oil, while possibly present in large quantity, seeps in but slowly. In others, rapid pumping brings up an excess of sand. There is also a limit to the speed at which sucker rods can operate. Senor Bonillas further proceeds to say that there is no restriction as to the export of crude oil from Mexico, and that if the drilling of new oil wells had been stopped, it was no doubt due to the fact that compliance had not been made with the rules of the Department of Industry, Commerce and Labor regarding permits. This slap on the wrist should result in at least a fourth note on the subject.

The restrictions seem aimed particularly at Americans, for the Royal Dutch company, according to reports, has not been interfered with, its holdings being operated through the Mexican Eagle, a Mexican company.

Every day it becomes more evident that the Sick Man of America needs the close attention of a competent staff of physicians such as America, Great Britain, and France could no doubt provide.

The American Supply of Manjak comes principally from Trinidad, according to "Commerce Reports." Mining operations are carried on by the Trinidad-Tarouba Oil Development Co., of San Fernando, shipments amounting to 41 tons from Jan. 1 to Oct. 1, 1919.

More Than 60 Per Cent of the Refining Cacacity of the United States is situated in states along sea coast, 19¾ per cent being on the Atlantic seaboard, 20 per cent in California and 23½ per cent in Texas and Louisiana, according to the Boston News Bureau. Indications point to Texas and Louisiana becoming greater refining states, because of the big light-oil discoveries of Burkburnett, Ranger, Desdemona, and Homer.

Political and Commercial Geology Series
The Petroleum Resources of the World—Part II.*

American, British, and Dutch Interests Control Most of the World's Oil—United States is Surpreme in Western Hemisphere, But Has Not the Aggressive Nationalistic Policy of Foreign Governments

BY JOHN D. NORTHROP

Formerly Geologist, U. S. Geological Survey
Revised and abridged for "The Journal"†

THE commercial control of the world's production of petroleum, as far as nations are involved, is determined, in the main, through direct ownership of lands, leases, and concessions, or by the control through holding corporations of subsidiary companies holding fee, leases, mineral rights, or concessions of petroleum land. Outside of Argentina, where the domestic petroleum industry is owned and operated by the state; Germany, where the government participates directly in the financing of petroleum enterprises through the Deutsche Bank; and Persia, where the British government owns a substantial interest in a company owning and operating extensive concessions, the commercial control of the petroleum industry is determined almost wholly by aggregations of private capital acting in their own interests.

So far as the author is aware, Canada is the only country in which the petroleum industry may be said to be controlled by foreign (United States) interests, by virtue of an essential monopoly of pipe-line and refining facilities.

The following table shows, according to the best information available, the nationality and approximate extent of control exercised by the dominant interest in each of the principal oil-producing countries of the world in 1917:

COMMERCIAL CONTROL OF PETROLEUM IN 1917

Country	Production in 1917 (Barrels)	Nationality of Dominant Interests	Approximate Extent of Control by Dominant Interests
United States	335,315,601	American	96
Russia	69,000,000	British-Dutch	40+
Mexico	55,292,770	American	65
Dutch East Indies	12,928,955	British-Dutch	100
India	8,078,843	British	100
Persia	6,856,063	British	100
Galicia	5,965,447	German	100
Japan and Formosa	2,898,654	Japanese	100
Rumania	2,681,870	British-Dutch	36
Peru	2,533,417	American	70
Trinidad	1,599,455	British	80
Argentina	1,144,737	Argentinian	100
Egypt	1,008,750	British-Dutch	100
Germany	995,746	German	100
Canada	205,332	American	(b) 80 +
Venezuela	127,743	British-Dutch	80 (?)
Italy	50,000	French	96

(b). By control of refining facilities.

The accompanying diagram, Fig. 2, shows graphically the approximate commercial control of the world's production of petroleum in 1917.

United States—Commercial control of the petroleum industry in the United States is in the hands of the so-called "Standard Oil Group" of companies, by reason of their control of most of the great pipe-line systems of the country, of probably 75 per cent of the refining facilities, and of the substantial part of the actual production. Other do-

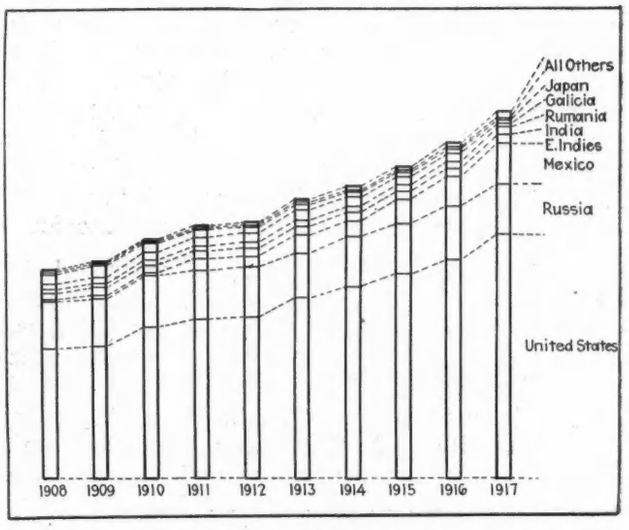


FIG. 2. APPROXIMATE COMMERCIAL CONTROL OF THE WORLD'S PETROLEUM

mestic interests having important shares in the control of the petroleum industry in the United States include the Southern Pacific R. R. Co., the Cities Service Co. (Doherty interests), the General Petroleum Corporation, the Gulf Oil Corporation, the Ohio Cities Gas Co., Cosden & Co., the Sinclair Oil & Refining Corporation, The Sun Co., the Texas Co., the Tide-water Oil Co., and the Union Oil Co.

Foreign interests in the United States include purely British companies, controlling production to the extent of about 2,000,000 bbl. a year; British-Dutch companies represented by the Royal Dutch-Shell Syndicate, controlling production to the extent of about 9,000,000 bbl. a year, together with refining and marketing facilities, and Franco-Belgian companies, controlling about 1,000,000 bbl. of production a year. Aside from the probable holdings by individual Germans of shares in companies engaged in one or more phases of the petroleum industry of the United States, I am aware of no organized German interest in any phase of the domestic industry.

Russia—Commercial control of the petroleum industry of Russia is, under the political conditions now existing in central Europe, to a large extent a matter of speculation. As nearly as can be ascertained, the dominant control is in the hands of purely British, Franco-British, and British-Dutch (Royal Dutch-Shell Syndicate) interests. Certain of the

*The basis of this article by Mr. Northrop was issued in mimeographed form for government use only, as one of the Political and Commercial Control series prepared under the direction of J. E. Spurr, and after the armistice the remaining copies were released to the general public. In this article of Mr. Northrop's the Editor has incorporated certain later notes and additions; as, for example, information furnished by E. Russell Floyd, of the U. S. Geological Survey; A. G. White, and W. E. Perdew, of the Bureau of Mines, and others.—J. E. S.

†Part I was published in the "Journal" of Dec. 27, 1919.

second-named interests are allied closely with an additional group of capitalists represented by the firm of Nobel Bros., of much importance, the present control of which is by no means clear from the literature available on the subject. Though originally Swedish, the financial interests now involved in Nobel Bros. are believed to include representatives of financial groups in England, France, and Germany as well, with control probably lying with the Anglo-Swedish interests.

Prior to the war, direct German interests in Russian petroleum included control by the Deutsche Bank through a Belgian company (the Petrole de Grosny) of the important producing and refining company, A. I. Akverdoff & Co., direction of which is now in British or British-Dutch hands. As in the United States, a considerable part of the actual production of petroleum in Russia is distributed among a large number of individually weak companies, dominated, because of the control of pipe-line or refining facilities, by one or another of the principal groups.

Of considerable importance in Russian petroleum affairs at one time was the European Petroleum Union, organized for combat in the world markets with the Standard Oil group. This union included, among others, such important petroleum operators as the Nobel Bros., the Rothschild interests (Now Dutch-Shell), Mantascheff (now Russian General Oil Corporation, British), and the Deutsche Bank, the latter controlling Akverdoff and Spies, in Russia, together with important companies in Rumania and Galicia. The extent to which this union controlled the affairs of its constituent companies now operating in Russia is uncertain.

In view of the present conditions in Russia, it is impossible to make any definite statement with regard to the petroleum situation. A decree of the Bolsheviki government concerning the nationalization of the petroleum industry, of June 20, 1918, declared as the property of the state all movable and immovable property employed in and belonging to the petroleum industry. Trading in oil was declared a state monopoly, and was delegated to the Chief Petroleum Committee of the Fuel Department of the Supreme Council of National Economy. In view of the fact that the principal producing areas are now under British military control, this decree is ineffective.

Mexican Control Divided

Mexico—Commercial control of petroleum in Mexico is divided between United States, British, and British-Dutch interests, controlling about 65, 30, and 2 per cent, respectively, of the production in 1917. The interests of the United States include the Doheny group, operating principally as the Huasteca and Mexican Petroleum companies; the Standard Oil Co. of New Jersey, operating as the Penn Mex Fuel Co.; the Sinclair interests, operating as the Freeport & Mexican Fuel Oil Co.; the Texas Co., Gulf Co., the Southern Pacific R. R., and others. The British interests are represented by the Pearsons, operating as the Mexican Eagle Oil Co., and the British-Dutch interests by La Corona Petroleum Co., and Chijoles Oil Ltd., controlled by the Royal Dutch-Shell Syndicate. No exclusively German interests are known to hold substantial interest of any important company operating in Mexico.

Formerly, concessions were freely granted to foreign individuals and companies for the exploitation of mineral deposits, and oil lands were sold by the native owners to foreigners. Article 27 of the new Mexican constitution of 1917 expressly forbids any but Mexican companies acquiring directly, or indirectly, petroleum lands in Mexico. A provision appears in all recent concessions for the exploitation of oil properties, stating that the concession will be declared null if any of the rights are transferred to any foreign government. The provisions and intent in a series of presidential decrees issued on Feb. 19, 1918, July 7, 1918, July 31, 1918, and Aug. 1, 1918, are to nationalize all petroleum lands and to permit them to be operated only by Mexican citizens or companies that agree to consider themselves Mexican, and that further agree not to invoke the protection of their governments. A bill was presented in December, 1918, to carry out Article 27 of the new constitution, but thus far no action has been taken in the matter. The decrees and legislation growing out of Article 27 have been protested by the principal petroleum companies operating in Mexico and by their respective governments.

Dutch East Indies—Commercial control of the petroleum resources of the Dutch East Indies is in the hands of the Royal Dutch-Shell Syndicate, and is essentially absolute by reason of the restrictions on foreign acquisition of mining rights in the East Indian Archipelago contained in the Netherlands East Indian Mining Act and subsequent supplements. Actual control is in the hands of the Bataafche Petroleum Maatschappij, which has a capital of $56,000,000, divided into five shares, three of which are owned by the Royal Dutch-Petroleum Co., and two by the British, Shell Transport & Trading Co. Purely British interests control an inconsequential production of petroleum in British North Borneo and in Sarawak.

Prospecting licenses and concessions are granted only to Dutch subjects and to Dutch companies. It is officially stated that the object of these restrictions is not to exclude foreign capital; however, their character is such that this is precisely the effect, and on account of the economic monopoly of the petroleum industry of the Dutch East Indies, which the Royal Dutch-Shell now have, it would be difficult for any new enterprise to gain a foothold.

India—Commercial control of the petroleum resources of India is exercised by the Burma Oil Co. by reason of its dominance of production, refineries, and pipe-line facilities, and through agreements as to marketing with its principal competitor, the British Burma Petroleum Co., both controlled by British capital. The Burma Oil Co., is allied with, if not directly controlled by, a group of British financiers, one or more of whom is interested in companies in Trinidad and Persia.

Rumania—During the war the Rumanian petroleum industry was temporarily wholly in control of German and Austrian interests. The advanced stage of development of the oil fields prior to the war, and the intentional damage, much of which is irreparable, wrought in the fields by British detachments in 1916, when capture of the fields by Austro-German forces became inevitable, are believed, however, to have deprived Germany of a large part of the fruits of her conquest, as it is considered doubtful if the Rumanian fields can ever again be made to yield petroleum at the rate of 12,000,000 bbl. per year attained before the war.

The American Petroleum Institute states that "Rumania is considering the erection of a state monopoly of both production and distribution on the ruins of the monopoly which Germany sought to establish there but was compelled by the armistice to renounce."

Prior to the war, British-Dutch (Dutch-Shell) interests controlled about 30 per cent of the annual production of petroleum in Rumania, German interests about 26 per cent, United States interests (Standard Oil Co. of New Jersey) about 18 per cent, French interests about 16 per cent, purely English interests about 6 per cent, and Belgian and Rumanian interests the remainder.

Galicia—Through the Austrian Society Gaz and the German Deutsche Erdoel Aktien-gesellschaft, German interests have dominated the petroleum industry of Galicia for years through the direct control of the larger producing and refining interests, and by reason of the fact that the smaller scattered interests were dependent almost entirely on the two leading companies, the Galizische Karpathen Petroleum A. G. (controlled by Society Gaz) and the Premier Oil & Pipe Line Co., (controlled by the Deutsche Erdoel A. G., which is in turn controlled by the Diskonto and Bleichroder, a branch of the Deutsches Bank) for their transportation and refining facilities. British and Dutch capital were involved in the Galician fields prior to the war, but not, it is believed, to a controlling extent in either of the dominant companies.

Japan—The petroleum industry of Japan is controlled wholly by Japanese interests and to a preponderant extent by a single company, the Nippon Oil Co. So far as I am aware, no foreign interests share in any way in the development or control of the Japanese petroleum industry.

Peru—Commercial control of the petroleum industry of Peru is exercised by the Standard Oil Co. of New Jersey through its subsidiary, the Imperial Oil Co. of Canada. This control involves about 70 per cent of the annual production, the remaining 30 per cent being divided in the ratio of 27 to 3 between British and Italian interests, respectively. So far as is known no other interests are involved.

Trinidad—The interests engaged in the petroleum industry of Trinidad include financial groups purely British, controlling about 57 per cent of the production; British-Dutch interests (Dutch Shell), controlling about 23 per cent, and United States interests (General Asphalt Co.) controlling the remainder. The leading operator in Trinidad is the Trinidad Leaseholds, Ltd., a British company which, in 1917, produced about 42 per cent of the petroleum output credited to Trinidad that year.

Alsace—Commercial control of the petroleum resources of lower Alsace has been in the hands of the Vereinigte Pechelbronner Oelbergwerke Gesellshaft and the Deutsche Tiefbohn A. G., both of which companies are believed to underlie the Deutsche Bank via the Deutsche Erdoel A. G., and the Diskanod and Bleichroeder. The negligible production of petroleum in Hanover is doubtless under the same financial control, though confirmatory data are not at hand to warrant a positive statement to that effect.

Argentina—The petroleum reserves of Argentina, which comprise the only areas from which petroleum is being commercially produced in that country, are operated by the state through the Comodora Rivadavia Petroleum Commission. German interests are thought to have been involved in two or three unsuccessful efforts in the last decade to obtain petroleum on tracts adjacent to the government reserves in the Comodora Rivadavia district.

Egypt—The petroleum industry in Egypt is controlled wholly by British-Dutch capital operating as the Anglo Egyptial Oilfields, Ltd., a subsidiary of the Royal Dutch-Shell Syndicate, through the Anglo-Saxon Petroleum Co., the last named company being predominantly British.

Canada—Commercial control of the petroleum industry in Canada is exercised, in effect, by the Standard Oil Co. of New Jersey through its subsidiary the Imperial Oil Co. of Canada. This control is exercised in consequence of a virtual monopoly of pipeline and refining facilities and through the fact that the producing interests, though British and Canadian, are individually small and are unorganized.

Italy—The production of petroleum in Italy, which is small, represents the output of two companies, the Petroli d'Italia, in which French capital is predominant, and the Petrolifera Italiana, which is believed to be essentially Italian.

Venezuela—Financial groups interested in petroleum in Venezuela include the Dutch-Shell Syndicate (British-Dutch), the General Asphalt Co. (United States), and a group of British financiers who control properties in Trinidad as well as the most important group of companies other than Nobels and the Dutch-Shell, in Russia.

Colombia—United States interests, including the Standard Oil Co., the Doherty interests, the Texas Co., the Gulf Corporation, and the Island Oil & Transport Corporation, are predominant in the quest for petroleum in Colombia.

Costa Rica and Panama—The Sinclair interests (United States) are particularly active in the search for petroleum in Costa Rica and Panama, and The Sun Co. (also United States), is understood to be investigating petroleum possibilities in other Central American republics.

Algeria and Morocco—The Pearson interests (British) have expended considerable effort in the

quest of petroleum in Algeria and Morocco, and in the former country, American interests (E. E. Smith) are reported to have recently sought petroleum concessions from the French government.

Persia—British interests, including the British government, control extensive petroleum concessions in Persia, from which oil in unreported quantities is now being produced. The most promising oil territory of Persia has recently been closed to American activity through the granting of a concession aggregating approximately 500,000 square miles to the Anglo-Persian Oil Co., a majority of the voting stock of which is owned by the British government. The concession runs until 1961. The importance of this oil territory is indicated by the fact that it is now reported as having a potential capacity of 30,000,000 bbl. yearly, with tremendous reserves undeveloped.

China—United States interests (Standard Oil Co. of New York) are understood still to retain control over the petroleum rights in certain provinces in China, where active prospecting in two or three localities a few years ago was reported to have yielded unfavorable results.

New Zealand—Petroleum in small quantities is produced in New Zealand by purely British interests.

Position of the Leading Powers

United States—With respect to developments expected in the petroleum industry within the next decade, the position of the United States, thanks to the enterprise and foresightedness of financial interests of domestic origin, is apparently strong. United States interests are practically supreme in the commercial control of the petroleum resources of the Western Hemisphere, dominating the petroleum industry in the United States, Canada, Mexico, and Peru, and holding substantial interests in Trinidad and Venezuela and in the prospective petroliferous areas in Central America and Colombia. Their only competitors are British and British-Dutch interests, which control the petroleum situation in Trinidad and are not only strongly intrenched in the United States, Mexico, and Venezuela, but are aggressively seeking to enlarge their holdings in those countries and to gain footholds elsewhere.

Unless the United States adopts measures to limit the aggressions of foreign capital in this country, such as Federal operation of the trunk pipe-lines, and formulates a firm, forward-looking governmental policy toward the protection of investments of its citizens in petroleum properties in other countries, particularly Latin-American countries, it may witness its commercial supremacy in petroleum affairs wane and disappear while it is yet the largest political contributor to the world's supply of petroleum.

As contrasted with the strongly nationalistic and deliberately aggressive governmental petroleum policy of Great Britain, France, Holland and some other nations, the United States has never adopted any policy founded on recognition of the importance of political and commercial control of petroleum. Though American companies may not own and operate oil lands in the British Empire, in the French possessions, or the Dutch colonies, the only American restrictions on foreign activity in the petroleum industry are those which cover all minerals contained in public lands. Only American citizens or those who have declared their intention of becoming American citizens can apply for patents to such land. However, after the application is made, there is no restriction on transfer of the mineral rights thus secured.

Great Britain—British and British-Dutch interests easily control the petroleum situation in the Eastern Hemisphere by domination of the petroleum industries of Russia, Persia, India, and the Netherlands East Indies. Domination of the petroleum situation in Russia alone is believed tantamount to control of the petroleum situation in the entire Eastern Hemisphere for the greater part of the next century. The strength of Great Britain's present position in the world's petroleum affairs lies in a strong governmental policy in the matter and in the wide scope of British petroleum investments, embracing practically every country of which petroleum is an important product and nearly every country of which it is a product of potential importance.

The general policy of the British Empire seems to be to control all oil development and to restrict operations by foreign capital. In Australia licenses are required for the exploitation of oil lands, and only companies incorporated in the United Kingdom or a British possession may receive such licenses. The Governor General has the right of pre-emption of all oil produced, and in case of war may take control of all oil properties. In Canada, or those Western provinces where minerals are the property of the Crown, petroleum and natural gas lands may be leased only to British companies. A similar restriction exists in Burma. In that country a monopoly of the petroleum industry was granted to the Burma Oil Co. for 99 years in 1885. This arrangement was apparently inspired by fear of the Standard Oil Co. of the United States, and it is part of the agreement between the company and the government that it shall not amalgamate with other oil companies. Regulations of like effect are the rule in other British colonies where oil exists; in Barbados, the British government has the right of pre-emption of all oil residues; in British Guiana, non-British companies can hold lands only by special license of the Governor; in British Honduras, all mineral oil is reserved to the Crown; in Southern Nigeria, the Gold Coast, Trinidad, and Tobago, the British government has the right of pre-emption over all petroleum.

The recent granting of a concession amounting to a monopoly in the most promising oil district of Persia (a region believed by many oil experts likely to become one of the most important in the world) to a British company controlled directly (by stock ownership) by the British government signified an aggressive policy of England, outside of her own dominions, to secure and hold under government control oil lands in all parts of the globe.

The best-known oil territories in Venezuela are thought to be already covered by concessions which

are practically all controlled either directly or indirectly by British interests, chiefly the Dutch-Shell Co.

So far as observed, German interests actually dominate the petroleum industry in Galicia and at home. Whether forced back on its own petroleum resources or on its own supply from those of Galicia, it will obviously have an inadequate supply, and the result will probably be that German interests will be particularly aggressive in the quest of petroleum in Mesopotamia, Africa, and South America.

France—Since control of the petroleum interests of the Rothschilds passed into the hands of the Royal Dutch-Shell Syndicate (British-Dutch), the influence of French finances in petroleum affairs has been negligible, outside of Galicia and Italy, where it was not great. French capital will undoubtedly participate in efforts to determine the petroleum capacity of the Barbary States, French dependencies, but that it will be appreciably involved in organized efforts to control the world situation with respect to petroleum is not anticipated.

The French mining law holds that oil and gas belong to the state, and may be exploited under concessions, the area and time limit of which are matters of negotiations between the applicant and the authorities. It is understood that the French government is unwilling to grant oil concessions except to companies the majority of whose stock is held by French citizens. A company incorporated recently to work the Algerian oil fields contained in its articles of incorporation the provision that 60 per cent of its stock must be held by French citizens.

Japan—Japanese investments in the world's petroleum industry have not yet attained significant proportions outside of Japan itself, though the Japanese government is officially alive to the importance of Japanese investments in petroleum properties in Mexico, particularly in Lower California and Sonora; in China, and, undoubtedly, in Russia, and large investments of Japanese capital in the petroleum industry in one or all of those countries may be confidently expected in the near future.

Present Condition of Rumanian Oil Fields

According to a report by Robert S. Doman, Red Cross commissioner to Rumania, the oil fields of Rumania are the country's greatest source of mineral wealth. In 1912, a total of 1,835,940 metric tons was produced, and the capital invested was estimated at $125,000,000. When the Rumanians retreated from Wallachia, hundreds of wells were destroyed by the British. The Germans during their occupation of Rumania put 432 soundings in a condition of production out of a total of 962 existing on July 1, 1916, or a proportion of 45 per cent, and had succeeded in raising the yield to 75 per cent at the time of the armistice. They concentrated their attention on the richest bores.

Since the departure of the enemy, last November, the number of wells has been increased to 508, but the number of borings has been reduced from 220 to 119, owing to lack of material. The gross production of petroleum in 1917 was about 520,000 tons, or 35 per cent of the normal, and, in 1918, 1,200,000 tons. In the first five months of 1919, it was 473,000 tons, an average monthly output of 94,600 tons, or approximately 63 per cent of the pre-war volume.

The oil is obtained partly from shallow, hand-dug wells and partly from boreholes in the region of the Carpathians, the principal centers being Prahova, Bacau, Buzeu, Dambovitza, and Campini, 90 per cent of the production in 1912 being from the Prahova district.

The average boreholes are less than 1,600 ft., and the wells are only from 60 to 300 ft. deep. The bulk of the petroleum is refined and the residue is employed in Rumania for heating purposes. Briquettes compressed from lignite are soaked in oil residue and make excellent fuel. Production in 1919 has been interrupted by strikes and export difficulties, the Standard Oil Co. having had some trouble in this respect. The latter problem will be solved partly by putting into working order of the Baico-Constanza pipe line and the improvement of shipping facilities via the Danube.

Manjak Has Chief Use in Oil Fields*

THE term "manjak" is applied to a variety of bitumen or solid hydrocarbon occurring on the Island of Barbados, West Indies, and in Utah, Cuba, and Trinidad. The deposits on the latter island are found within a distance of three miles of San Fernando, the second largest town on the island, and within three miles of the famous asphalt lake.

In chemical composition, manjak is like asphalt. It is almost pure bitumen. Its melting point is, however, more than 400 degrees F., whereas asphalt melts at 100 degrees F. In composition, it consists of 80 to 90 per cent carbon, the remainder being chiefly hydrogen, with a small quantity of sulphur. It resembles coal in appearance, is odorless, hard, and brittle. It is found in thin beds between layers of clay.

The most important use of manjak, and one wherein it has won a reputation for saving money, is in connection with rotary drilling for oil. A soft compound is used on the joints of the pipes between the casing threads and drill stem threads, and this prevents either water, sand, or grit getting into the threads, thus preserving them from being stripped or worn off. It not only acts with particular efficacy in keeping such pipes water-tight, air-tight, and free from corrosion at the joints, but it also facilitates the work of joining and separating the pipes, owing to its lubricating qualities. It has been found much superior to white lead or any other substances previously used for such purposes.

Important Petroleum Developments are expected from the French districts of Morocco, where one small well, situated at Dgecel, is producing about 20 bbl. of oil per day. Twelve more wells are being drilled.

*Excerpt from "Commercial Reports" Oct. 27, 1919.

THE MINING NEWS

LEADING EVENTS

The Utah Apex Suit

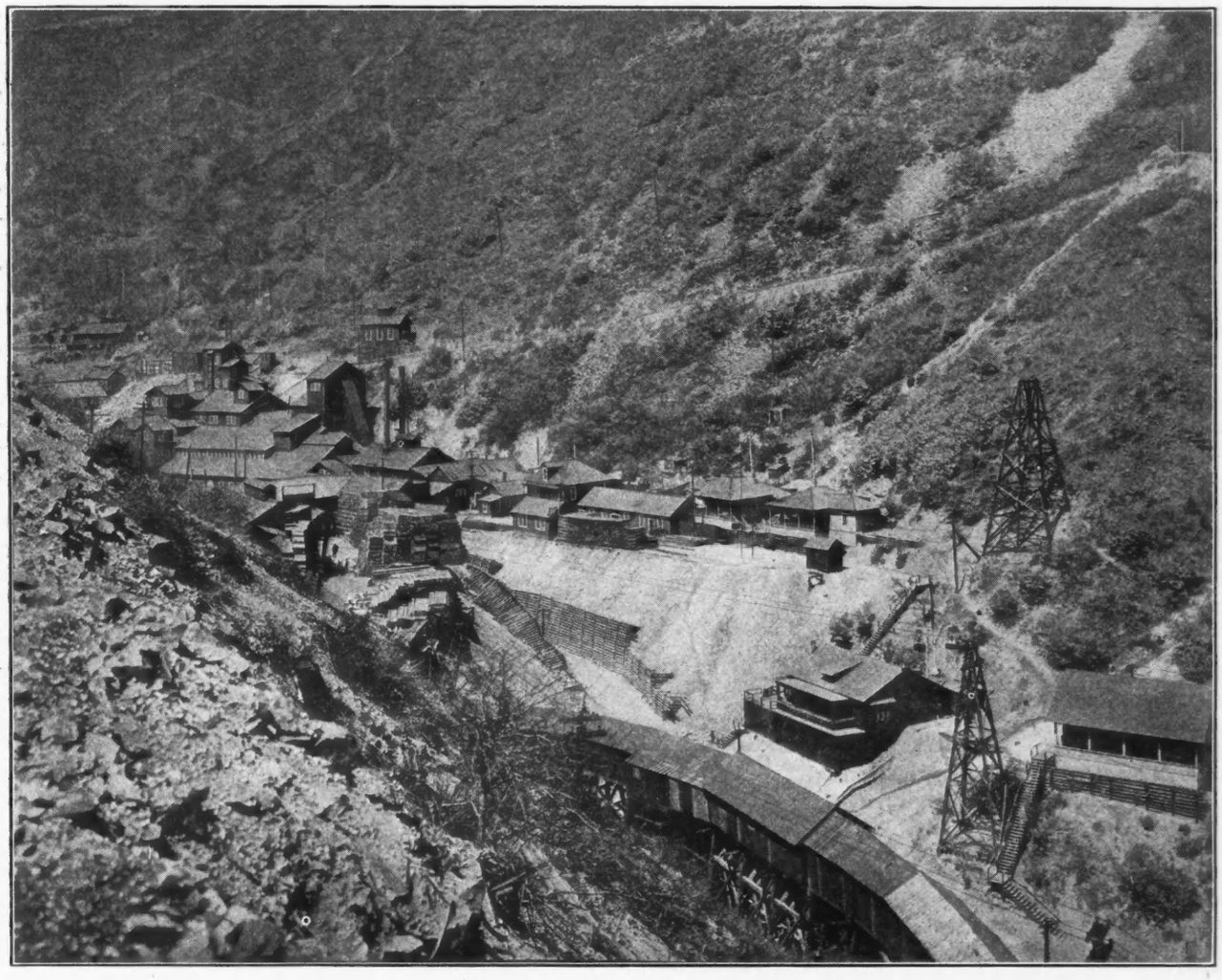
Testimony Ended, Arguments to Begin Jan. 26—No Decision for Several Months

Testimony in the suit between the Utah Consolidated and the Utah Apex companies over extra-lateral rights is completed. Arguments will begin Jan. 26, lasting three days, and a decision is expected not before three or four months from that date. H. V. Winchell in concluding his testimony for Utah Consolidated in the second part of the suit dealing with the Yampa limestone, stated that ore deposition in the Yampa limestone as described by Prof. Winchell, was due to mineralizing solutions, which came up along the limestone-quartzite contact. Open fissures, he stated, as he knew them, did not go to great depth, the pressure of the rock closing them. The case for the Utah Apex was opened on Dec. 8 by Judge Marshall, who stated that the ore taken out came from below the surface of the Utah Apex grounds. He denied that the Yampa limestone bed was the apex of this ore. The Yampa lode, he said, was strictly a copper producer, and the old Yampa workings were of that character, while the ore taken out came from the lead-bearing fissures. Among the witnesses for the Utah Apex were Albert Burch, Orrin Peterson, geologist for the Utah Apex, and V. S. Rood, of the Utah Apex.

Vanadium Corporation of America Buys Primos Chemical Co.

Newly Acquired Company An Important Producer of Molybdenum

The Vanadium Corporation of America has purchased the Primos Chemical Co., according to an announcement made recently. The latter company is an important producer of molybdenum as well as vanadium. It is stated that a new issue of 93,000 shares of Vanadium Corporation stock without par value will be issued to provide funds for the new acquisition. This new stock is to be offered to stockholders for subscription at $45 a share on the basis of a new share for three old shares. At the ruling market price of



SURFACE PLANT, MILL AND OTHER BUILDINGS OF UTAH APEX MINING CO., BINGHAM CANYON, UTAH, AT MOUTH OF TUNNEL, LOOKING NORTHWEST

58 for Vanadium shares, this will give rights on the old stock of approximately $3 a share according to the "New York Sun."

The initial balance sheet as of Sept. 16, 1919, of the Vanadium Corporation of America as submitted to the New York Stock Exchange shows assets and liabilities as follows:

Assets — Mines, $5,500,000; patents and processes, $1,000,000; plant, $2,000,000; inventories, $177,093; cash, $1,500,000; total, $10,177,093.

Liabilities — Capital stock, 280,000 shares of no par value; capital and equity, September 16, 1919, $10,177,093.

The income account of the American Vanadium Co. for the period from Jan. 1 to Sept. 15, 1919, follows: Earnings from sales, $523,565; other income, $150,265; total income, $673,830; charges, $54,103; balance, $619,727; dividends, $128,334; surplus, $491,393.

Park City Companies Settle Differences Out of Court

Conflicts between the Silver King Coalition and the Keystone mining companies of Park City, Utah, have been settled out of court, and both companies have received certain rights and privileges, each dismissing legal actions, which were pending. The Keystone company is to have easements through certain workings of the Coalition, such as the Hanauer tunnel, etc., on a rental and royalty basis, and can now open up its ground to advantage. The Keystone company has released to the Coalition certain extra-lateral rights which are a possible ground of future controversy, and has itself received a money consideration from the Coalition, the amount of which has not been given out.

Metallurgical Research and Ore Testing at Golden, Col.

The conditions under which ore testing and metallurgical research will be carried out at the Colorado School of Mines, Golden, Col., have been announced by Robert M. Keeney, director of the department of metallurgical research, in the following:

a. Any responsible person or organization may with the consent of the director use the equipment by paying for the actual material, labor, power, water, expert assistance used, and depreciation. In this case the person using the plant is responsible for the accuracy of the results obtained.

b. The director of the department and his assistant will run a test, in which case a charge equal to the cost of similar work done by a commercial testing plant or by a consulting engineer will be made. If desired, the director will make an estimate of the cost previous to starting the work, but this will not be used in billing the actual charges. The director will be responsible for the accuracy of the results, and will make a report to the person authorizing the test without stating that the ore comes from any particular mine or locality, unless he supervises the arrangements for taking the samples. The director will not suggest suitable devices nor recommend machines put out by the various manufacturers for the commercial plant that will subsequently be built as a result of his test work. The person receiving the report of the test work should employ a consulting engineer to advise further in regard to the building of a commercial treatment plant.

c. A person or organization desiring to conduct a prolonged research may establish a fellowship at the school under the research director, to cover a period of one year or longer, and the fellow may give all or a part of his time to the special research work. In the latter case, the greater part of his time will be devoted to the special research and the remainder to post-graduate study. The person establishing the fellowship will pay the salary of the fellow and the actual cost of material, labor, power, water and depreciation necessary for the research work. The director and his staff will supervise the work of the fellow without charge, will assume the responsibility for the accuracy of the results obtained, and will make a complete report of the work performed. This will not be published for a period of two years without the consent of the person establishing the fellowship. Any patents to cover any part or all of a process developed by the fellow under this agreement will be assigned to the person establishing the fellowship.

Ore shipments. Ores may be shipped by express or freight directly to Golden, Col., all charges prepaid. Freight sent via the Colorado & Southern Ry., or via the Denver & Intermountain Ry., must be hauled by wagon from the railroad yards to the testing plant at the expense of the shipper. All details as to responsibility of the shipper, suitable modes of making payments, size and handling of shipments, nature of testwork to be carried on, the persons to whom reports are to be made, and other necessary business matters should be clearly understood, as a result of correspondence or conference with the director before consignments of lots of ore of any size will be authorized.

The Dominion, Saskatchewan, and Manitoba governments will erect a lignite briquetting plat at Estovan in 1920. Machinery has been purchased for a plant with a capacity of 30,000 tons of briquettes per month.

Rehearing Ordered in Alice Gold & Silver Case

Minority Stockholders' Appeal Against Sale to Anaconda to be Re-argued

Re-argument of appeal proceedings of the minority stockholders of the Alice Gold & Silver Mining Co. against the Anaconda Copper Mining Co. to set aside the sale of the property of the former, as voted by a majority of the stockholders, has been ordered by the U. S. Supreme Court. The action was begun in 1911 and has been in the courts ever since. The Anaconda company is the owner of 383,000 shares of the Alice Company, and holders of 9,000 shares are back of the injunction suit. Holders of 20,000 shares more are sitting by observing the proceedings. The property of the Alice embraces more than 24 claims and mill sites in Walkerville, commonly known as the northern part of the district, comprising more than 250 acres in the silver-zinc belt of Butte. The Alice was one of the early day silver mines of prominence in the district, a smelter at one time being in operation.

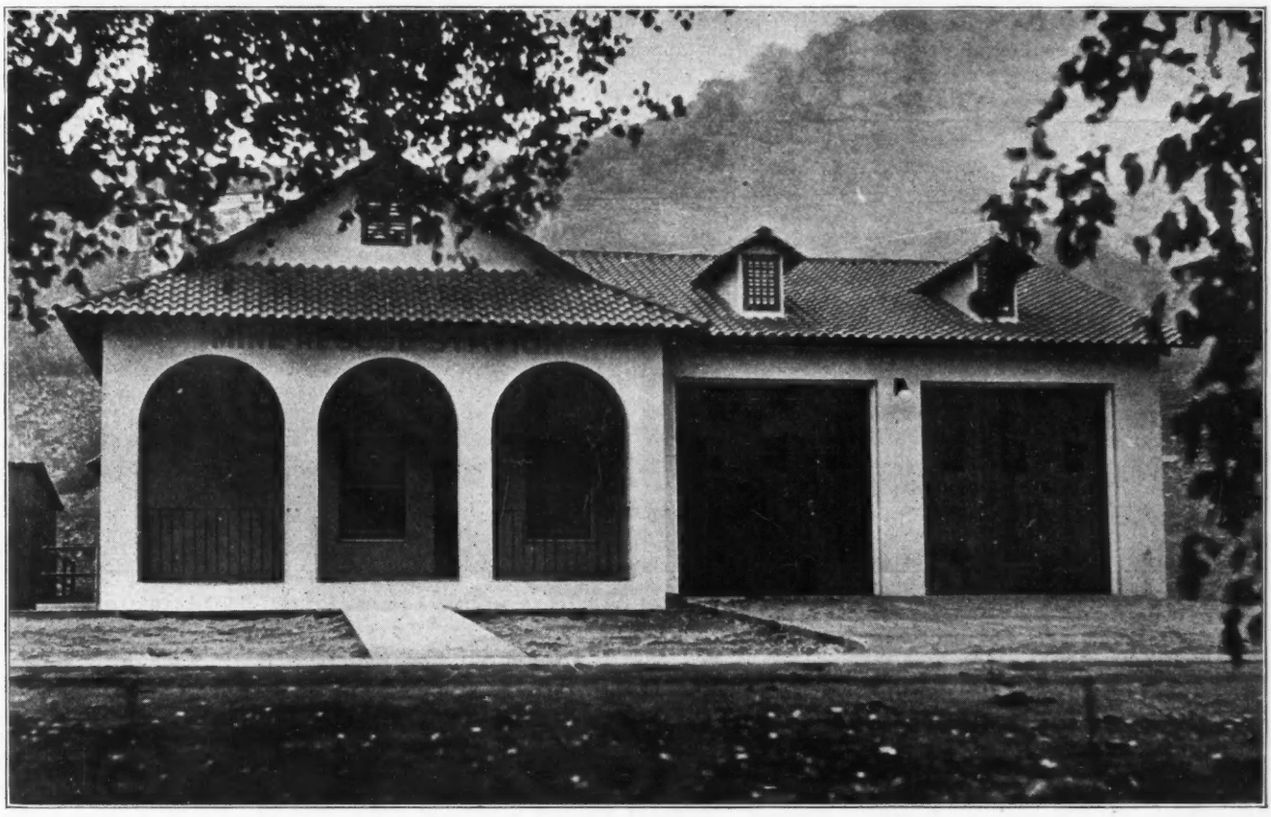
A majority of the stockholders voted to sell to the Anaconda, the deal being consummated through an exchange of stock with the latter. Minority stockholders headed by Joseph Stettheimer, Peter Geddes and others object to the sale, alleging that by virtue of the territorial laws of Utah, under which the Alice company had been incorporated, the sale of the stock was illegal unless sanctioned by all the stockholders. The action of the majority was upheld by Federal Judge G. M. Bourquin, of Butte, and the property sold at auction in Butte, following an order for a resale made by Judge Bourquin, it being bid in by the Anaconda. The resale order followed a hearing on objections made to the original sale. The reasons for the return of the suit to the calendar of the Circuit Court of Appeals were not indicated in advices received by legal counsel for the Anaconda, but it is believed that the Supreme Court desired additional information on points which may not be clear.

Neill Sued for Half Interest in Premier Mine

Maurice D. W. Bacon, of Los Angeles, Cal., has filed suit in Spokane, Wash., against R. K. Neill, of Spokane, for a half interest in the Premier, formerly the Bush mine, situated near Stewart, B. C. It is asserted by Mr. Bacon that a partnership existed between him and Mr. Neill; that the value of the Bush mine, as it then was termed, was misrepresented to him and that Mr. Neill thus obtained possession. Mr. Neill states that there is no foundation for the claim made.

Mine Rescue Station in Miami-Globe District, Arizona

The mine rescue station of the Miami-Globe Rescue and First Aid Association is situated near Globe, Ariz., on the road to Miami. The building is shown in the accompanying illustration. It is built of hollow tile with a tile roof, and is designed to house five motor trucks and afford living accommodations to three men. These three men are furnished by the Old Dominion Copper Mining & Smelting Co., the Miami Copper Co. and the Inspiration Consolidated Copper Co., the executive heads of which companies together with that



MIAMI-GLOBE DISTRICT MINE RESCUE STATION, GLOBE, ARIZ.

of the International Smelting Co. constitute the Association's board of directors. The supervisor of the station is Orr Woodburn, and his assistant R. H. Whyte. Each man of the crew of three under the director serves for six months, then returning to his regular employment.

The duties of the crew consist in keeping in proper condition the mine rescue and first aid apparatus maintained throughout the Miami-Globe district. This includes 20 Draeger two-hour oxygen - breathing apparatus, 29 Draeger self-rescuers and 7 pulmotors, together with all accessory equipment. Two 10-men outfits on motor trucks are kept ready at the station for instant service. Thus the apparatus needed for fighting mine fires is always ready when needed by the volunteer rescue crews organized by the Association among the employees of the various companies.

New Process for Making Zinc Oxide Reported Discovered

Announcement has just been made in Joplin, Mo., that Alfred Schwartz, a Joplin mining engineer and chemist, has invented a new process for producing oxide of zinc. L. P. Buchanan, a local zinc mine operator, informed the Joplin Chamber of Commerce that New York bankers have agreed to finance the building of a plant at Joplin or some nearby place to make use of the process. Nothing definite as to the discovery is given out except that by Mr. Schwartz's plan the oxide is produced in much less time than by the older process. Local business men are planning to donate a site, which is not asked by the company, but which no doubt will be accepted. The construction of a plant to cost from $100,000 to $200,000 is expected to start soon.

The Uniform Fibrous Talc Co. of Gouverneur, N. Y., has developed a large body of talc upon its property, and is sinking a new shaft to develop it, according to R. B. Ladoo, in a report of the U. S. Bureau of Mines.

El Tiro Copper Mine

Success of An Arizona Enterprise

One of the notable financial successes of Arizona mining was made in the last year by El Tiro Leasing Co., of Silver Bell, Ariz., a success the more remarkable in the fact that it has come through operation of an abandoned copper mine, pronounced almost valueless. The property was taken over by Percy Williams, a mining engineer familiar with local conditions, and has proved very profitable to him and his associates. At the same time there has been satisfactory working out of unusual and obscure geological problems.

Like the United Verde Extension at Jerome, the New Cornelia at Ajo, and other prolific present-day copper producers, El Tiro has undergone a checkered career, handicapped by a succession of unfavorable expert reports made by engineers not thoroughly familiar with the eccentricities of southwestern copper deposits. These very eccentricities and irregularities of geological phenomena which have beclouded the analysis of the uninitiated have been the principal cause of the productiveness of these types of copper deposits when once they are found.

There is no regularity of formation, no continuity of strike and dip, no conformable deposition of sedimentaries, no uniformity of eruptive intrusives,

but on the other hand a chaos of cross-slips, unexpected faults, open fissures and closed fissures, occurring in different varieties of granite, lime, schist and porphyries, metamorphosed by a successive intrusion of acid and basic dikes, which in turn are faulted and crushed and then the entire mixture buried under a hundred-foot flow of recent silicious lava.

At El Tiro the new orebodies of high-grade are found under outcrops, i. e., barren of copper but not necessarily of evidence to those who have learned to read such.

No engineer, without long Arizona experience, can be expected to pass favorably upon such combinations without extensive study, yet the Arizona engineer is rapidly becoming disposed to view with favor the more complicated assemblages of copper rocks as being more prolific in the long run than the more regular, more easily read deposits.

It makes one feel that in the vast desert ranges of Arizona, unmarked by even copper stain, there are lying unappreciated reserves, not only of high-grades, but of disseminated low-grade copper bodies awaiting the bite of the churn drill.

On the 200 level of El Tiro a strike of very rich copper ore was recently made from which the company has been shipping eight carloads a week, averaging $900 a car.

University of Utah Laboratory to Aid Smoke Inquiry

A new and fully equipped laboratory at the University of Utah will aid in the smoke nuisance investigation now in progress in Salt Lake City under the direction of the U. S. Bureau of Mines in co-operation with the University and the municipality of Salt Lake City. Field work, designed to get an idea as to the amount of soot and other materials in the air is underway.

Few New Discoveries on Indian Lands in Arizona

Known Ground Relocated—Indians Profit Serving as Guides

The late opening of Indian reservations to prospectors for the location of mineral land appears to have resulted in few finds that have added to the state's mining news. South from Parker was a breakneck race along the Colorado to reach first the old La Paz placer fields, whereof are many stories of buried treasure and rich gravel. This field was abandoned in the early seventies and now is believed valuable only in the event that sluicing water can be piped up from the Colorado River. Further inland a number of old gold and silver mines have been relocated. The Indians appear to have reaped a harvest as guides, leading confiding palefaces into the wilderness, though without notable results.

A number of known gold ledges have been located in the Salt River Mountains and in the Sacatons, the latter west of Florence, both on the Pima reservation. South of Phoenix about ten miles, Lincoln Fowler, a local capitalist, has located a large gold ledge that he will develop at once.

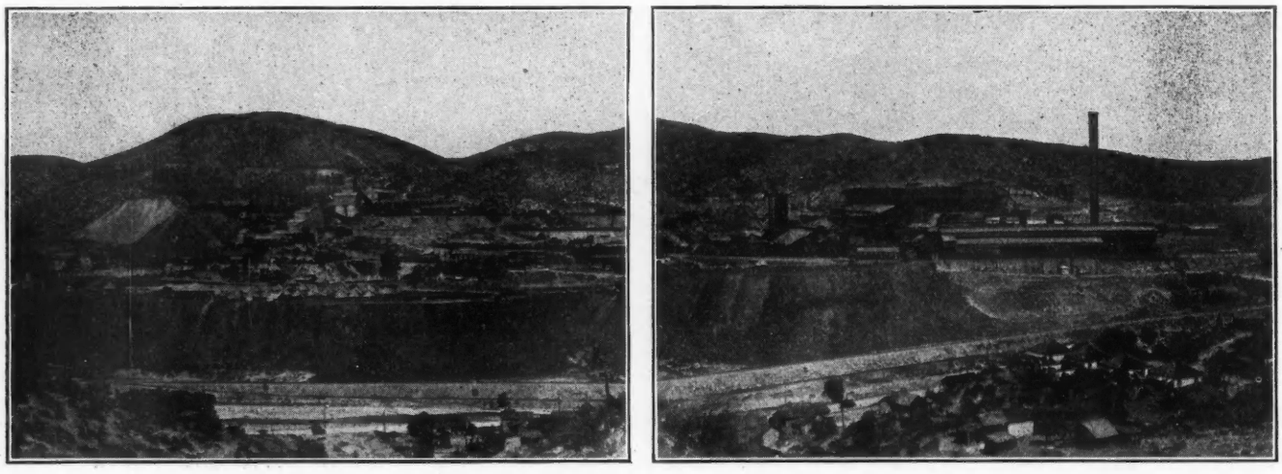
A number of silver prospects have been located in the first rush into the Wallapai Reservation, northeast of Kingman. Very rich silver ore was taken out in pioneer days from horizontal veins, under spar, in the botttom of the Supai Canyon, but the Hava-Supai Reservation appears to have been exempted.

Most of the Navajo Reservation is a sandstone plain, yet in the northern part, near the Colorado, are blowouts of carbonates carrying good percentages of copper. In the vicinity of the railroad coal formations, which show fair quality and are of some extent, have been found.

Contractor Not an Employee

Arizona Court Refuses Damages in Case Against Arizona Binghamton Copper Co.

That mine injury cases have at least two channels under Arizona laws is indicated in a Superior Court action filed by the administrator of the estate of Harry A. Dickson, asking $50,000 damages of the Arizona-Binghamton Copper Co., Stoddard, covering the death of Dickson, who was killed by falling in a raise last July. Judgment was asked under the common law. In the same court, a few days before, had been dismissed the suit of Dickson's mother, seeking $20,000 damages, the court holding that under the Arizona employers' liability act Dickson, as a mine contractor, was not to be considered as an employee. The company therefore was held not responsible for Dickson's fall and not liable for damages.



MINE PLANT AND SMELTERY OF OLD DOMINION COPPER MINING & SMELTING CO., GLOBE, ARIZ.

Canada Losing Silver

The Royal Mint at Ottawa has been running to capacity lately in the minting of silver coins to replace currency that has been shipped to the States. At present prices of silver and the high premium for New York funds it has paid to buy up Canadian silver coinage and bring it to the States to be melted into bullion. It is of course illegal to melt Canadian currency in Canada. At the present time Canadian silver coins have a fineness of 925 compared with 900 for American coins, but after this year this difference will probably disappear.

Car Shortage Again Hits Joplin-Miami District

After experiencing some relief for several weeks through obtaining coal cars for ore shipments, the Joplin-Miami zinc and lead district producers are squarely up against it once more, with the car shortage more acute than

ever. Breaking of a gas line resulting in cutting off gas for two days to many mines that are using it for power, however, and the stricture of the electric company requiring mills to hold to night shift, have joined to hold production down. It is estimated that there is at least 40,000 tons of sold ore in bins in the district, and probably 25,000 tons unsold.

The Birmingham Situation

A friendly suit to test the coal and iron ore tax of the general revenue bill passed by the Alabama legislature in September last is said to be planned by a number of operators in Birmingham and elsewhere in the state. Just what company will be the defendant is not known positively, but whatever one it may be, it will share the expenses with other operators in the district. This tax is believed to be discriminatory and double taxation by the operators in Alabama, and it is to be hoped that it will be found unconstitutional.

The Sloss-Sheffield Steel & Iron Co. has begun electrification of its mines and several companies of the district are known to be considering this important step forward. This is absolutely necessary if operators wish to cut production cost, and at the same time keep wages at their present high level. In connection with this several companies are experimenting with mechanical loaders and four were purchased in the district during the first part of December. Although these ore loaders are experimental in the Birmingham district, should they prove successful with the electric haulage planned, they will be the solution of the problem of cutting cost and at the same time paying wages sufficient to meet the cost of living.

With the coal strike ended, prospects are bright for great production in all lines of the iron industry in the Birmingham district. Although the coal strike brought some conservation measures into play, Alabama's real answer to both recent strikes was the blowing in of three additional furnaces and a production in October larger than in several months previous, a production in November of some 195,000 tons of pig iron or about 1,000 tons more than November, 1918.

Seek to Encourage Prospecting in Ontario

Ontario has a new mines act that was supposed to have come into force Jan. 1, 1920, but which is not yet in print. It is possible that it may now be held up until the new Government gets a chance to revise it. Whether this occurs or not, it is probable that the near future will see a decided change in the mining laws governing the gold and silver mines of the province. Strong representations to this end have been made to the new farmer government. The opinion is held by many that the prospector and claimholder should be encouraged.

For the last few years, the search has been for ores of lower-grade than in former days, requiring large expenditures for plant and equipment. Under these conditions the prospector has found it necessary to transfer his rights in his discovery, in part at least, to others having the required capital in order to prove or disprove the prospect. The reward for discovery is neither as great nor as rapid, with the result that many have become discouraged.

To overcome this it is suggested that licensed claim holders doing assessment work be permitted to have twenty assays run per year at the Provincial testing laboratory for a nominal charge. Some instruction would also be given these men in the proper method of sampling. The Government is also being urged to grant to the prospector the same low rate over the Government railroad as commercial travelers are given.

In regard to assessment work it is also urged that more rigid inspection be enforced. Many claim holders hire others to do this work which, although sworn to, is in many cases not performed, so that the claim holder gets nothing for his money.

Another important point relates to the Government's record of progress and discoveries on different properties. It is advocated that these records be so complete that if an abandoned property is taken up, the records will show in detail what work was done and the result. These reports would be made by the mine inspectors. It is also intended to ask that the mining inspectors of Northern Ontario be given powers not unlike the Gold Commissioner of British Columbia. These powers would facilitate the settling of many little mining disputes which now have to be taken to the courts. Such litigation ties the property up and is expensive.

It is also being suggested that the present fees charged for prospectors' permits and for filing claims should be somewhat lowered to encourage others to prospect the untried areas of the north. In this connection the diamond drill is being used extensively. Practically all finds of a promising nature are now tested out by this means. The method of exploration though quick and efficient, is nevertheless costly. The diamond drillers state that this is due to the high duty on the diamonds employed. It is contended that there are large areas that might be advantageously explored in this way were the cost lower, and to this end the federal government is to be urged to remove the duty on industrial diamonds.

The mining men of Cobalt headed by the Mine Managers Association, believe that a new geological survey of the camp would greatly prolong the life of the camp. They intend to petition the Ontario Government to have its geological department make a re-survey of the camp. During the last few years the Keewatin contact has been pierced in many mines and the different geological horizons could be fairly well well mapped at the present time. It is hoped that with this information available new development work will be undertaken.

One amendment to the act sought by miners would change the wording of the clause relating to discovery from "valuable mineral in place" to "mineral in place."

Boston & Montana Co. Provides for Mill and Power Line

In connection with the $3,000,000 issue of first mortgage 6 per cent convertible sinking fund bonds offered by the Boston & Montana Milling & Power Co., a subsidiary of the Boston & Montana Development Co., it is stated by W. R. Allen, president, that the proceeds from the sale of the bonds are for the purpose of building the mill, equipping it, and for the materials and construction of the power line. The mill is now under construction, it is stated, and machinery ordered; poles have been delivered, the wire is in transit and the pole line is being set. The entire plant should be in operation by Apr. 1, 1920. The first unit is to be of 500 tons capacity, of the concentration flotation type, designed by O. B. Hoffstrand, of Salt Lake City, Utah. Mr. Hoffstrand will also have general supervision of construction.

The mill site is 1,700 ft. down Elkhorn Creek from the mouth of the main working tunnel of the Boston & Montana Development Co., with sufficient gradient to give advantage to loaded cars. Ore will be delivered directly from the tunnel to the top of the mill. The process will be entirely by gravity. The company owns 40 acres of land on which mill operations are to be conducted, as well as an abundance of water. The water will be conveyed through a ditch and flume from Elkhorn Creek to the mill, a distance of approximately three-quarters of a mile.

The power line will extend from the power plant of the Montana Power Co. on the Big Hole River. The power at the present time will be purchased from them and transmitted along the Montana Southern Ry. to the Elkhorn properties, a distance of thirty-five miles.

NEWS FROM WASHINGTON

By PAUL WOOTON
Special Correspondent

Four War Mineral Awards Announced

Awards announced by the War Minerals Relief Commission on Dec. 23 as having been approved by the Secretary of the Interior are as follows: White House Mining Co., Philipsburg, Mont., manganese, $468.97; C. E. Atherton, Frank Atherton and Dan Quirelo, Jamestown, Calif., chrome, $407.11; John E. Secrest, Kansas City, manganese, $206.25; W. C. Green, Georgetown, Calif., chrome, $555.10.

Baruch Recommends Development of War Mineral Resources

In summing up the work of the War Industries Board in a report to the President, Bernard M. Baruch outlines the lessons by which he thinks the nation should profit. He believes that "through a system of stimulation by a protective tariff, a bonus, an exemption from taxation for a limited period, licensing or any other effective means, every possible effort should be made to develop the production of manganese, chrome, tungsten, by-products of coal and all such raw materials usually imported but which can be produced in quantity in this country. Above all, immediate and persistent efforts must be made to develop production of nitrogen and its substitutes, not alone for war but for agricultural purposes."

In addition, Mr. Baruch believes there should be created a peace-time skeleton organization based on the experience of the war-making agencies. In this skeletonized organization, there should be specialists, he said, in charge of raw materials, finished products, facilities, prices, labor, planning, statistics, priority and conservation. He suggests that, during peace, this work should be under the Department of Commerce. The peace-time organization, he recommends, should meet at least once a year to discuss and outline plans and to keep in touch with the general world situation and with one another. With the exception of a secretary and a very small force the personnel of the organization is to serve without compensation. Mr. Baruch also recommends that the Government must offer encouragement to certain industries sufficient to allow the maintenance at all times of a skeleton organization.

In his report to the President, Mr. Baruch promises a later detailed report as to the Board's work. There are also to be reports from the members of the Board and the divisional chiefs.

Graham Committee's Report Charges Copper Men Made Illegal Profits During War

Politics Back of Investigation into War Department's Expenditures —Minority Member States Committee Showed Ignorance of Technical Questions Involved

Copper producers are scored in the report made to the House of Representatives by Chairman Graham, representative from Illinois, in connection with the investigations made by his committee of expenditures in the War Department. In this connection, it may be stated that politics is conceded by disinterested observers to be playing an important part in the various investigations of the war activities of the Administration. Representative Garrett, a minority member of the committee, declared on the floor of the House that the committee had shown great incapacity to deal with the technical questions which had come before it. Moreover, he pointed out that the matters considered were executive and judicial and not legislative. Among other things, the majority report says:

"In the case of the United Metals Selling Co. immense profits were made by the producers of copper by virtue of a combination of the low-priced copper producers, which combination was aided and encouraged by the Government, although in violation of the law of the land."

In refuting the allegations in regard to copper, Mr. Garrett sketched the story of copper throughout the war; how, when the United States entered, copper was selling at from 26 to 33c.; how with this market condition existing the copper men agreed to furnish the Navy Department and the Army with 45,000,000 lb. of copper at 16⅔c., the average price during the previous ten years of production; how when copper continued to rise a uniform price of 23½c. was agreed upon in September, 1917, between the Government and the selling agencies; and how in July, 1918, the price was advanced to 26c. to meet the rising scale of prices due to inflation.

The method of disposing of the Government's surplus was then described by Mr. Garrett, who recounted how in April, 1919, the United Metals Selling Co. bound itself to take from the Government, beginning in April, 5,000,000 lb. of copper per month for the succeeding ten months and thereafter 10,000,000 lb. per month for the succeeding five months, the contract price being fixed at the "Engineering & Mining Journal's" monthly average New York quotation for electrolytic copper; and how this agreement resulted in stabilizing the market.

During Mr. Garrett's speech the question was raised as to the reliability of the "Journal's" copper quotations, to which Mr. Garrett replied that an investigation was made as to this point by a witness selected by the committee, which witness testified to the prices given in the "Journal."

In stating his conclusions with regard to copper, after declaring that the cooperative committee on copper, appointed in 1917 by Bernard M. Baruch, practically controlled the companies who in turn controlled the price of copper in the United States, Mr. Graham said that because of their official status the members of the committee could more effectively control the price of this metal than they could have done as individuals. Mr. Graham then said:

"As soon as the arrangement was made with the Government by the cooperating copper companies through the common agent, the United Metals Selling Co., four things were accomplished: First, all competition was eliminated; second, all expense of selling and finding a market was eliminated; third, the possibility of all loss from bad accounts was eliminated; fourth, the market was absolutely under the control of the American producers of copper."

Mr. Graham also made the statement that the price of copper fixed at 23½c. in September, 1917, was decided upon at a meeting of producers at which no Army representative was present and that no reason appears in the record for the increased price. In closing Mr. Graham said:

"The profits made by the copper producers out of the purchase by them of the surplus copper of the Government after the armistice would be hard to compute. It is certain that if this 100,000,000 lb. of copper had remained in the hands of the Government or had

been sold by the Government to retailers or to the consumer the price of copper would have remained at least stationary. However, by its purchase, the producers were enabled, by their combination and by the allocation of business among them as they chose, to control the market absolutely, and being permitted by the Government to combine and pool their interests the market immediately turned and started upward. Even in the matter of the contract itself it is evident that the copper producers were buying on the 5th of May, June and July large sums of copper at a price that was the average price for the month before, and on a constantly rising market so that any margin there might be in price, by way of an increase, would accrue to the copper producers and be lost to the Government. Just what this loss to the Government would be could only be ascertained by careful computation. In addition the copper producers were given 1 per cent of the cost as a condition of the trade. In addition every pound of the approximately 200,000,000 lb. of copper a month they were selling had an added value given to it by the rising market which the copper producers were creating. It is reasonable to assume that if, during the period the copper producers were taking the Government copper, their aggregate sales were 600,000,000 lb., including the Government copper, their profit by virtue of the increase in price was approximately $50,000,000."

War Minerals Hearing at Atlanta

Senator Shafroth, the Chairman of the War Minerals Relief Commission, recently conducted hearings at Atlanta on claims made by producers in that general region. This was done so that claimants in the South might have the same advantages as were extended to Western miners when the commission conducted hearings in that section of the country.

Western Branch of Interior Department Unlikely

No action has been taken in regard to the bill providing for the establishment of a branch of the Interior Department in the Western states (H. R. 6,551) and the transfer to such branch of certain bureaus and offices of the Interior Department. Judging from the experience of previous bills to the same effect no action is likely to be taken either by the committee or by Congress.

New Hayden Bill Affects Mining Claims

A bill to amend section 2,319 of the Revised Statutes of the United States relating to mining claims was introduced by Representative Carl Hayden, of Arizona, last month. Section 2,319 is to be changed to read as follows:

"Sec. 2,319. All valuable mineral deposits in lands belonging to the United States, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase by citizens of the United States under regulations prescribed by law, and according to the local customs or rules of miners in the several mining districts, so far as the same are applicable and not inconsistent with the laws of the United States."

Higher Salaries Recommended for Government Geologists

Representatives of the geologists in civil service have presented an elaborate article to the Government salary reclassification committee as to the necessity of paying salaries sufficient to attract high-grade men and retain them. The committee, consisting of E. S. Bastin, D. F. Hewitt and W. C. Mendenhall, urge that salaries paid should at least equal those paid in the best universities. It cannot be expected, it is stated, that the salaries should equal the highest paid in the mining world but, it is thought, the existing disparity should be greatly reduced. The committee states that 30 geologists of assistant and associate rank, who have resigned from the U. S. Geological Survey since 1914, were receiving at the date of resignation an average of $2,241 per annum and are now receiving in private employ an average of $7,944 per year.

Professor C. K. Leith, of the University of Wisconsin, is credited with the statement that "it would be a catastrophe of the first magnitude to geology and mining if the organization (the U. S. Geological Survey) is wrecked, as it is rapidly becoming, by failure to secure a living wage."

To Sell Surplus Copper Wire

Approximately 1,710,000 ft. of telephone cable and 854,923 lb. of copper wire held as surplus by the War Department are to be marketed. Proposals will be received up until Jan. 13 at the office of the Director of Sales, Munitions Building, Room 2,514, Washington, D. C.

NEWS BY MINING DISTRICTS

ALASKA

GOLD BULLION PROPERTY SOLD

Sale of the Gold Bullion property on Willow Creek in the Fishhook Mountains, twenty miles from Houston, was recently reported. Frank G. Barth, Loveland, Colo., was the seller and Hugh Doheny and L. C. Thompson, of Montreal, Que., the purchasers. Houston is 165 miles from Seward along the new Government railroad. It is stated that hydroelectric power may be substituted for steam. Equipment for a sliming plant is being shipped to the property. Maurice D. Leehey, attorney of Seattle, is said to have handled the deal.

ARIZONA

DIRECTORS ELECTED BY SUPERIOR & BOSTON, VERDE COMBINATION, AND JEROME SUPERIOR — MOHAVE COUNTY ACTIVE

Miami—The Inspiration Co. is working about two-thirds capacity, with fifteen mill sections operating. Miami is operating five sections and handling about 4,500 tons a day. The latter is equipping its new No. 5 shaft and installing a new man hoist. Diamond and churn drilling is to be started soon on the Louis d'Or property, north of Inspiration, and a mill is planned.

Globe—The Gibson Co. is producing about eleven tons of concentrate daily in its new mill from 150 tons of sulphides, mainly from the dump. Much of the work is done by Apache Indians. The Iron Cap Copper Co. is pushing construction of its new mill and of its mill railway.—Superior & Boston has chosen as directors Garrett Mott, J. B. Hardon, W. F. Fitzgerald, J. F. Barry and T. R. Drummond. Election of officers will be at a board meeting in Boston. Mr. Drummond is managing director. Shipments are being made of glance ore from a 4-ft. vein on the 400 level, sampling 24 per cent copper and 92-oz. silver. Drifting is in progress both ways on the vein. The company is drilling schists below the 1,200 level, to pick up extensions of known orebodies, particularly that of the Old Dominion.

A New York company is operating the Princess Pat property in Graham County, eighteen miles southeast of San Carlos, in the Arivaipa section. The mine is under bond from G. M. Allison, of Stanley, and O. W. and J. S. Allison, of Globe.

Gila Bend—The Rowley Copper Mines Co. is sinking a 7 x 9-ft. shaft, now 250 ft. deep, to 500 ft., where a crosscut will be driven to a ledge developed above as about 20 ft. wide. At that depth sulphides are expected. The company has a small mill which handled wulfenite ores from a parallel ledge last year. A 200-hp. Nordberg and a 200-hp. Corliss engine, with two 100-hp. Erie boilers,

were added recently. The pumping equipment will handle 1,600 gals. a minute. About $140,000 has been spent.

Kelvin—The Gila Development Co. has nearly completed its milling plant, which is expected to be in operation in January. Work has been held up by delay in delivery of equipment. Development in the mine will be resumed as soon as the mill starts. Twelve men are now employed.—The Ray Boston Copper Co. has closed a contract with the Pittsburg Diamond Drilling Co. for several thousand feet of drilling. Work will be under the supervision of C. E. Hart, of Miami.—The U. S. Vanadium Development Co. plans to construct a new camp of modern buildings and install a compressor. Tests on the ore are to be made with the company's plant after the first of the year.

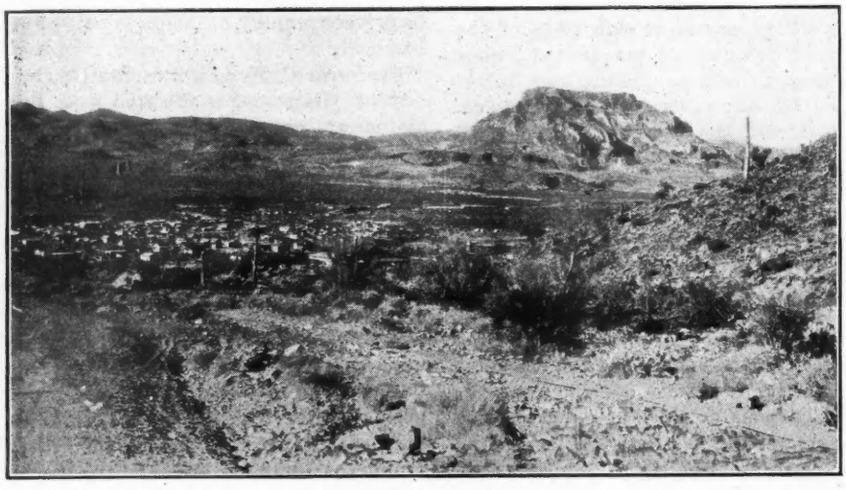
Winkelman—Recent heavy rains have caused much damage to wagon roads and delayed ore shipments from the Bunker Hill property for two weeks.—The Magma Chief Copper Co. shipped about 90 tons during December from the Sombrero Butte property.

Price—The High Line Copper Co., which owns property at Cochran on the Arizona Eastern R. R., will re-start development soon. Considerable development work has already been done.

Tucson—Ore sampling up to 400 oz. silver is being taken from workings of the Cababi Co., seventy miles southwest of Tucson. It was found accidentally in the roof of workings that caved, deeply covering a seam that was being followed. The company has thirty-four patented claims and valuable surface equipment. S. G. McWade is operating the property under lease.—To the southwest fifty-seven miles, the Altar-Cananea Co., a local corporation, is developing twenty-five claims, in five groups, in the Babocquivari Mountains. On the Victor group three fissure veins that sample well on the surface are to be explored. To secure income a small concentrator is to be erected as soon as possible, utilizing suitable ores already developed. P. A. Roberts is consulting engineer.

Ajo—New Cornelia has reduced production by 25 per cent and will confine output to not over 3,000,000 lb. of copper a month till the market demand improves and copper stocks are smaller. Development work is proceeding. By a single blast of 80,000 lbs. of powder in the steam shovel pit recently, 300,000 tons of rock was shattered.

Superior—The annual meeting of stockholders of the Silver King of Arizona Mining Co. will be held at the company's office, Phoenix, Ariz., on Jan. 13, to elect seven directors and also to vote upon the following propositions: To change the par value of the stock from $1 to $5 per share and to authorize the exchange of old stock for new at the ratio of five to one.



LOOKING ACROSS SUPERIOR, ARIZ., FROM MAGMA COPPER CO.'S PROPERTY. PICKET POST MOUNTAIN IN DISTANCE

Jerome—At Verde Combination's annual meeting an encouraging report was made concerning highly mineralized ground now being cut on the 1,080 level, the development cost being considered remarkably low. The old directorate was re-elected, with the exception of secretary J. C. Callaghan, of Phoenix, who resigned and who was succeeded by L. J. Gilchrist, vice-president of the Security Bank & Trust Co., El Paso. The other directors are: John L. Dyer, El Paso, president; Dave Morgan, Jerome, vice-president and manager; James E. Primm, El Paso, treasurer; W. N. Richards, Pittsburgh, John S. Eberman, Pittsburgh, and James M. Layman, Los Angeles. The balance sheet showed assets of nearly $1,000,000 with property valued at cost.

Jerome Superior also re-elected all directors save one, Tod Ford, of Pasadena, Calif., being replaced by H. G. Bockius, of Los Angeles. The others on the board are M. P. and L. J. Selby and George D. Case, of Los Angeles, and George Mitchell, of Clarkdale. The last named is manager.—Green Monster failed of a quorum and its annual meeting was adjourned to the third Monday in March.

Oatman—The 340 level of the Telluride property is in ore believed to be a continuation of the old Tom Reed ledge.—The Kingman Silver-Gold Co. is a consolidation of the Tipperary and Gold Road Bonanza interests, effected to permit handling the two properties and also the McKeeson property in the Wallapai Valley section.—George Kingdon and Ray Hart, of Jerome, have optioned from Fred Miller the Three Jims prospect in the Wallapai Mountains, forty-five miles from Kingman.—Silver ore from the Prince George and silver-lead from the Banner are being shipped by the Arizona Butte Co., which has instituted a plan of furnishing all supplies to its lessees and halving with them the net proceeds of the ore shipped.—The United Eastern Mining Co. is shipping bullion from the mill every ten days.—United American has cut a large vein of low-grade gold ore on its 300 level, though the main ledge has not been reached.—Drifting at 300 ft. on the new Telluride vein has demonstrated a length of more than 100 ft. of a 30-inch stringer that assays well in gold.—The Oatman Amalgamated property is being prepared for development at a point where it is believed the Gold Road and Tom Reed vein systems converge. The 500-ft. shaft is to be deepened.—Midway Moss, near the Arizona Mossback in the Silver Creek section, has been financed for early operation.

Kingman—The Catherine mine has installed a compressor and is now operating on three levels. On the second, 600 ft. of drifting is all in good milling ore. The ledge is over 30 ft. wide, with a 10-ft. paystreak. It is proposed to mill the ledge from wall to wall.—The old Buckeye workings have been drained for the first time in twenty-four years. A new shaft is being sunk on the footwall and will be connected with the old workings at 170 ft. The ledge averages over 4 ft. wide in commercial ore.

CALIFORNIA

KENNEDY MINE RUNNING THREE SHIFTS —ANGELS DEEP COMPANY ERECTING MILL—BULLY HILL MINES UNCOVER NEW ORE

Jackson—The Kennedy Mining & Milling Co. now has sixty out of its one hundred stamps dropping, an increase of twenty. The mine is working three shifts instead of two.

Carson Hill—The Morgan mine produced $105,000 in November from 8,600

tons of ore. A new tunnel is being driven from the Calaveras mine to connect with the Morgan, Iron Rock and Relief mines. The tunnel is now in 1,900 ft. and will be 7,000 ft. long when completed.

Angels—The Angels Deep Mining Co. has a 20-stamp mill under construction. Mill tests show a return of $4.86 per ton. No cyanide plant will be erected for the present as the ore plates readily. A dam will be constructed across the ravine below mill to impound the tailings, which may be treated later. All machinery will be electrically driven. The Lightner mine is to be opened by its present owners, who will deepen the 1,000-ft. three-compartment shaft to 2,000 ft.

Nevada City—The operations of the Penn-California Mining Co. have reached a point within 200 ft. of the point where a raise will be put up to tap gravel under Harmony Ridge. Fifteen different properties have been acquired in this section.

Grass Valley—At the Idaho Maryland mine the hoist taken from the Union Hill mine has been installed and work to unwater the mine continues unabated. The property of the Black Bear Mining Co. in Rough and Ready Township was recently bid in by William Buchholz for $24,400.—At Washington the Red Ledge mine is reported to have been sold under bond by Williamson Bros. and Cole to P. R. Kelsey, of Quincy, Calif.

Tuttletown—The Patterson and Atlas mines are to be worked by the California Consolidated Mines Co.

Darwin—The Argus-Sterling Co. has opened a new block of medium grade silver-lead ore in the old Sterling mine, seven miles south of Darwin. Shipments to the smelter have been resumed.

Winthrop—The Bully Hill mines has uncovered a new and large orebody on the 900 level of the Star mine. The company has been working about sixty men.

Yreka—Rockberry Mining Company has acquired the San Jose ditch and water rights, which extends for fourteen miles into the mountains from Scott Bar. The ditch will be cleaned, and extended eight miles further, insuring a delivery of over 2,500 in. of water. The company is at present operating three four-inch giants.

Keeler—The Ella group (known as Mrs. Ryan's property) in the Cerro Gordo district is making substantial shipments of good-grade silver ore which carries some gold, copper, and lead. J. T. Harrington has recently leased the group.

The Snowbird mine at Forest Hill in the Damascus district, is now being operated by Harry M. Thompson, who has obtained a lease and bond from the owners, G. McCall and Ed Lewis.—The Gray mine at Blythe Junction is again being operated by the Assets Realizing Co., of Los Angeles.—In San Bernardino County, the Gold Reef Consolidated Mining Co. at Danby has reopened the Clipper Mountain and Gold Reef mines. Officers are S. S. Wold, president; C. N. Post, vice-president; E. S. Harwood, secretary; and E. P. Kepner, superintendent. At Kelso, the Francis copper mine has resumed operations with Edward Bluett as superintendent.—At Otay, in San Bernardino County, the General Petroleum Corp. has secured a lease from John Morton on 320 acres of land on the Otay Mesa. The company plans to mine soapstone, occurring in large deposits on the property.—At Portola, the Trask & Coffer mine is to increase the equipment of the present five-stamp mill to twenty-five stamps.

COLORADO

CASHIN AND GOLCONDA PROPERTIES TO HAVE MILLING PLANTS — DOUGLAS MOUNTAIN COPPER WILL USE AMMONIA LEACHING

Ouray—Development of the well-known Cashin copper mine in the Paradox country by the Michigan-Colorado Copper Co., Bedrock, Colo., has resulted in the decision to build a flotation mill, and machinery is being ordered for a 100-ton plant. The design calls for ball mills for primary and secondary grinding, concentrating tables and flotation apparatus. The ore is largely covellite, with copper carbonates in the upper zone.

The Golconda Mines Consolidated, Inc., C. E. Slocum, manager, Lake City, have taken over a large amount of property on the Gold Konda-Bob Ingersoll vein near Mineral Point, and have begun an extensive campaign of ore development. The vein is a long, wide gold-silver vein which is expected to develop a large quantity of high-grade milling ore. Recent shipments have been made from the Golconda tunnel end of the property, assaying $200 per ton. The present plans call for steady driving of the Golconda tunnel by air drills this winter, the driving of a crosscut and development levels in the adjoining Hurricane Basin next summer, and the construction of a concentrating mill at Rose's Cabin on Henson Creek next summer. The company is ably financed by Indianapolis men.

Ouray County mining continues lively. The Camp Bird continues to develop through the new two-mile crosscut, and to store ore piled up on the surface. The Mountain Top Mining Co. is making a handsome monthly profit from mining high-grade lead-silver ore on the Terrible vein, milling the rejects from sorting this ore, and is going ahead with substantial development of their main vein, the Smuggler-Union vein.—The Atlas M. & M. Co. continue extensive development along with their milling.—Lessees on the Barstow have finished with winter supplies and are now sinking on the vein.—The Silver Mountain Mines Co., a new company, is finishing fine quarters for men and commencing extensive development of the Kentucky Giant.—The Colorado-Zanett Mining Co., on the Portland, the Fellin & Co. lease on the Neodesha, both new companies, are developing steadily and will soon reach their expected ore.

Idaho Springs—Operations at the Golden Edge property are being pushed. The raise is now up 125 ft. and is being timbered and appears to be under the bottom of another large ore shoot.

Breckenridge—The Monte Cristo Mines Co. in the Pollack mining district which is operating the Monte Cristo and Fredonia group has begun extensive development of its properties, and plans to remodel its milling plant and add flotation to increase the capacity to 150 tons. The company has 40,000 tons of silver-lead-zinc ore developed on the Monte Cristo, the average value being about $11 per ton. No work has been done on the Fredonia group since 1893. The company will develop it.

Sunbeam—The Douglas Mountain Copper Mines Co. has not operated its 30-ton reverberatory during 1919 and will probably be unable to do so for some time. It is planned to install an ammonia leaching plant early in the spring, possibly fashioned after the Kennecott plant but on a modest scale. Ores running better than 12 per cent copper will be handled.

MICHIGAN

MASS CONSOLIDATED SUSPENDS—CALUMET & HECLA'S PLANS FOR CONGLOMERATE DEVELOPMENT AT DEPTH

The suspension of operations at the Mass Consolidated was the most important item of recent occurrence. It is particularly unfortunate from an engineering standpoint, for this property, for the first time in its career, had been brought to a point of underground development where a continuance of underground openings assured material progress and success. Suspension was due to inability to continue to finance operations. The company has 1,300,000 lb. of unsold copper and has borrowed all the money it may. Cost of production is 19c. The working force was inadequate and inefficient. The 14th level west drift was in better grade of ore than ever before found in the property.

Winona is helped by the suspension of operations as Mass miners are looking for jobs at Winona. The force now numbers 195. The crosscut from 15th level No. 4 to King Phillip is due to reach the projected line from No. 1

within twenty days and an upraise will then run 75 ft. to connect. Winona produced 211,000 lb. of mineral, making 135,000 lb. of ingot in November and the last two weeks of month the ore ran 16 lb. to ton.

Calumet & Hecla's plans for conglomerate development at great depth include the use of No. 12 shaft, South Hecla, for wiring, for water and for general utility purposes. This shaft stopped at the 65th level years ago, when the conglomerate vein pinched down to a width of three feet. In the development of a great haulage level in the Calumet amygdaloid, 180 ft. under the conglomerate, at a total depth of 8,000 ft., the plan includes an upraise from a lateral run over from No. 11. This work now under way. The raise is in the conglomerate lode which is showing greater width than at any other point. The copper contents is higher than the conglomerate lode shows elsewhere at this depth.

Calumet & Hecla's great underground highway is being run from the Red Jacket and No. 5 Tamarack shafts to the main mine. It already has reached No. 5 and No. 6, Calumet branches, and laterals are being run to these shafts. Five electric pumps will be installed to handle the water and a sump with a capacity of 3,000,000 gal. will be cut. Ultimately the sub-shafts will be sunk from this 8,000-ft. level. In the meantime there is a lot of rich conglomerate ore to be mined, for the shafts all have at least 100 ft. of such ore on either side and running the full 8,000 ft. This lode is of average thickness and width and varies in contents from 20 to 100 lb. to the ton. It will be sent through gravity chutes to the tram haulage way and then hoisted by the Red Jacket perpendicular shaft route to surface.

Champion produced 37,000 tons of copper ore in November, Baltic 17,000, Michigan 4,850, Mohawk 40,829, Trimountain 13,202, and Wolverine 22,563.

Victoria has not shipped any mineral from the mine to its smelter since July and still has on hand some of last January's supply of mineral. Production for November was 108,000 lb.

GOGEBIC RANGE

Ironwood—The mines have started getting in their year's supply of timber, of which a large quantity is required here. Although most mines already have their winter supply of coal, it was announced that they would have to close down except for pumping. However, this has proven to be premature. The open-pit mines at Wakefield expect to carry on stripping operations during the winter. At the Puritan mine construction has been started on fifty dwellings for miners. A fire lasting six or seven hours did much damage at the 19th level station of "B" shaft at the Norrie mine.

MINNESOTA

MESABI RANGE

Marble—In the western Mesabi district the Mesabi Cliffs Iron Mining Co., subsidiary to the Cleveland-Cliffs Iron Co., has commenced work on a washing plant at the Hill-Trumbull mine located at Marble. The plant is to be a single unit with trommel, two 25-ft. logs, four 18-ft. logs and eighteen high-deck concentrating tables, and shipments are expected early in 1920. The property comprises the old Hill mine, released by the Oliver company, and the new Trumbull prospect adjoining. It is a Great Northern lease throughout.—At the York mine, Nashwauk, work has been begun on extending the limits of the present pit. The extension will involve the removal of 200,000 cu. yds. of overburden and will be done by the operators of the mine, Coates & Tweed. The Oliver company announces the completion of the electrification of all their mines in this district, with the exception of the pumping station at the Arcturus which will be completed as soon as the new shaft is bottomed.

Hibbing—The Mead Iron Co. has encountered ores of such widely divergent structure in the development of their Warren mine that work has been started on a screening and crushing plant to serve the property. The foundations will be laid by the operators themselves and the contract for equipment has been let to the Allis-Chalmers Manufacturing Co. It is expected that the plant will be ready for test runs early next spring, and should furnish considerable tonnage during the 1920 shipping season.

Chisholm—The Chisholm district adds another new mine to its list with the commencement of shaft sinking on what is to be known as the Wellington mine of the Oliver company. The shaft is to be 8 x 20 ft., in three compartments with concrete sets. Sinking will be done with the aid of an electric hoist and complete electrical equipment with steel headframe will be a permanent installation.

Eveleth—In the Eveleth district the Oliver company is relining old No. 1 shaft at the Leonidas mine with concrete. The shaft is 457 ft. deep and work has progressed 80 ft. up the shaft. The same company is also conducting an experiment in the use of the Armstrong loader in rock development work.

VERMILION RANGE

On the Vermilion Range the Phoenix Mining Co. announce that the old Consolidated Vermilion workings are now unwatered to a depth of 300 ft. Three shifts of miners are at work cleaning up the workings and a high-grade bessemer ore is being hoisted.

MISSOURI

JOPLIN-MIAMI DISTRICT

Mining men in the Joplin-Miami district are interested in the recent announcement that Charles M. Schwab has acquired control of the United Zinc Smelting Corporation. Mr. Schwab stopped at Joplin the latter part of November and looked over the district, taking time to make a personal investigation of a zinc mine in the Picher field, owned by the United Zinc company. It was announced recently that improvements in the operating department of the company would be made at once, but just what will be their nature is not known. Out of several mines owned in this field, the Manhattan at Picher is the only one now in regular operation.

The Rialto mine, north of Douthat, Okla., has been taken over by E. S. Warner and Henry Medlin and the mill, which has been idle for more than a year, will be started up by them at once. Medlin until recently was manager for the Niangua mines at Picher.

Despite the fact that it has been in existence for a year and more without any income, the Oklahoma Ore Storage Association still believes in the warehouse plan. It has let the contract for two new warehouses, one to be built at Tar River and the other at Zincville. Three other warehouses already are virtually complete.

The Huttig L. & Z. Co. has placed its new mill in operation northeast of Picher but a shortage in gas has held operations to a single shift, and even this was possible only by shutting down the company's No. 1 mill. The Blue Mound Mining Co. has installed crude oil burners under all its burners and is using this fuel exclusively. It recently opened up its No. 5 shaft, over 200 ft. from its mill, and is bringing ore from it by steam locomotives over a surface narrow-gage road.

NEVADA

Tonopah—All Tonopah mines have been running at capacity for the last two weeks. Tonopah Belmont cleanup for latter half of November was $56,920, West End $58,700, figures not being available for Tonopah Extension and Tonopah Mining. Regular shipments are being made from Rescue, California Tonopah, Montana and Halifax. The Cash Boy is reported to have excellent showing on the 1,646 level. The MacNamara mill is operating steadily on ore from Divide mine and its own dumps. The labor situation is good.

Divide—The Tonopah Divide is making regular shipments of about forty tons per day to the MacNamara mill

in Tonopah. The showing on the 585, or bottom level, is said to be excellent and the shaft is being deepened. The Divide Extension drift on the 200 level is reported by the company engineers to be in ore of milling grade. The Belcher Extension vein, which at point of discovery showed a narrow width of high-grade ore, is developing satisfactorily. Practically all Divide mines are operating to capacity. In most cases shaft sinking has been discontinued and crosscutting begun. There is reason to believe that the next few months should witness some interesting developments.

Arrowhead—The Arrowhead silver district, seventy-three miles east of Tonopah, is the scene of considerable activity. Many companies have been organized and are beginning work. The Arrowhead mine has cut rich ore on the 175 or bottom level. Favorable surface showings have been found throughout the district.

Manhattan—The White Caps mine encountered a heavy flow of water in the lower workings recently which temporarily stopped production. The water is reported to be under control and regular mining resumed.

Goldfield—According to preliminary estimates by E. A. Byler, engineer for the company, the output of the Florence mine for the year will be $252,400, most of which was shipped by lessees. Carload recently mined and shipped on the company's account averaged $100 per ton.—A. H. Merrill, president of the Merrill Silver-Lead Mining Co., has returned from New York and announces that the company has been financed to the extent of $50,000. Its property is located at Casey's Flat, twelve miles south of Goldfield, and a recent sample across 6 ft. of excellent smelting ore gave good values in silver and lead.

Ely—Sayre and Tilford are lessees of the dumps of the Monitor mine, seventeen miles south of Ely, and will screen and sort same for shipment to smelter, using trucks for hauling to railroad.

Battle Mountain—J. A. Ballinger is now shipping from his property at Maysville, near Hilltop, Lander Co., an argentiferous stibnite ore unusually rich in silver for high-grade Nevada antimony ores, in carload lots. It is unusual to find so much silver in high-grade antimony ores in Nevada.—A carload of high-grade silver-gold ore was recently shipped by Sweickhamer and Triplett, lessees on the Gray Eagle mine near Hilltop. Heavy snows will probably cause shutdown for remainder of winter.

Mina—The mill of the Olympic Mines Co., recently destroyed by fire, is to be rebuilt on the old site, according to reports credited to the management. There was $60,000 insurance on the mill.

SOUTH DAKOTA

NATIONAL TIN'S CONCENTRATOR READY

The National Tin Corporation's mill at Hill City is completed and ready for operation. Shortage of coal has prevented its starting. For the same reason Cowboy mine has been closed down.—At the Mohawk mine a tin ledge has been cut at a distance of about 300 ft. from the shaft. Miners have been driving a lateral for several months past to cut this ledge, which outcrops on the surface. —A new two-compartment incline shaft is being sunk on the Tin Boom and has gained a depth of 30 ft. A shaft house, boiler, compressor and hoist are being installed.

TEXAS

The Freeport Sulphur Co. has purchased a 10-ton tractor to use in heavy hauling between the town of Freeport, Tex., the sulphur works at Bryan Mound, and the oil properties on McNeill lease and Stratton Ridge.

UTAH

Alta—The Emma Silver Mines, now unwatered, is taking out ore running high in silver from the 200 level and winze. Arrangements are being made for shipping this ore as soon as the roads permit. This company has added to its holdings by the purchase of two adjoining claims, the Revolution and Mackay from the Tipperary Mining Co., payment being made in Emma stock.

Eureka—The Tintic Standard has declared its regular quarterly dividend of 8c. a share, bringing the total for the year to $281,976. Payment was made Dec. 24. The officers of the company are considering the question of a possible extra or Christmas dividend.

Park City—The Daly Mining Co. paid its regular quarterly dividend of 10c. a share or $15,000 on Jan. 2. This brings the total for the year to $112,000.

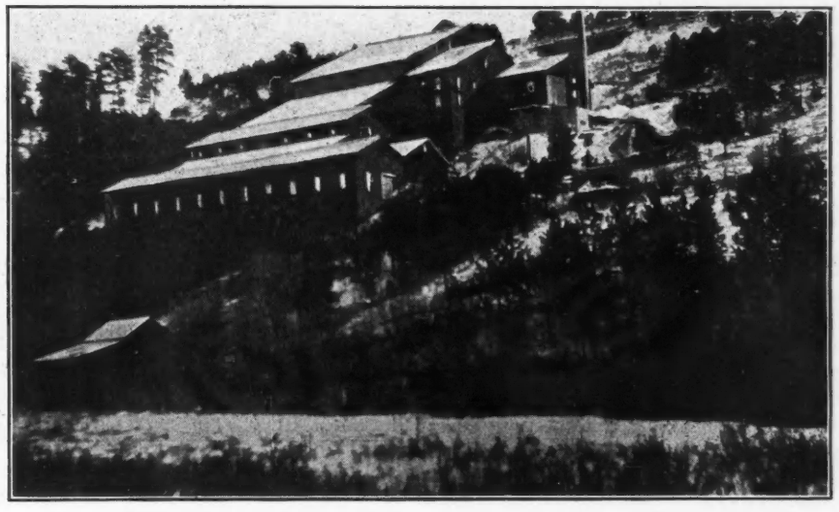
WASHINGTON

Republic—The Castle Creek Mining Co. is in the Park City district, twenty miles southwest of Republic. The company is installing 15-ton flotation plant to treat dumps carrying silver.

Nespelem—The Panama mine is reported to have encountered a vein in its lower crosscut. Exploration work will continue with small crew during the winter. The company expects to ship silver ore to Great Metals Custom mill when it reopens early in 1920.

Nighthawk—The Pyrargyrite Co. has completed a building for 75-ton mill and is ready for the installation of machinery.

Concunully—The old Hargrave mine near Concunully has been bonded by A. H. Patterson and associates, who are constructing a 50-ton mill.



CONCENTRATOR OF NATIONAL TIN CORPORATION, HILL CITY, S. D.

Chewelah—The Northwest Magnesite Co. is working two shifts in the Finch quarry and employing about 120 men. The calcining plant at Chewelah is operating at full capacity on a three-shift basis. The plant is handicapped by lack of electric power, owing to low water at Myers Falls. The company has pressed auxiliary distillate engines into service as boosters. The Stroback mine has shipped its first car of ore to the smelter at Trail.—M. E. Joseph, receiver, has offered for sale the claims and property of the Silver Basin Mining Co., in the Deer Trail district. These are said to contain high-grade silver ores.

Leadpoint—The Electric Point Mining Co. announces that production will be resumed early in 1920. This is the largest lead-producing property in the state and production has been curtailed during the past year on account of unsatisfactory market and smelter conditions.

CANADA

ONTARIO

Cobalt—Temiskaming has again entered the ranks of the dividend payers by the declaration of a 4 per cent dividend payable January 31. It is stated that the surplus is not being used for this payment but that the money is derived from ore recently found. In November the Kerr Lake produced 115,000 oz. of silver worth about $150,000. The long expected decision in the La Rose-O'Brien lawsuit has finally been given in favor of La Rose, the O'Brien action being dismissed with costs. It is expected that the La Rose will ask for a joint survey and an accounting of any ore removed from the disputed ground. The old Hargraves and the Reliance are being amalgamated in a new $2,500,000 company, of which the Reliance will receive 800,000 shares and the Hargraves 1,000,000 shares, leaving 700,000 in the treasury. The Adanac is using a diamond drill in exploratory work. The Mining Corporation of Canada will shortly stop the treatment of slimes for the winter. The Chambers Ferland has been offered a good price for their old tailings.

Kirkland Lake—Mines are getting back to normal and underground operations have been resumed on the Canadian Kirkland. At the 600 and 700 levels the Kirkland Lake Gold has run into high-grade ore, and the results on the Lake Shore are also satisfactory. During November the small tonnage of dump ore treated on the latter property averaged over $17.50 a ton. The Ontario Kirkland has also resumed and is developing the vein on the 300 level.

Porcupine—The Hollinger has declared an extra dividend of 1 per cent paid Dec. 31 and also paid a dividend on Dec. 2. The Dome Lake is to resume operations and the rumors regarding the reopening of the Porcupine Crown continue but no definite action has been taken.

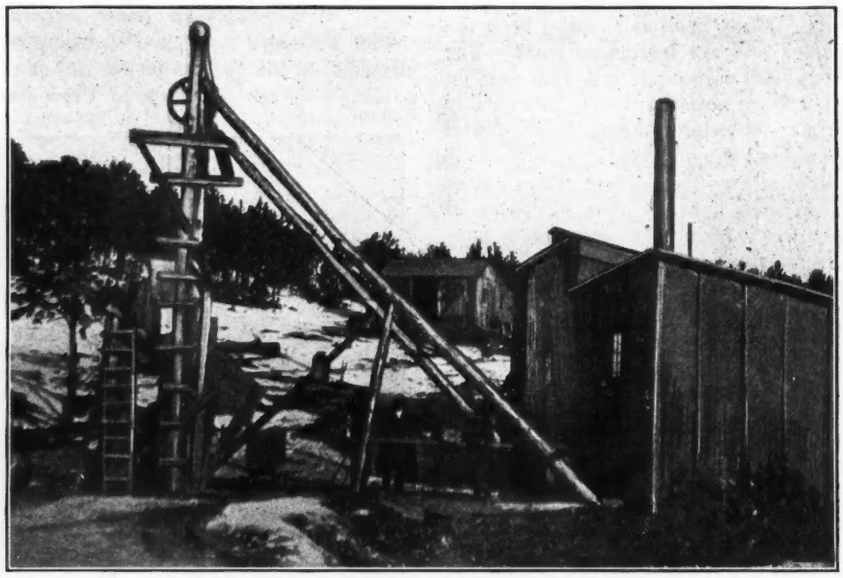
Matachewan—Mining operations have been suspended on the Matachewan Gold Mines, and it is stated that other interests are to be in control. Cost of operations have been excessive and the company is probably short of money. The increase of the capital of the Wasapica, in Shining Tree district, to $6,000,000 has been ratified at a special meeting of the shareholders.

MEXICO

NORTHERN SONORA

El Tigre—Mine and mill operations were handicapped to some extent during the latter part of November by heavy rains which raised the Bavispe River to flood level and washed out the road so badly that it was impossible to transport supplies or move ore and concentrates to Esqueda, the company's shipping point on the Nacozari railroad. However, it is stated that conditions soon will be normal. An attempt made by six masked men to hold up a stage carrying $15,000 for the Tigre mine payroll was made near Esqueda Dec. 4, but was frustrated by the guard of six federal soldiers, one of whom was killed and another wounded. Several arrests have been made but the nature of the evidence has not been revealed by the authorities.

Cananea—The Cananea Consolidated Copper Co. has cut its production by about 25 per cent. Labor trouble at Fuertocitos, one of the company camps, has caused a decrease in the working force at that point. Considerable development work is being done by the company, but details are not available at this time. November production was 3,998,203 lb. of copper.



MOHAWK MINE OF NATIONAL TIN CORPORATION, HILL CITY, S. D., SHOWING HEAD FRAME AND HOIST BUILDING

Moctezuma—The recent cut in copper production made by the Phelps Dodge Corporation will have little effect at the Moctezuma property. The number of men employed will remain about the same, it has been learned, more being employed in development operations than heretofore. This unit of the Phelps Dodge interests will be so gaged as to produce 2,000,000 lb. of copper per month from its shipments to the Copper Queen smelter at Douglas.

Tellamar—Yaqui Indian activities and the withdrawal of troops from guard duty at mining properties, has caused the closing of the Tellamar mine on the Sonora-Chihuahua line, 225 miles south of the international boundary. Franklin H. Harding, engineer for the company, has gone to Chicago to report to his principals. Bullion worth $18,000, stolen from the company several months ago, recently was found cached in an abandoned tunnel. It was not brought out, being concealed until such time as it would be possible to bring it out without fear of bandits, Mr. Harding said.

Con Virginia—The Con Virginia, a promising silver-gold prospect, formerly explored to some extent by the late Don Carlos C. Soto, has been bonded to L. C. Shattuck of the Shattuck-Arizona and Denn-Arizona companies, for a substantial sum, by Ygnacio Soto of Douglas, Ariz. Mr. Shattuck proposes to put a crew to work on development very soon under R. R. Belknap, formerly chief engineer for the Shattuck-Arizona mine. At the present time the Con Virginia is no more than a promising prospect, but has an excellent showing of silver-gold ore both on the surface and underground, while geological indications are favorable to the values carrying to depth. The property is connected with the outside world by trails only at the present time, making transportation by pack train the only feasible method. Pearson, Chihuahua, sixty miles northeast, is the nearest rail point.

Progresso—The Progresso Silver Mines Co. has shipped through Douglas one Dorr and two Pachuca tanks for its cyaniding plant in order to increase its capacity. Shipments of bullion have begun, the first shipment going out via Nacozari and Douglas to the Selby refinery at San Francisco the first week in December. Similar shipments will be made weekly hereafter.

Nacozari—The International Commission company has taken a lease on La Montanesa, a silver group near Nacozari, and is getting out ore for a shipment to the smelter at El Paso.

PERSONALS

Herbert R. Hanley has returned from the Shasta copper field to San Francisco.

Harold A. Linke recently made an examination of sulphur deposits in Washington County, Utah.

Frank L. Hess, of the U. S. Geological Survey, sailed for South America on the Santa Luisa, Dec. 6.

T. R. Drummond has recently been chosen a managing director of the Superior & Boston Copper Co.

E. R. Schoch has resigned as consulting engineer to the Rooiberg Minerals Development Co. of South Africa.

Francis J. Heney is president of the recently organized Swisshelm Gold-Silver Co., incorporated in Tucson, Ariz.

Donald C. Brown, one of the officials of the Compañia Metalurgica Mexicana, has returned to New York City, from Mexico City.

Eugene H. Dawson, mining engineer, has returned from Alaska where he has been investigating placer ground during the past summer.

Frank Mills, the new Minister of Mines of Ontario, expected to leave Toronto early in December to visit the mining centers of northern Ontario.

John T. Reid, mining engineer of Lovelock, Nev., left on Dec. 20 for New York City, where he will remain until he returns to Lovelock in the spring.

J. Benjamin Parker, of Salt Lake City, has accepted a position as flotation engineer with the Consolidated Interstate-Callahan Mining Co., of Wallace, Ida.

H. A. Stewart, of Denver, has returned to that city after spending seven years as superintendent of the Chiksan Gold Mining Company, Ltd., in Korea (Chosen).

D. H. Newland, assistant state geologist of New York, has been granted six months' leave from Jan. 1, 1920, and will spend it in geological and mining work in the West.

C. D. Leslie has retired from the position of consulting engineer to the Consolidated Gold Fields of South Africa, and it is understood he will devote his time to farming.

Charles Bocking, recently assistant manager and cashier of the Butte & Superior Mining Co., of Butte, Mont., has been appointed general manager in place of **J. L. Bruce,** resigned.

P. S. Janderup, formerly with the engineering department of the Raritan Copper Works, is now constructing engineer with the Balbach Smelting & Refining Co. of Newark, N. J.

Arthur B. Parsons, former metallurgical engineer on the staff of the Butte & Superior Mining Co., of Butte, recently resigned to accept a position on the staff of the "Mining and Scientific Press."

Frank H. Skeels, mining engineer of Wallace, Ida., recently completed an investigation of the clay deposits of Idaho, under the direction of the state bureau of mines and geology, in cooperation with the U. S. Bureau of Mines.

L. D. Hutton, formerly of Yale University, and **Charles Berkey,** of Columbia University, have been making a geological examination of the Hill Top Metals Co.'s holdings in the Chiricahua Mountains, northeast of Douglas, Ariz.

C. V. Jenkins, recently business manager of the Nevada Consolidated Copper Co., has been elected secretary-treasurer of that company, in place of **W. E. Bennett** who resigns as vice-president-secretary but remains on the directorate.

Felix Wormser, of the U. S. Bureau of Mines, is in New York. Mr. Wormser has been engaged in work connected with publishing the monthly reports of the Bureau's investigations, an extension of its work very helpful to the mining industries.

Thomas Carnahan, for many years a mining engineer with the Utah Copper Co., Bingham Canyon, Utah, sailed late in December for the Belgian Congo, Africa, where he will assume the superintendency of the Katanga Copper Co's. extensive workings.

A. B. McCallum, administrative chairman of the Honorary Advisory Council for Scientific and Industrial Research in Canada, has been visiting British Columbia in connection with the problem of producing steel from the higher-grade ores of that Province.

Norbert Koepel left for Chile on Nov. 1, to take charge of an experimental laboratory for the Andes Copper Co. Mr. Koepel, for the past year, has been employed in the experimental metallurgical department of the Anaconda Mining Co., Great Falls, Mont.

Linn Bradley has resigned as chief engineer for the Research Corporation, administering certain Cottrell patents, and will engage in consulting practice, specializing on the collection of dust and fumes. His address is 46 So. Arlington Ave., East Orange, N. J.

P. E. Hopkins, of the Ontario Bureau of Mines, is working on a report on the West Shining Tree district which will be published soon. **A. G. Burrows,** of the same Bureau, together with Mr. Hopkins, is preparing a detailed report on the geology of the Kirkland Lake area.

John E. Nelson, superintendent of the Cambria mine, Negaunee, Mich., on the Marquette range, for the Republic Iron & Steel Co., has been named general superintendent for the company's mines in the Michigan field, including those of the Marquette, Menominee and Gogebic ranges.

Gordon R. Campbell, secretary of the Calumet & Arizona Copper Co., has been inspecting the company's mines at Bisbee, the New Cornelia at Ajo, and the Jerome mines. He was accompanied by Thomas Cole of New York, and Thomas Hoatson of Calumet, Mich., directors of the company.

L. W. Gill, head of the electrical engineering department of Queen's University, Kingston, Ont., during the past fifteen years, has been appointed Director of Technical Education and will administer the $10,000,000 lately voted by the Dominion parliament to encourage technical education throughout Canada.

A. J. Bone, smelter superintendent of the Granby Consolidated Mining, Smelting & Power Co., at Anyox, B. C., has resigned. Mr. Bone went to Anyox from the Tennessee Copper Co. and has been with the Anyox plant from its beginning. He is succeeded by **W. B. Bishop,** who has been smelter superintendent at Grand Forks.

Charles W. Wright has received from the King of Italy the honorary title of Commendatore in recognition of his services as Red Cross Director of the District of Sardinia, and for services in organizing the mining industry in Sardinia. The title "Commendatore" is one which is usually given only to governors of Italian provinces and to certain other civilians.

Joseph W. Richards, secretary of the New York section of the American Electrochemical Society, addressed the Baltimore Section of the American Institute of Electrical Engineers and the Johns Hopkins University Scientific Association, Dec. 12, on "Power for Electrochemical Industries." He will address the Minnesota Section of the American Chemical Society at Minneapolis, Feb. 3, on "Electrochemical Industries."

F. W. McNair, president of Michigan College of Mines, and **John F. Hayford,** director of the College of Engineering of Northwestern Reserve University, devoted their time and genius to the study of big-gun problems with **Lyman J. Briggs** of the U. S. Bureau of Standards during the war, and their respective institutions, have recently received formal letters of appreciation of their services from the Chief of Bureau of Ordnance, U. S. Navy, who emphasized the advance in the gunnery of the navy due to their work. They accompanied the Pacific Fleet on its recent trip to the California coast.

OBITUARY

Charles H. Traebling, assistant superintendent of Deep Water Oil Refineries, died suddenly at Houston, Tex., on Dec. 7, in his sixty-first year.

Edward Zelleken, retired Joplin mine operator and a pioneer of the district, died recently at the age of eighty. He went to the Joplin district from Cincinnati in the early '70s, and to Joplin itself in 1880. His philanthropic activities were widely known.

Homer R. King, who was associated with John W. Mackay and James G. Fair in developing California's mineral wealth, died at San Francisco on Dec. 19. In 1873 he was cashier of the Wells Fargo Express Co., and ultimately rose to the presidencies of the Wells Fargo Nevada National Bank and the Bank of California.

William O. Oschmann, electrical engineer of the Oliver Iron & Steel Co., Pittsburgh, for the past twelve years associated with that company, died in a Pittsburgh hospital on Dec. 3 as the result of an accident. He was a member of the American Institute of Electrical engineers, and of the Association of Iron and Steel Electrical Engineers.

Captain Edward R. Hughes, who was in charge of underground operations at the Hiawatha mine, Iron River, Mich., was killed by a fall of ground on Dec. 16. Had been engaged in mining work on the Menominee Range for twenty years, being at the Vivian, at Quinnesec, before going to the Hiawatha. Captain Hughes was sixty-four years of age and a native of England.

SOCIETIES

Mining Institute of Scotland, held a general meeting in Glasgow on Dec. 6, at which members discussed H. M. Cadell's paper "Oil Possibilities in Scotland." The society announces the removal of its headquarters and library to Royal Technical College, George Street, Glasgow, where communications should be addressed.

American Electrochemical Society, New York Section announces the following program of future meetings: Jan. 23—Cheap Cyanide and Its Utilization; Feb. 6—Joint meeting with local sections of American Chemical Society and Society of Chemical Industry; Feb. 27—Electric Furnace Reducing Agents; Mar. 26—Peace Uses of War Products; and compressors. May meeting—Residual Gases: Helium and Argon.

American Association of Engineers (membership) has recently secured the affiliation of the Southwestern Society of Engineers, the Engineers' and Architects' Association of southern California, and the Houston, Tex., Engineers' Club. The Southwestern District of the A. A. E. has recently been organized, and its directors include **J. A. French,** state engineer of New Mexico, **R. S. Moore,** of the American Smelting & Refining Co., El Paso, and **D. B. Gillies,** mining engineer.

American Association of Engineers, Southwestern District, will hold its first annual convention at Globe, Ariz., Jan. 9, 10 and 11, 1920, the Globe-Miami Chapter acting as hosts. The program will include business meetings, inspection trips to the various mines and mills of the section, a trip to Roosevelt Dam on Jan. 11, and a banquet at the Miami Y. M. C. A. the night of the 10th. G. Montague Butler, director of the Arizona Bureau of Mines, etc., is president of the Southwestern District, and C. B. Neiwender is secretary of the Globe-Miami Chapter.

INDUSTRIAL NEWS

Garfield & Co., Hearst Bldg., San Francisco, are the exclusive representatives in the West for the Kennedy-Van Saun Engineering Corporation, of New York.

Parsons & Petit, of 63 Beaver St., New York City, announce that Schuyler L. Parsons, son of the late senior member of the firm, will be admitted as a partner in the firm on Jan. 1, 1920.

Overstrom & Sons, engineers, have moved their office and plant to 718 Date St., Los Angeles, Cal. They are builders of the Overstrom Universal Concentrators, specializing on foreign business.

National Lead Co. will remove its white-lead plant from Selby, Contra Costa Co., Cal., to Oakland. Its new plant at Forty-seventh Avenue and East Tenth Street, Oakland, has just been completed and is in readiness for the transfer.

Traylor Engineering & Manufacturing Co., Allentown, Pa., announces that on Dec. 1, G. B. Livingood, one of its sales engineers for the past two years, was appointed Assistant Sales Manager of its mining and crushing machinery department.

American Zinc Products Co. has installed a complete line of zinc roofing machinery in its rolling plant at Greencastle, Ind. The company is prepared to promptly fill orders for flat, corrugated, V-crimped zinc sheets of all forms and sizes.

Hardinge Conical Mill Co. announces that W. L. Penick, until recently connected with its Salt Lake City office, has been advanced to Northwestern Sales Manager and will open a new branch office for the company in the Old National Bank Building, Spokane, Wash.

Inland Steel Co. will install a complete powdered coal system for firing the 40 furnaces in its plant at Indiana Harbor, Ind., according to an announcement in "Iron Age." For the initial installation, powdered coal will be applied to 16 sheet furnaces, 16 pair furnaces, 3 continuous plate mill furnaces, 2 continuous bar mill furnaces and 3 slab heating furnaces. A contract awarded the Quigley Furnace Specialties Co., 26 Cortlandt Street, New York, calls for the engineering work and installation of a complete milling plant of 20 tons an hour capacity.

TRADE CATALOGS

Dorr Co., of New York and Denver, has issued an attractive illustrated booklet of 12 pages, entitled, "Proving Industrial Values." It gives details regarding the Westport mill at Westport, Conn.

Metalkase Magnesite Brick. Harbison - Walker Refractories Co., Pittsburgh, Pa. 6 x 9; 16 pp.; illus. Gives facts about Metalkase brick and suggestions regarding use. It is stated that these brick possess the high refractoriness and basic properties of magnesite brick, but are stronger at high temperatures and do not spall.

Machinery—The Salt Lake Hardware Co., Salt Lake City and Pocatello, Idaho. Catalog, Department 18; 8¾ x 11¼; 195 pp. illus. Describes mine, mill and smeltery machinery, including hoists, compressors, rock drills, crushers, classifiers, concentrators, pipe, cars and cages; power plant equipment, including engines, generators, motors, boilers, pumps, heaters, separators, condensers, and steam specialties, and general machinery, including wood- and iron-working machinery, irrigation pumps, concrete mixers, contractor's hoists, transmission machinery, lathes, planers, shapers, and radial drills. Tables of dimensions are also given. Equipment represented by the Salt Lake Hardware Co. in the intermountain territory includes, among others, Aldrich and Deming pumps, Gardner governors, Pelton water wheels, Western gas and oil engines, Deister-Overstrom concentrators, and Sullivan drills.

THE MARKET REPORT

Daily and Weekly Metal and Mineral Prices, Metal Market Conditions, Average Monthly Prices, Stock Quotaticns

Silver and Sterling Exchange

Dec.	Sterling Exchange	Silver New York, Cents	Silver London, Pence	Dec.	Sterling Exchange	Silver New York, Cents	Silver London, Pence
25	....	.....	.....	29	378	131	76¼
26	380	132½	.....	30	378	131	76¼
27	379	132½	.....	31	375	131	76

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London quotations are in pence per troy ounce of sterling silver, 925 fine.

Daily Prices of Metals in New York

Dec.	Copper Electrolytic	Tin Spot	Lead N. Y.	Lead St. L.	Zinc St. L.
25	.....	.....	.....	.....	.....
26	18.55	55¾	7.65	7.20	8.45@8.55
27	18.55	55¾@56	7.70	7.40	8⅝@8¾
29	18.60@18.85	57	7.90@8.10	7.50@7.75	8.65@8.75
30	18.60@18.85	57½	7.90@8.10	7.50@7.75	8.80@8.90
31	18.60@18.85	57⅛@58⅜	8⅛@8¼	7.75@7.85	8.80@8.90

The above quotations are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for the deliveries constituting the major markets, reduced to basis of New York, cash, except where St. Louis is the normal basing point.

Quotations for copper are for ordinary forms of wire bars, ingot bars and cakes. For ingots an extra of 0.05c. per lb. is charged and there are other extras for other special shapes. Cathodes are sold at a discount of 0.125c. per lb.

Quotations for zinc are for ordinary Prime Western brands. We quote New York price at 35c. per 100 lb. above St. Louis. Tin is quoted on the basis of American tin, 99 per cent grade.

London

Dec.	Copper Standard Spot	Copper Standard 3 M.	Copper Electrolytic	Tin Spot	Tin 3 M.	Lead Spot	Lead 3 M.	Zinc Spot	Zinc 3 M.
25	....	....	....	....	....	....	....	....	....
26	....	....	....	....	....	....	....	....	....
27	....	....	....	....	....	....	....	....	....
29	111½	113½	118	337	340	45⅜	45⅝	57½	58½
30	116¾	119¼	125	342	344¼	45½	45¾	56¾	57⅞
31	115¼	117¾	125	341¼	343¼	45⅜	45¾	56⅞	57¾

The above table gives the closing quotations on the London Metal Exchange. All prices are in pounds sterling per ton of 2,240 lb.

METAL MARKETS

New York, Dec. 31, 1919

The markets for copper, lead, zinc and tin were all spectacular this week, sharp advances on large buying being recorded in each case.

Transatlantic freights were distinctly easier, quotations being approximately as follows: Hamburg $9@10; Rotterdam $8@9; Havre $10@12; British ports $10@12.50. It is reported that as low as $7 to Antwerp was done. Special conditions create the sharp difference in rates between those to British and to Continental ports. Transpacific rates to Hongkong and Kobe remained unchanged at $12.

Gold was quoted in London at 109s. on Dec. 23; 109s. 3d. on Dec. 24; and at 109s. 2d. on Dec. 30.

The American Metal Co., Ltd., has acquired by purchase the entire business of L. Vogelstein & Co., Inc., as of Jan. 2, 1920, and L. Vogelstein has acquired a substantial interest in the American Metal Co. Mr. Vogelstein has been elected a vice-president of the American Metal Co., and will take an active part in its future management.

The entire organization of L. Vogelstein & Co., Inc., has been taken over by the metal company and all contracts and engagements for the Vogelstein company extending beyond Jan. 2, 1920, will be for account of the American Metal Co., Ltd.

Interests connected with the Cerro de Pasco Copper Co. have also bought into the American Metal Co.

Copper

A large business was done, both for domestic consumption and for export. The domestic business was spread pretty generally among wire drawers, brass makers and rollers. In the early part of the week prices ranged from 18½ to 18¾c., delivered, in the latter part of the week from 18¾ to 19c. Business was done at two prices at all times. The advance in prices in the latter part of the week did not check buying in any way. Sales for export were partly to Japan and partly to Europe. They amounted to more than in any week for a long time.

Altogether, the December sales will figure to a large total.

Tin

This metal experienced a spectacular advance following the advance in the London market. There was substantial buying by domestic consumers.

Singapore quoted £331 sterling, c.i.f. London on Dec. 29; £337 on Dec. 30; and £338½ on Dec. 31.

Lead

The situation in this metal became acute and dangerous. The A. S. & R. Co. advanced its price to 7.50c. on Dec. 26, but sales of tonnage occurred on that day at 7.65c., and on Dec. 27 at 7.70c. On Dec. 29 and 30 large business was done at 8c. These purchases seem to have exhausted supplies immediately available, and on Dec. 31 it was hard to say where lead could be obtained in quantity.

Europe bought heavily of bonded lead for export, paying 7½@7¾c., New York, and was a bidder for domestic lead. The shortage of supplies abroad, resulting from the curtailment of production in Australia and Spain, is such that Europe must get lead if possible from this country and Mexico. There will probably be no relief to the situation until production in this country and Mexico increases. Steps are already being taken to add to the Mexican supplies, but in this country it is not so easy.

Zinc

Very large buying both for speculative account and for export resulted in a sharp advance in the market, some of the largest transactions occurring at the highest figures. Of buying by domestic consumers there was scarcely any. The absence of such buying was reflected in the condition that while spelter sold in St. Louis at 8.90c., it could be bought in New York at 8.95c. The major business of the week was transacted previous to today, when the tone of the market became a trifle easier.

Antimony — Rather large business was done at 9¾c., which we quote, but at the close some agencies were asking 10c. We quote futures at 9½@9⅝c.

Aluminum—32½@ 33c. per lb.

Platinum — Unchanged at $150@155 for refined ingot.

Palladium—We quote $135.

Iridium—Quoted nominally at $300.

Quicksilver—The market remained steady at $85 throughout the week. San Francisco telegraphed $90 steady.

Tungsten Ore — Substantially unchanged. Some small lots of Chinese wolframite were sold at $6.50.

Molybdenum Ore—A little business was reported done at 75@80c.

Copper Sheets—28½c. per lb. Wire 22c., f.o.b. factory, and 22¼c., f.a.s. New York. Quiet. Market stronger.

Zinc Sheets—$11.50 per 100 lb. less 8 per cent on carload lots. Slightly higher prices for export.

Bismuth—$2.65 per lb. for 500-lb. lots. Prices range from $2.60 to $2.80 per lb., depending upon quantity purchased.

Cadmium—$1.40 to $1.50 per lb. Dull.

Nickel—Ingot 42c.; shot 43c.; electrolytic 45c.

Silver—The market has been slack owing to the holiday season. Not many commitments are being made, partly owing to the fact that the smelters have sold rather freely in advance for December and January deliveries and buyers are waiting for fresh China exchange reports for February and March deliveries.

Mexican dollars at New York: Dec. 25, holiday; Dec. 26, 101½; Dec. 27, 101½; Dec. 29, 100¾; Dec. 30, 100¾; Dec. 31, 100¾.

Graphite—Ceylon grades are quoted: Lump, 15@16c.; chip, 11@12c.; dust, 8@9c. The recent increase has been owing to the increase of premium on rupee exchange and higher freight rates.

Feldspar is quoted from $13.50 to $17 per ton, according to quality. Labor difficulties are hindering producers in increasing production.

Fluorspar—Lump ore containing 85 per cent CaF_2 and not over 5 per cent SiO_2 is quoted at $16 f.o.b. mines at Tonuco, N. M. Freight to Chicago, $7.50; to New York, $15. Prices quoted f.o.b. Kentucky and Illinois mines are about $25 for washed gravel grade.

Nitrate—Spot supplies are quoted at $3@3.02 per cwt. for carload lots. Contracts for delivery during first six months of 1920 are stipulating $3.05@3.07½. Shortage and good demand.

Pyrites—Spanish pyrites is quoted at 17c. per unit for furnace-size ore, free from fines, c.i.f. New York or other Atlantic ports.

Sulphur—Prices remain unchanged at $20 for export delivery and $18 for domestic delivery, per ton f.o.b. mines at Freeport, Tex., and Sulphur Mine, La.

Zinc and Lead Ore Markets

Joplin, Mo., Dec. 27—Zinc blende, per ton, high, $52.90; basis 60 per cent zinc, premium, $51; Prime Western, $50; fines and slimes, $47.50@45; calamine, basis 40% zinc, $35. Average settling prices: blende, $49.84; calamine, $36.80; all zinc ores, $49.55.

Lead, high, $91.20; basis, 80 per cent lead, $90; average settling prices all grades of lead, $88.91 per ton.

Shipments the week: blende, 5,012; calamine, 116; lead, 943 tons. Value all ores the week, $337,850.

Shipments the year: blende, 469,178; calamine, 12,042; lead, 72,359 tons. Value all ores the year, $25,212,270.

Sellers received a report Friday night of 9c. New York metal price, and sat hard and held firm for advanced prices until eleven o'clock Saturday, when some offered to accept the price proffered by the buyers. The short shipment is from lack of cars with some cattle cars boxed up and used. Coal cars have all been withdrawn and box cars are very scarce.

Platteville, Wis., Dec. 27—No open market sales of premium ore. Prime Western grades of blende are reported. Lead ore, basis 80 per cent lead, $88 per ton. Shipments reported for the week are 1,236 tons blende and calamine, 183 tons galena and no sulphur ore. For the year to date the totals are 100,135 tons blende and calamine, 6,922 tons galena, and 17,791 tons sulphur ore. During the week 2,446 tons blende were shipped to separating plants.

Iron and Steel Review
Pittsburgh—Dec. 30

The blast furnaces and steel making and steel finishing departments are now making progress at rather widely varying rates toward operation at capacity. The iron and steel strike is left well behind, but effects from the coal strike have not everywhere disappeared, and there remain labor shortage, labor inefficiency and low morale.

There are a few strikers left, as at Monnessen, Pa., and in the Wheeling district, although in both cases the great majority of the men have been already to work for several weeks.

As to the coal strike, there is little shortage of coal now, as affecting mill operations, but here and there a department is not sufficiently supplied with coal. In the matter of coke the influence is more important, as the Connellsville coke region still has a car shortage, attributed to there being such a heavy movement of coal, and some blast furnaces are poorly supplied. An outstanding case is that of the Bellaire blast furnaces and steel plant of the Carnegie Steel Co., in the Wheeling district, idle since the iron and steel strike of Sept. 22, and now ready to resume except that a coke movement to the plant from the Connellsville region has not yet been established.

A large steel interest, with important plants in several districts in the Central West, has production for the whole month of December but little short of normal, fully 85 per cent, but on the other hand a large interest in the Mahoning Valley expects an average production in the first quarter of 1920 of only about 75 per cent. Everywhere, however, increasing production is fully expected, and there is no serious thought but that operation at 90 per cent or more will be attained by March or April. The average rate just before the strike of Sept. 22 was about 83 per cent, the low point of the year having been about 50 per cent, at the middle of May, whereas January 1919, showed about 87 per cent.

The steel market has been decidedly quiet in the last week, and relatively quiet for two or three weeks. Practically all such forward business as the mills would accept at this time has been entered. As to prompt material, the search by prospective buyers continues but the volume of inquiry is not nearly as great as two or three weeks ago. Premiums above March 21 prices are the rule in most lines for any early deliveries, but the volume of business thus put through is not large. It is greatest in tubular goods for the oil country trade.

A new record price is made for plates, 1,000 tons for delivery in about 30 days having gone at 3.25c., against 3c. in similar transactions a fortnight ago, 2.65c. as the March 21 price, and 2.50c. as the price bid within the fortnight by the Carnegie Steel Co. on 10,000 tons for the navy department. Fancy prices are paid for plates chiefly for oil tanks.

Pig Iron—Bessemer $36; basic $35; foundry $38, f.o.b. Valley furnaces, freight to Pittsburgh being $1.40.

Steel—Bessemer billets $38.50@40; open hearth billets $38.50@45; bessemer slabs $38.50@43; open hearth slabs $38.50@45; small bessemer billets $42@43; small open hearth billets $42@46; sheet bars $42@50; Pittsburgh or Youngstown. Rods are $52@66.

Ferromanganese — Domestic makers have advanced their price $10 to $130 delivered; English reported available at $125 c.i.f. Market is quiet at the moment. Speigeleisen is quotable at $40 for spot and $41 to $42 for futures.