

# The Engineering and Mining Journal

VOL. LXXXIV.

NEW YORK, NOVEMBER 23, 1907.

NO. 21.

## Dredging Beach Gravel Deposits Near Nome

Unequally Frozen Ground Is the Chief Obstacle in Handling the Material in the Beds of the Three Beach Levels

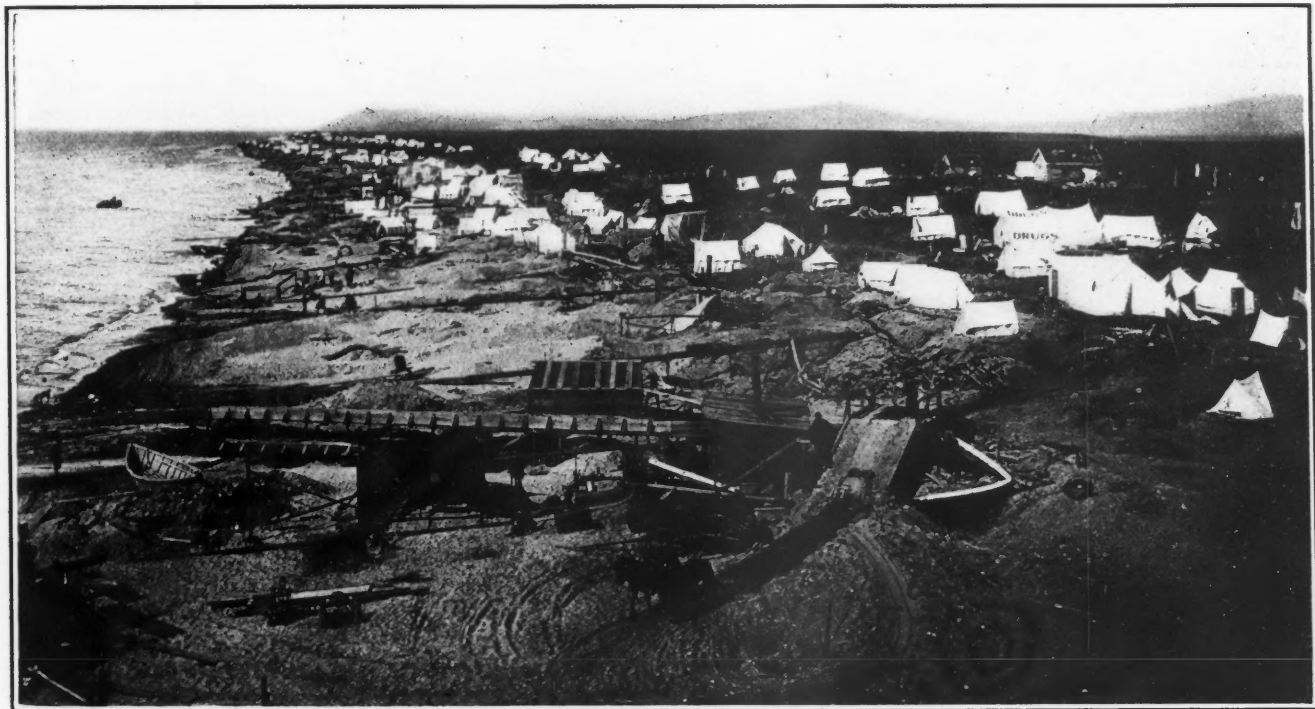
BY JOHN POWER HUTCHINS\*

The discovery of the rich beach deposits near Nome led to a great many attempts to use machinery for the work that was done by hand. There were many features that encouraged attempts of this kind, among the most influential being the lack of a gravity water supply. Pumps were used to supply water at a sufficient height to allow grade for the sluices and dump for the tailing. Usually seawater was thus elevated and used in sluicing. Inasmuch as it was necessary

result. The ordinary small sluice about 12 in. wide was generally used with pole riffles and quicksilver. It was soon observed that the pumping and sluicing plant could not be readily moved and that there was a large loss of fine gold from the sluices.

Hand methods of excavating were also observed to be slow and costly, and much of the material was below sea level. Numerous attempts were made to overcome these disadvantages and many de-

dredging operations in North America and the inexperienced men who flocked to Nome knew little of these operations and could, therefore, not appreciate the necessity of installing heavy, powerful, and expensive machinery to work the seemingly loose, fine gravel generally found on Seward peninsula. They made the same mistakes made elsewhere in North America in early dredging operations. Another cause of failure was a common ignorance of the difficulty of



NOME CAMP, ALASKA

to have an immobile pumping plant which in requiring considerable machinery and attention was expensive and generally supplied more water than was needed to treat the material that could be excavated by hand, it was thought wise to have all the work done by machinery and have it all on one movable unit. This, it was also thought, would make it possible to get a better coordination between excavating and other operations. It was also believed that a lower operating cost would

be achieved by using machinery and devices incorporating a great array and variety of appliances for excavating, transporting, sluicing and wasting the beach deposits by machinery were tried. All sorts of dredges were installed, many of them of considerable ingenuity, but like dry excavators they lacked sufficient mobility. Each storm wrecked many and among them all there was not one unqualified success.

Attempts were also made to dredge the stream beds, notably those of Solomon river and Bourbon creek. Up to this time there had been few successful

handling frozen ground. Another important circumstance that was not appreciated was the great vertical concentration in a large proportion of the gold occurring near, on and in bedrock. None of the early dredge operators attached sufficient weight to this feature and most of the excavating devices were notably deficient in power and strength and were thus unable to dig bedrock.

Drill prospecting as a means of investigating low lying areas of stream beds where loose gravel and a large content of water make it almost impossible to sink

\*Consulting mining engineer, 52 Broadway, New York.

shafts to bedrock had not become generally known. In consequence there was little knowledge of the material which was to be worked, and unsuitable machinery was generally installed although, as subsequent developments have proved, the equipment was in several cases located on rich ground.

#### TYPES OF EARLY DREDGES

The many varieties of dredges that were installed would make an interesting collection. Steam shovels on wheels, steam shovels on barges, steam shovels on stern wheel steamers, steam shovels on skids with the screening and sluicing apparatus on the same or separate cars, platforms or barges, were among the arrangements employed; also bucket excavators on wheels, bucket excavators on barges, bucket excavators on skids with the screening and sluicing apparatus on the same or separate cars, platforms or barges. Centrifugal pump dredges were tried in a number of cases, particularly on the beach where the sand and fine gravel seem particularly unsuitable for working in this way. All of the mechanical excavators used on the beach were failures.

It is likely that the beach near Nome will be reworked and with successful machines. There are no insurmountable obstacles to the operation of properly designed machinery which in addition to having this feature must be such as not to be damaged by storms. A considerable gold content, due to wasteful excavating and sluicing methods and to the general crudeness of all mining at Nome in the early days, make it seem certain that the beach will be reworked with great success. It will probably require separate excavating devices of great mobility to permit rapid movement as the shallow material is removed and so as to permit retreat to a place of safety above the breakers in the event of sudden storms.

The screening and sluicing plants can be located on the tundra flats immediately adjacent to the beach and need not be moved except on occasion when the exigencies of exhaustion of dump or too great distance from the excavating machinery demand. Much care will be needed in treating the material to insure recovery of the gold which has been reduced by wave action to a very fine condition. This will demand a large sluicing area and special devices whose design and operation can be determined only by experience. It has been estimated that only about 50 per cent. of the beach gold has been recovered from the ground that has been worked. It is certain that there is a large amount of gold still in the beach deposit, but it will not be easy to save it unless much skill is exercised in designing and operating devices used in sluicing.

#### BEACH DEPOSITS

The Nome beach is one of the most im-

portant of the dredging possibilities of Seward peninsula, and the peninsula presents several kinds of dredging ground. There are the several deposits at different elevations resulting from the uplift of the coastal region near Nome in conjunction with the transport of auriferous material to these beaches from the higher areas back of Nome by stream action. There are also the deposits in the beds of streams and in their flood plains; also a number of deposits thought to have resulted from the action of ice in the form of glaciers and icebergs. These have not been delimited particularly and their modes of deposition are rather of geologic than of economic interest, although they are of importance as areas for future successful operation when proper means for working them shall have been evolved.

These deposits are of great importance not only by reason of their richness but also because they possess dredging possibilities of considerable scope. About 50 per cent. of the gold product of Seward peninsula is from the second and third beaches. There are three beach lines at Nome. The first is the present beach; the second is about 37 ft. and the third 79 ft. higher than the first beach; the two higher beaches lying, the one about three-fourths mile and the other about five miles behind the present wave line.

The first beach is a typical beach containing sand, fine and coarse shingle, sub-angular and rounded gravel, and a few large boulders. The large boulders are the most unusual feature and they probably owe their present location to transport by ice. They are generally found on or near the surface. Strata of clay are, sometimes found, and, in some instances, concentration of gold upon them has been sufficient to justify working with the clay as a bottom.

The gold occurs irregularly through the gravel section and it may be found in concentrated form at any depth in the gravel and sand composing the deposit; but gold is not found in the muck or other vegetable soil that caps the gravel and sand. This vegetable matter is commonly called tundra and it is composed of the decomposition products of moss and grass intermixed and interbedded with sand and ice in varying proportions. Sometimes the ice is pure and clean; again it is encountered in such form as to make it seem as if it were the result of the freezing of gritty, muddy water. The tundra and underlying gravel are generally frozen, though there are areas that show no frost, seemingly because of the circulation of warm underground water from springs. This circumstance has been observed in several drifting operations and has been a source of great difficulty and expense, for when the ground is not frozen, close timbering and pumping are

necessary, and the material encountered becomes running ground. The presence of a growth of willows is supposed to indicate unfrozen ground. This sign is not infallible; in many instances merely superficially unfrozen ground has been found beneath the willows. The occurrence of unfrozen ground on Seward peninsula, as in the interior at the Tanana and the Klondike districts, is irregular and its presence is difficult to explain. In general the beds of large streams are not frozen though frozen areas are encountered in them.

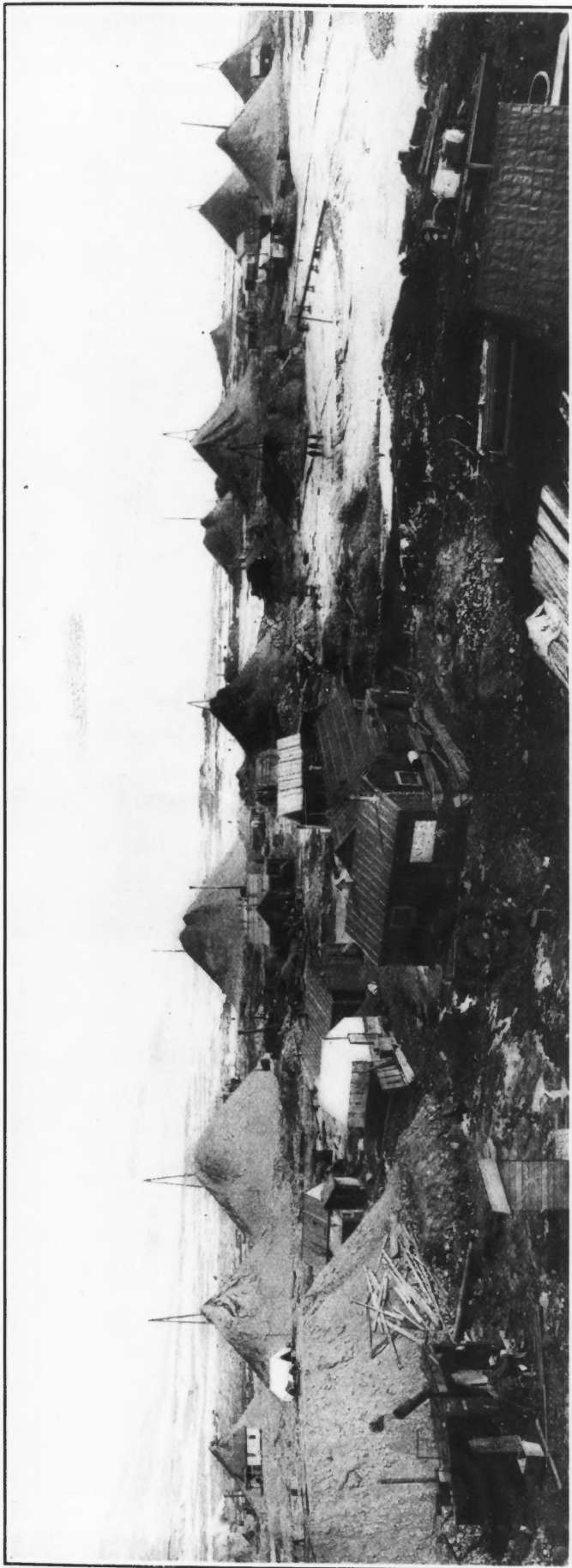
#### TUNDRA GRAVEL

It has been said, after rather extensive investigation by drilling, that part of the tundra deposits back of Nome between Cape Rodney and Cape Nome contains gold in sufficient quantity to make dredging very profitable should it be possible to thaw the material cheaply. This seems to be the problem, a seemingly insurmountable one when considered from the present economic point of view. Much thought has been devoted to the removal of this difficulty.

It is claimed that the capping of moss and muck can be ground-sluiced away and that the underlying gravel will then thaw to bedrock, but no work has been done that makes such a conclusion safe. To be sure in numerous cases muck has been sluiced off and the underlying gravel when shallow, say not more than 12 ft. in depth, has thawed to bedrock; but in no case has material of a depth of 50 ft. thawed progressively for several years after the surface muck had been sluiced. Experience has shown that the only thawing that occurs is a seasonal one, and that during the subsequent winter, material which thawed during the summer is frozen solidly again.

Much material on the high benches in Klondike has been observed to freeze in this manner where the conditions were favorable to thawing. The gravel was on a sunny exposure and where the early snow fall covered the gravel and protected it from low temperatures; and the gravel was well drained. It was thought that some of the freezing was from below, the frozen material underneath absorbing the heat that the sun and air supplied in summer.

It is also supposed that draining the tundra by deep cuts will result in thawing. Were it possible to drain the tundra, such procedure might have beneficial results; but this belief must be questioned when it is recalled that some of the bedrock is below sea level (most of it is little if any above sea level) and that perfectly drained deposits that have been honeycombed by drifting are still solidly frozen after several years, also that gravel without muck overburden and well drained is frozen. The average yearly temperature for Nome is considerably be-



LITTLE CREEK, THIRD BEACH LINE

low freezing, so that any other than the seasonal superficial thawing is not likely to occur.

It has been suggested that, after stripping the muck overburden and allowing seasonal thawing to occur, flooding the underlying gravel in the fall to protect it from the cold and exposing it to the sun and air in summer for several years in succession would result in complete thawing to bedrock. This suggestion does not take into account the circumstance that seasonally thawed material seems to freeze from beneath as if the temperature of the deep material were enough below freezing to abstract the heat accumulated in summer. Here is an opportunity for an extremely interesting investigation of the temperature at various depths in the frozen material of the Northern placers. It is not unlikely that it would show temperature lower than 32 deg. F. and possibly it would show the way to finding a method for successfully dredging immense volumes of auriferous material now valueless as dredging ground because it is frozen and of too low grade to be drifted.

Between the present beach and the hills back of Nome there is a gently sloping area that begins above high water mark. It attains an elevation of about 150 ft. at the surface of the ground back of Little creek, where the gravel deposit of the third beach is supposed to end. This area is colloquially called the tundra from the peculiar growth of arctic moss which overlies it. The gravel of this area is called tundra gravel. It seems to have been formed during periods intermediate between those in which the rich deposits of the second and third beaches were laid down and concentrated.

Fred H. Moffitt, in Bulletin 314 of the United States Geological Survey, p. 136, says: "These old beaches indicate periods of temporary stability in an intermittently advancing or retreating coast line. It is evident that if a sea floor gently sloping away from the land were gradually and uniformly raised, the beach line if affected by elevation only would slowly move seaward, and that the beach deposits would be continuous from the time when elevation began till it ended. Such does not appear to have been the case on the Nome tundra. The coast was not raised uniformly. Nor are the tundra deposits due to the work of the sea alone; rivers and ocean both took part."

#### STREAM GRAVEL

The stream gravels of Seward peninsula are similar to those of recent stream deposits elsewhere; as in them, the boulders are generally sub-angular. There are no exceptional occurrences except those due to the frigid climate. While material in the stream beds is generally unfrozen, superficial frost penetrates each winter to a depth of 6 to 12 ft. or more. This



does not leave the ground in some places until about August 15 or even later and it is a great hindrance to dredging operations. Frozen areas are often encountered in the stream beds and these cannot be anticipated by any superficial discoveries. When such zones are met in dredging they are a source of great difficulty. An important part of dredging procedure at present in the far North is to locate and avoid frozen zones. Drills are used to delimitate the frozen areas and the holes must be drilled close together. Stream gravel is more easily thawed than gravel having a muck overburden or content.

No steam thawing of magnitude for dredging has been conducted on Seward peninsula; frozen ground is left untreated. Experience in Klondike, where steam thawing has been tried on a large scale to prepare partly frozen ground for dredging, has shown a cost of more than 25c. per cu.yd.; where it was frozen in greater degree about 40c. per cu.yd. was

edge of which should prove helpful to anyone dredging in a cold climate.

Alfred H. Brooks, of the United States Geological Survey, has on several occasions called attention to the occurrence of gold near the limestone and mica-schist contacts. Dredging in the streams of Seward peninsula is being conducted where limestone is encountered as a bedrock and as dikes in the mica-schist. It is rough and hard to excavate. In one instance in dredging gravel about 15 ft. deep a dike of limestone approximately 6 ft. thick projected about 12 ft. above the general bedrock level. It was necessary to dig through this dike, for drilling had not revealed its presence and its occurrence was quite unexpected. Any large number of such dikes would be fatal to a dredging enterprise. Large limestone boulders which have been detached from the dikes are encountered rather frequently. The schist bedrock is often excavated in slabs too large to pass over the screen

wherever they are available, for it has been demonstrated that it is usually cheaper and more satisfactory to use them than to sink shafts even where a frozen condition makes it unnecessary to use pumps and timbers.

The cost of drilling is generally lower than that for shaft sinking. It costs from \$50 to \$75 per day to operate a steam drill and rapid progress may be made, particularly where deep frozen ground is drilled and no drive-pipe, except enough to case the superficially unfrozen material, is used. When deep ground is tested there are fewer moves to be made and there is consequently small loss of time. More than 50 ft. per day of 10 hours is often made when drilling holes close together in deep frozen ground. Drilling the shallow, loose unfrozen gravel of the stream beds can generally be conducted at a rapid rate, for the boulders are usually small and of comparatively soft material. Moving in



DREDGE AT WORK



DREDGING GROUND



TYPICAL INSTALLATION

the cost. This work was done in material less than 20 ft. deep. Where deep gravel or gravel composed of hard coarse boulders is frozen solidly, it is impossible to drive steam points to the required depths.

At present the status of the frozen ground problem is discouraging. Work has been carried on only where a remarkably high gold content permitted a heavy expenditure for steam thawing. None of the proposed means for thawing, by stripping the muck, draining, or otherwise, have been proved effective for other than shallow material; nor do they offer much in the way of promise.

As a suggestion to the dredgemen of the North the work at Ruby, Mont., where dredging is carried on all winter with minimum temperatures of 25 deg. F., described recently in the *JOURNAL*, may be noted. The operators have there combated conditions which, while much less rigorous than those of the far North, are severe enough to have called for ingenious devices and manipulation, knowl-

and up the stacker; they must, therefore, be removed by a man whose time is largely consumed in this way.

#### METHODS OF PROSPECTING

The use of drills has facilitated the investigation of the placers of Seward peninsula like the others of the far North. In the first investigations the shaft method was used. This method is well adapted to the work of testing placers where they are frozen, for usually no pumping or timbering is needed. When unfrozen material is encountered pumping and timbering are necessary and these are unusually expensive in these regions, for there is little timber available for fuel and mine supports. Gas engine drills have generally been used of late. They were first introduced to test ground so wet and loose as to be difficult of investigation by the shaft method. Soon a general realization of their advantages in prospecting all kinds of alluvion resulted in their use on frozen areas also. Now they are used

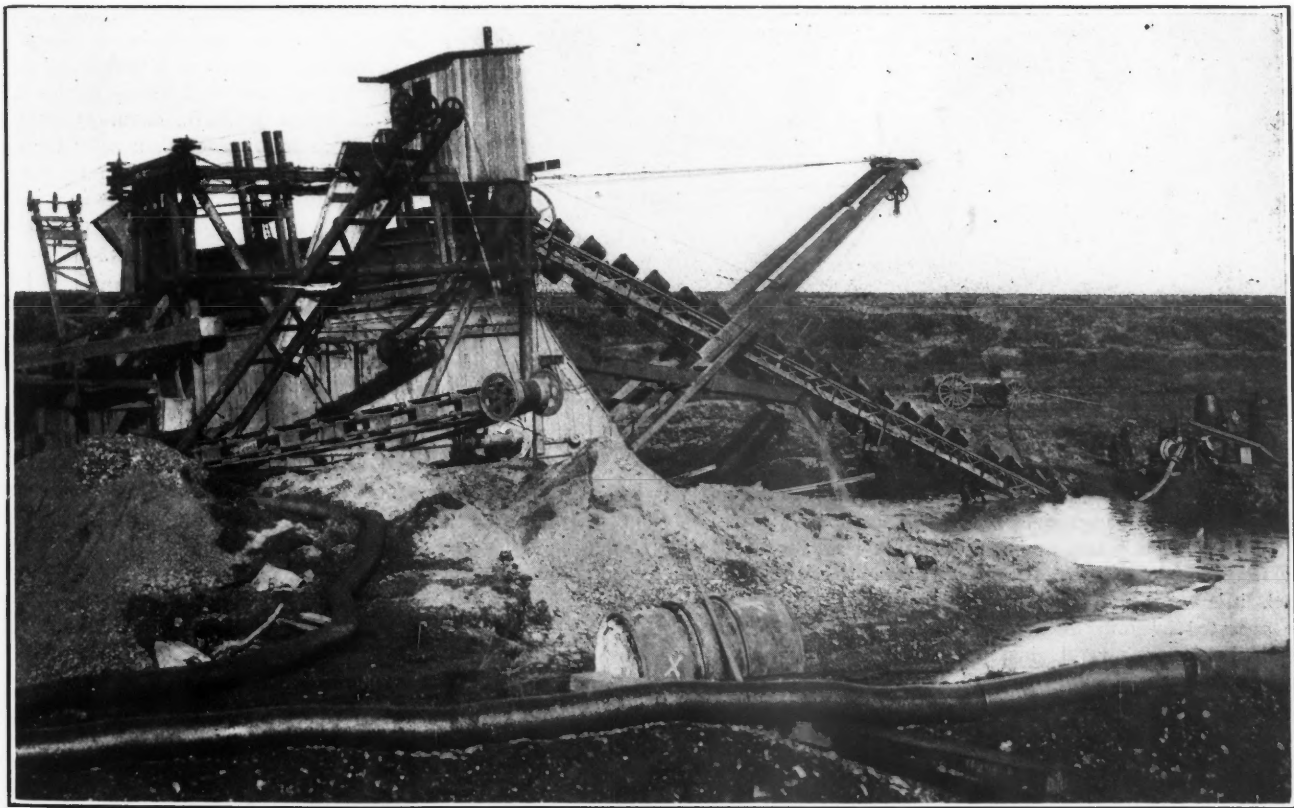
stream beds is usually easy and the moves are not long, for holes must be drilled comparatively close together to delimitate the generally irregular pay streaks and the frozen areas. The cost for such drilling is often no more than \$2 per ft. This low figure is surprising to those familiar with the cost of drilling in the United States.

The chief difficulties of drilling are due especially to the necessity of moving the heavy steam apparatus over the soft surfaces encountered everywhere in the far North except in the stream beds. The surface is covered with a moss which is always saturated with the water that comes to the surface of the underlying soil as it thaws; even on sloping ground this surface covering is invariably wet. Corduroy of some sort must always be used. Cleated planks which are so heavy as to require a horse to drag them from behind to a point ahead of the drill as it advances are generally used. Fuel requires hauling usually over the soft sur-





DREDGE, W. M. JOHNSTON & CO., SNAKE RIVER, NOME



OPERATION OF THE ANVIL HYDRAULIC AND DRAINAGE COMPANY, BOURBON CREEK

face, and costs \$25 or more per ton. In one drill investigation coal cost \$120 per ton. Sufficient seepage water can generally be collected on the ground. A man and team cost \$20 or more per day. Repairs for wear and tear are costly, for machine shops are generally inaccessible and their charges are high. Supplies are also expensive.

#### VARIATIONS OF USUAL PRACTICE

There is one hand drill that is particularly well adapted for use in the far North. It is light and mobile and if necessary can be transported on the backs

drive-pipes, and such work has been done cheaply; but all results of drilling without the use of a drive-pipe are unreliable. It is cheaper not to use the pipe in ground that will stand, and this is the reason for the vogue of this method; but it is bad practice unless only information of a general character is desired. Material from the sides of a hole in frozen ground thaws by contact with the water that is thrown into the hole and falls to the bottom. Thus material from the upper part of the gravel section may be collected with that taken from a greater depth. As in other places where drilling has been

have frozen be worked with the drill resting on the ice. When hand drills are used this point is immaterial, for considerations of mobility then have little weight.

#### OPERATIONS ON SEWARD PENINSULA

To chronicle the history of all the dredging operations that have been attempted on Seward peninsula would be to record a long list of failures with few successes. The account would be similar to that of all early dredging operations in any placer district. This does not mean that there are no good dredging possibilities; when one pauses to remember that only one first-class dredge has been installed on ground that had been properly prospected it is not remarkable that there have been so many failures. The success of this dredge is worthy of note. It is probable that with the same care in investigating, designing, construction and operation, other areas may yield similar favorable results.

This dredge is operating on Solomon river. It has close-connected buckets of 5 cu.ft. capacity, weighing about 1200 lb. each. Two boilers, 80 h.p. each, furnish steam to non-condensing engines. The dredge was designed so as to permit changing to electric power generated by water and so several cheap and uneconomical engines were used. From 10 to 15 tons of coal, at about \$20 per ton, are used per 24 hours, the amount varying with the character of the material excavated and the conditions of the boilers, which foul quickly when fed with water from the dredge pond. In the first operations each year when it is necessary to excavate through about 6 to 8 ft. of superficial frost, the total gravel section being about 12 to 18 ft., about 33 1/3 per cent. more fuel is used than when the entire section has thawed. From June 4 to October 10 of 1906, the dredge is said to have dug 21 acres of ground averaging about 12 ft. in depth or about 3000 cu. yd. per day. A rubber belt stacker, housed with canvas in cold weather, is used. Much difficulty is encountered each year during the spring breakup. The dredge has been caught in the ice and held fast and has been flooded by rising water. Winchmen work in eight-hour shifts at \$5 per shift and board. The engineers and firemen work 12-hour shifts. The material excavated is 23 ft. at the deepest point dug thus far and consists of a fine sub-angular free stream gravel resting upon an undulating bedrock of mica-schist which is crossed by belts of rough limestone. These limestone belts make excavation difficult and slow; where they occur in large numbers they seriously reduce the dredge's capacity.

Few large boulders are encountered except when working on limestone bedrock where at times large slabs clog the buckets, hopper, screen, and conveyer and lead to loss of time. Frozen ground is



LAYING BEDROCK DRAIN FROM SEA TO THIRD BEACH LINE, BOURBON CREEK

of men. When sectionalized for transport the heaviest part weighs only 75 lb.; the total weight when equipped to drill 75 ft. is about 1000 lb. It requires no fuel, little water and few repairs, and can be operated by four or five men and a small horse or several dogs. Drilling can generally be done on Seward peninsula with this device at a lower cost per foot than with a steam drill. The more inaccessible the area to be tested, the greater will be the difference in favor of the hand drill.

Much drilling has been done in frozen ground with steam drills without using

conducted, there is a tendency to sacrifice accuracy to speed and this tendency is stronger in the far North where the cost of steam drilling, when properly conducted, is generally extremely high. Drilling without casing is always bad practice when exact and detailed information is desired.

Drilling can often be conducted in winter to better advantage than in summer, for the soft surfaces are then frozen and it is easier to move the heavy steam drills. The beds of streams which in summer can be investigated only by floating the drill on a barge, can after the streams

generally encountered in an irregular way and its location can, therefore, not be predicted with certainty. A steam drill is kept constantly at work, ahead of the dredge, in part to delimitate the frozen gravel zones which are then avoided in dredging. Superficially frozen gravel is encountered each spring when operations are begun. This varies in depth to a maximum of about 12 ft. and it does not thaw completely until about 75 days after operations are begun, that is, about August 15. This frozen gravel is a great obstacle to rapid dredging and is also the cause of heavy wear and tear on the excavating machinery.

In dredging in the far North as a rule, the dredge is thoroughly repaired each fall after shutting down for the season, and is thus able to begin operation in the spring in the best condition. This practice reduces the time lost during the working season and results in a larger average daily capacity. The problem of handling frozen gravel remains to be solved. The operating cost is not known exactly but it is probably not much below 20c. per cu. yd. when the dredge handles 3000 cu. yd. per 24 hours.

#### DREDGING ON BOURBON CREEK

Several unsuccessful attempts have been made to work the gravel of Bourbon creek with mechanical excavators of various types mounted on cars. A dredge with 9-cu.ft. close-connected buckets, weighing about 2800 lb. each, is now being installed there. It is designed to excavate about 40 ft. below water line, and will be electrically operated from a central generating plant which has three 150-h.p. water-tube boilers burning California petroleum and furnishing steam to two turbine-driven generators each of 750 h.p. This large capacity was selected to supply power for other dredges. The turbines are of such capacity that one is sufficient to do all the work in case of accident or repairs to the other.

The stream gravel and adjacent tundra deposits are to be dredged; the holdings are said to include 30,000,000 cu. yd. of material. About 40 per cent. of this is said to be frozen, according to the drilling tests. It is expected that this frozen ground can be thawed by stripping the overburden (by ground sluicing) and by ground sluicing cuts to drain it and to give large thawing surfaces. Progressive yearly thawing is hoped to result, a process which it is said will require a number of years.

The use of a cheap and efficient straining device for removing water, minute metallic particles, dust and similar foreign matter from lubricating oil which has been used once, will result in very considerable saving in oil bills, as oil thus cleaned is entirely suitable for use again.

## The Steel Rail Question

At the recent meeting of the American Railway Association the committee on standard rail sections presented a report, the conclusions of which are summed up as follows:

#### CHEMISTRY

"In the matter of chemistry specifications for bessemer rails, there is a strong desire on the part of the railroad members to specify a lower phosphorus content than has been generally accepted in recent years; but the testimony of the manufacturers was to the effect that the available supply of low-phosphorus ores would make it impossible to manufacture more than a small percentage of the total rail requirements of the country to a maximum phosphorus limit less than 0.10, and the manufacturers, on this account, unanimously object to the incorporation in the bessemer-rail specifications of anything suggesting the adoption of 0.085 phosphorus.

"There was a desire on the part of the railroad members to arrange for a greater discard, and a strong disposition to insist upon a uniform minimum percentage. The manufacturers, however, presented considerable evidence which tended to show that a fixed minimum percentage requirement would be not only unfair but unscientific, claiming that the extent of piping and segregation is influenced by the size of the ingot, the rate of pouring into the mold, and other details of mill practice.

"The joint committee finally agreed unanimously upon two distinct types, that they could recommend for adoption, both of which were designed in accordance with the cardinal principles enunciated by the subcommittee.

#### INCREASED WEIGHT OF SECTION

"With regard to weight of section, the subcommittee presents sections running under 120 lb. per yard in weight. It should be remembered that probably not 3 per cent. of the total main-track mileage of the country is laid with rails weighing more than 90 lb. per yard, while there are many thousands of miles of track on first-class lines, where the heaviest engines are used, with rail weights ranging from 70 to 85 lb. per yard; also that it is a generally expressed opinion of railroad men that the older rails of the lighter sections are giving more satisfactory service.

"In the light of this experience, railroad men have naturally hesitated to order rails of heavier section, and it is this experience also that is responsible for the prevalent feeling among railroad men that modern mill practices are at the bottom of their difficulties.

"On the other hand, the manufacturers claim that this charge has not been proven, for the reason that statistics as to comparative wear have not always included

carefully compiled statistics as to tonnage and other conditions, and that reports of breakages and failures are not to be depended upon, because of the lack of uniform nomenclature among trackmen of different roads. This latter criticism as to statistics your committee feels is well grounded.

"The question of specifications for open-hearth rails was not reached by the subcommittee, but will be taken up later."

#### THE MINORITY REPORT

Julius Kruttschnitt, director of maintenance and operation of the Union Pacific Railroad, signed the minority report, which called for 0.085 phosphorus and a fixed minimum of discard. He took up first the increase in rail breakages, which he claims has been due to three principal causes: 1. Improper chemical composition, due either to improper specifications or to segregation. 2. Insufficient discard, causing concealed defects, which result in breaks in service, sometimes with, but frequently without, warning. 3. Too great haste in manufacturing of rails, which are finished at too high temperatures, due partly to faulty distribution of material in cross sections and partly to improper manipulation or work on the head in the rolls. On sections Mr. Kruttschnitt's report took this position:

"Your committee has been convinced by the manufacturers that a change in the sections whereby the metal would be more equally distributed between the base and the head, thereby allowing rolling to be done at a lower temperature, would be beneficial. Two sets of sections are submitted herewith and recommended for adoption, our preference being strongly for those in designing which great weight was given to the consideration of the rail as a girder and its function to distribute a load over a number of supports. To do this efficiently it must be stiff; that is, deep. These sections have high moments of inertia, and for the same weights are much stiffer, admit of very much stiffer splice bars, and will therefore make smoother riding track than the other sections."

#### REPORTS ON BROKEN RAILS

The convention gave practical effect to the portion of the majority report, relating to the shortcomings of statistics of broken rails as now collected. The unreliability of many reports of rail breakages was granted, and the convention adopted a uniform and thorough-going form of report on broken rails calling for full details.

A blast furnace record has been made by Carrie No. 3 of the Carnegie Steel Company, at Rankin, Penn. The furnace ran over six years and made 1,132,739 tons of pig iron without re-lining. It was blown out for repairs late in September.





# The Copper Belt of California—II

Values and Precious Metal Contents of the Ores of the Copper Belt.  
Various Methods of Ore Treatment Tried, and Results Obtained

BY HERBERT LANG\*

## THE SULPHIDES IN THE BELT MINES

The sulphides represented in the belt mines are those of iron, copper, zinc and lead, the last very sparingly. Pyrite and pyrrhotite are the prevailing minerals, predominating enormously over all others. In some mines pyrite forms the bulk of the ore; in others pyrrhotite. Without attempting to generalize, it seems to me that the northern part of the belt is characterized by the presence of pyrite, the southern part by pyrrhotite. In some mines, the Fresno, for instance, fully 70 per cent. of the whole weight of the

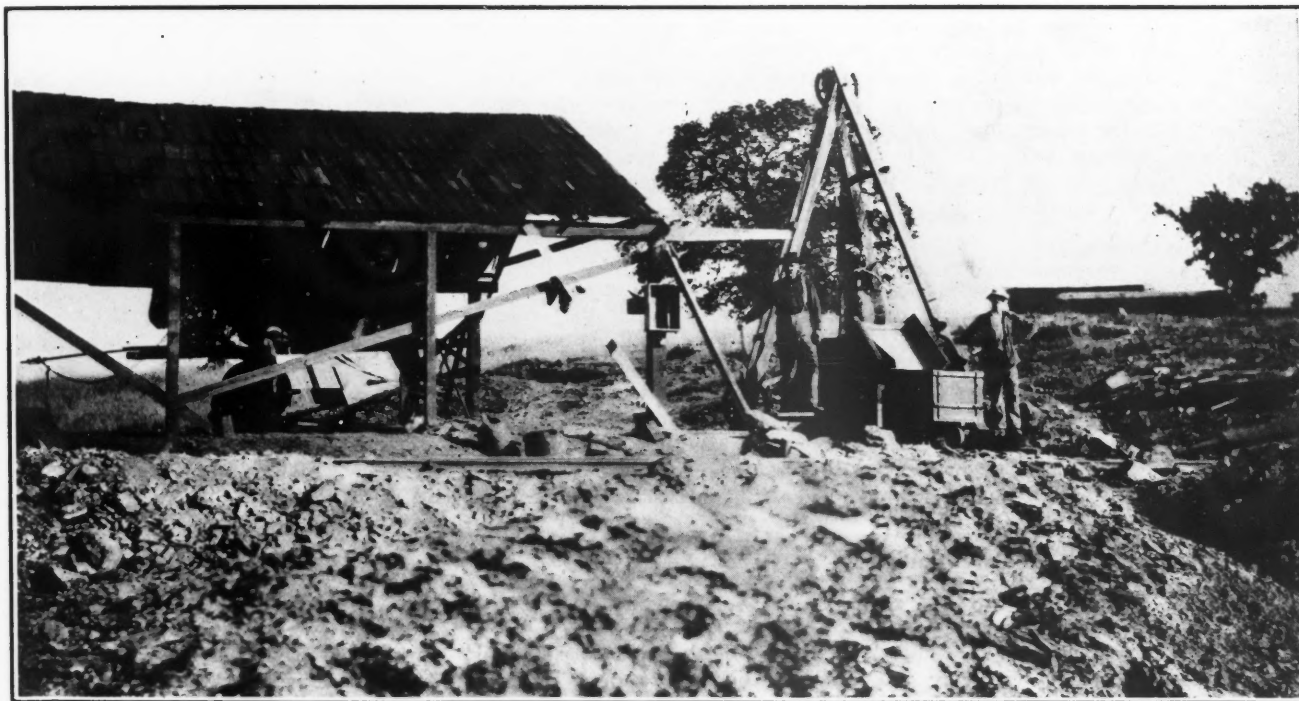
thing the chalcopryite is scattered in small masses through the bulk of the iron sulphides, and is very noticeable. It exists simply as a mixture in such cases. In other localities there is a more intimate mixture, giving rise to a cupriferous pyrite, as in the Newton, the Dairy Farm, and other mines, where the two sulphides are so mingled that a new compound is produced, which is unmistakable. I do not know of the existence, on the belt or elsewhere, of the corresponding cupriferous pyrrhotite.

The ore of the Copper King mine, the

discovered, from which a few tons of tolerable lead ore containing 30 to 40 per cent. lead, with 20 or 30 oz. silver to the ton, was extracted. In no case known to me has lead ever been found in these mines in larger quantities.

## ZINC ORES FOUND

Zinc in the form of sphalerite is abundant in some of the mines, but probably nowhere in quantity or purity sufficient to constitute a commercial source of the metal. In several of the mines it exists in small quantities, and might perhaps be



A BELT MINE IN THE PROSPECTING STAGE

ore is pyrrhotite, large masses occurring in which no other mineral is present, excepting perhaps a trace of chalcopryite. The same is true of the Green Mountain, the Buchanan and the Daulton mines. On the other hand, there are lenses quite as exclusively made up of pyrite—such as the Dairy Farm, the Spenceville, and others—although I am inclined to believe that the copper content in these cases reaches a rather higher percentage. The copper mineral is chalcopryite almost exclusively in these sulphide masses, chalcocite being totally absent, and bornite only occasionally reported. As a general

\*Mining and metallurgical engineer, Oakland, California.

southernmost of the more important belt mines, consists, mainly at least, of pyrite intermixed with chalcopryite, and in a certain part of the mine a very interesting and undoubtedly novel association was found. The pyrite is brass-yellow, and is highly crystallized, sometimes in crystals of several ounces weight. The faces of these are convex—so far as I know an absolutely unique feature. They lie in a paste or ground-mass of uncrystallized chalcopryite, like plums in a pudding.

Lead, in the form of galena, occurs in the Fresno mine, but not in the main ore-bodies. A small side-vein which enters the principal lens at the 200-ft. level, was

discovered in all were it looked for carefully. In the Satellite mine it was said to average 5 per cent., while in the adjoining mine, called the Borger, the ore is much richer in zinc, considerable masses of tolerably pure sphalerite being found. In certain parts of the Pocahontas mine the same mineral abounds. The most interesting occurrence of zinc, however, is in the so-called Radium mine, whose unique history is worth recounting. This mine is in Mariposa county, on the western verge of the belt. The ore consists of sphalerite intermingled with barite and a few subordinate constituents, among which there is a little galena, a trifling amount of copper, and precious metals to



a small amount. The ore deposit consists of a single lens, the greatest thickness as yet exposed being 5 or 6 ft., and the length probably 200 ft. The country rock is augite-porphyrite, and the lens is surrounded with the customary aureole of decomposed products, among which talc schist is the most noticeable. The ore for the most part is clearly a replacement of the talc schist with the sulphides, and sometimes can hardly be distinguished from the schist. Some of it, however, is made up almost wholly of blende and barite, constituting a heavy, dense substance, grayish in color. All of it possesses some tribo-luminescence—the faculty of giving out light on being rubbed. For an excellent description of this remarkable ore, the reader may consult the columns of the *ENGINEERING AND MINING JOURNAL*. In the issue of June 23, 1904, Messrs. Eakle and Sharwood, of the faculty of the University of California, published their investigation of samples of blende from this mine, in a clear and comprehensive monograph. In the *JOURNAL* of May 12, 1906, the matter of tribo-luminescence is treated editorially. The reader will find in these two articles about all that is known on the subject, and the theory up to date. The Berkeley scientists believe that the phenomenon arises from the crushing of minute crystals of sphalerite.

#### THE RADIUM MINE

As to the Radium mine itself, the owners, acting under the impression that the light-giving properties were due to radium, shipped a quantity of the ore to some metallurgical center in the east, and were greatly disappointed, no doubt, to get negative returns. Science denied the existence in their ore either of radium, or of the supposed parent of radium, which is uranium. But, said the owners, science is fallible, and the last word remains to be said. Meanwhile curative properties had been discovered. If the crushed and powdered ore were applied to rheumatic joints, or to almost any aching surface, relief, temporary or even permanent, ensued. Such a remedy needs to be known; a company composed mostly of medical gentlemen, was formed, the Greek name "Aposozein," which, I am told, means relief from pain, was given to the new corporation, and work, which in this case meant the bottling-up of small fragments of ore and selling each bottle for a dollar, was at once entered upon, but did not last. Either all the rheumatic patients were cured, or else some more potent or popular remedy was discovered; in any case the working of the mine has ceased, and the activity there is confined to the search for curiosities by the casual wayfarer.

Arsenic in the form of arsenopyrite is met with in a few mines, the Great Northern in particular, but in negligible

quantities. Antimony is contained in one property, the Irish Hill mine, near Ione, in considerable amounts, and might perhaps be recovered commercially and profitably. I do not know of its existence elsewhere in the belt mines.

#### GOLD IN THE ORES

Although the values in most cases are found in the heavy massive sulphide bodies for the most part, there are several deposits of what may be styled concentrating ores, consisting of disseminated sulphides in a gangue of altered country, or more commonly of altered dike material. It appears that such disseminated ores are found mostly on the western side of the belt, and particularly about the central portion, and in the region of augitic porphyrite. Of this the Olsen mine, not far from the Tuolumne river, is a case in point. A portion of the ore of that mine consists of a light-colored and even chalky appearing decomposition product of some aluminous rock which has been decomposed, presumably by the agency of the mineral-bearing waters, and now contains grains and crystals of pyrite and perhaps other sulphides, which carry gold. The same is true of the Woods mine, in Mariposa county, which, like the Olsen, has been worked as a gold mine. But the most conspicuous example of this kind of deposit is afforded by the Valley View mine, in Placer county, not far from Lincoln. The peculiar decomposition product here has proved so rich in gold that mills were run for years upon it. The gold, which is free, is susceptible of amalgamation, and was handled with profit for a considerable time. Lower down, where decomposition has not taken place, the rock is still light-colored, but firmer, and contains disseminated chalcopryrite, in considerable quantity. Projects looking toward the erection of ore-dressing works have been canvassed for years.

#### A GROUP OF RICH ORES

A group of several small mines possessing distinctive features occurs between the Green Mountain mine and Mariposa creek in Mariposa county. These are the Toad, the King, the Lone Tree and the Green mines. They have produced small quantities of rich ore, which consists of chalcopryrite intermingled with the schistose country, in veins and seams, and again in more solid masses of considerable size. In the Lone Tree, at a depth of 130 ft., a body of chalcopryrite of uncommon quality was found. The material, consisting of the nearly pure sulphide, was finely laminated, and was very evidently a replacement of the micaceous country, for which it would be mistaken at a distance of a few feet. This ore-body was at least 8 ft. wide, but was soon exhausted. In none of the mines of this group have I noticed the minerals

which characterize many of the other deposits, such as pyrite, pyrrhotite, sphalerite, etc., although they may very likely be present in small quantities.

#### OXIDIZED ORES

The products of oxidation of the sulphide ores are various. As a general thing there is a portion of the aluminous and magnesian derivatives of the country rock, which by the action of the oxygen of the air and the sulphuric acid generated from the sulphur of the ore, loses to a great extent its iron, its alkalies and its lime, leaving soft amorphous material of a great variety of colors, ranging from clay on the one hand to soluble sulphates of iron, of copper, and of alumina on the other. The residue of ferric oxide, generally hydrated, which occurs on the top of the lodes is noticeable, the uppermost portions usually having a bright red, brown, or yellow color, and consisting sometimes of nearly pure limonite, suitable, so far as the quality goes, for the manufacture of pig iron. A little deeper down a variety of products takes the place of the surface materials, which extend only a few feet as a general thing, and we find the sulphates above spoken of, with traces and sometimes considerable quantities of copper in the oxidized forms, and eventually we come to sulphides. As regards the general appearance of the upper part of a characteristic lode I cannot do better than quote from the words of Professor Silliman, who wrote a paper in 1868 on the Quail Hill mine, in Calaveras county, which, so far as its descriptive features are concerned, has not been surpassed by any other published matter which has come under my notice. The professor said:

"The (inclosing) rocks appear to have been originally talcose and chloritic schists, sometimes micaceous, inclosing masses of argillite, and of quartz, which appears to have been massive enough at certain points to assume the character of a vein, . . . All this mass of material, which at Quail Hill is certainly 300 ft. wide, and possibly twice that, and with a linear extent exceeding 1000 ft., appears to have been very highly impregnated or mineralized by sulphurets, chiefly of iron, with a portion of copper, zinc, and lead. The sulphurets have undergone almost total decomposition throughout the entire mass, leaving soft ochraceous deposits of a rusty red and yellow color, and staining the rocks with a brilliant color, a peculiarity which the miners have characterized by the name of 'calico rocks'. This decomposition or oxidation of the sulphurets has extended to a point as low as atmospheric influences extend, or probably to where water is permanently found, which at Quail Hill is assumed to be about 170 ft. below the outcrop of the mass. Dikes of porphyry and of other intrusive rocks divide these great ore-channels in a di-



rection conformable to the line of strike. But the decomposition which has affected other portions of the ore-channel appears also to have changed them, for they are found to be reduced completely to the condition of kaolin, or lithomarge, or kindred alterations of felspathic rocks. The outlines of the felspar crystals are still easily distinguished, although the mass of the dikes is completely friable. . . . The contents of this enormous channel of ore-bearing ground, so far as exposed, are completely decomposed by chemical agencies, so that they offer to the miner and geologist one of the most remarkable cases known of the total destruction of metallic sulphurets which plainly once filled the entire chasm, now converted into gossans or oxides of iron of various colors, and carbonates of copper, mingled with masses of spongy and white quartz, of talcose and chloritic rocks, rotten

tain the iron as well as the copper of their original form.

#### CARBONATE ORES

In some mines, as the Green Mountain, the search for the scattered bodies of "carbonates" has been carried on for years, until the gossan has been penetrated with gopher holes in all directions, yielding in the aggregate quite an amount of ore of good grade. The gossan itself, with some exceptions, rarely carried enough of value to be classed as ore. The large and particularly pure mass of surface material at the Fresno mine shows scarcely a trace of either copper, gold or silver. At the Victory mine the much smaller gossan masses show \$2 or \$3 per ton in the precious metals. A sample of manganiferous wad at this mine contained 6 oz. silver per ton. The rule is that the purer and more ferriferous gos-

layer a foot or two in thickness, but sometimes much more. It is white or gray in color, and seems to be a partly decomposed sulphide (marcasite?), in which the sulphur is held by very frail tenure. It has the property of taking fire spontaneously when exposed in heaps on the surface, and even sometimes when broken down in piles within the mine. It will be understood that it is not precisely a safe or comfortable substance to handle. I have seen it in the Fresno, the Painter, and several other mines, and my impression is that it is always copper-bearing, but that it never runs very high in metal. It lets go of the copper with much facility, however, as is shown by the fact that its natural decomposition when exposed to the air sets free a part of the copper within a year or two, the pile of ore weathering down into a heap of sand or mud. In some of the mines this sulphide is disseminated in schist to a considerable extent, and when it decomposes the schist partakes in the weathering and breaking down, and gives rise to several curious products, the effect, presumably, of the acid compounds which are generated. On digging into a mass of the rotted material a number of these products will be seen, notably a white aluminous compound, several different-appearing ferrous substances, especially hydrated ones, with quite a quantity of elemental sulphur and sulphates. The staining power of copper salts is demonstrated by the extensive patches of crystallized bluestone, which prove very disappointing when the whole mass is subjected to assay.



RUINS OF SMELTING FURNACE AT JAMES RANCH, MARIPOSA COUNTY

porphyry, heavy spar, etc., all so completely changed by the causes alluded to that the entire mass yields to the pick and shovel in any direction."

In extension of this able description it remains to be said that the copper inclosed within these decomposed masses is mainly in the condition of cupriferous limonite and hematite, exceedingly impure, and containing some intermixed azurite and malachite, usually small in quantity. A little chrysocolla and cuprite are sometimes seen, and some tetrahedrite rich in silver has been reported. The ores occur in veinlets or bunches throughout the oxidized zone, but generally nearer the bottom, where the copper minerals are apt to merge into indefinite mixtures of sulphides and oxides, which re-

sans carry smaller values, while impurer sorts, from which the valuable metals have not been leached, generally carry enough to form a workable ore.

In some cases, though rarely, the whole vein is given up to the carbonate ores, more especially where it is narrow, with no particular development of the gossan. Such is the case at the Victory, and also in certain portions of the Pocahontas and Lone Tree mines.

#### THE "BURNING ORE"

A curious kind of material which is found in the Belt mines, though not by any means confined to them, is that locally called "burning ore," which occurs at the dividing line between the sulphides and the oxides, and generally forms a

#### PRECIOUS METALS IN THE COPPER BELT

Gold and silver occur in all the ores of the Copper Belt, usually in small amounts, but sometimes in quantities sufficient to lend considerable additional value to the ores. The Satellite mine, the most worked of the copper mines of Campo Seco, is notably rich in both gold and silver. Some years since a pile of sulphide ore, which had been roasted in preparation for leaching, lay upon the ground at that mine, the weight of which was estimated at 25,000 tons. I sampled this carefully with a view to purchasing, and found as the mean of a number of assays, 3.9 per cent. copper, 5 oz. silver, and 0.08 oz. gold per ton. It contained also rather more than 50 per cent. silica, and 18 per cent. iron, from which the reader will infer, which is the fact, that the sulphides of that mine are less compact and massive than those of the other mines generally, and also that the gangue is more silicious than usually obtains in such mines, for example, as the Trent, and the Fresno. The exceptionally high values in gold and silver have been important factors in the present active working of the property, where a smelting industry of excellent proportions has gone on steadily for several years.

## SOME RICH MINES

The Irish Hill mine has produced ore somewhat richer than the above. A lot of about 80 tons, partially oxidized, smelted practically by itself, gave a furnace yield of 87.4 lb. copper, 5.9 oz. silver, and 0.138 oz. gold per ton. The Pocahontas mine, during a part of its history, shipped 280 tons of carbonate ore, which assayed an average of 25 per cent. copper, 2.5 oz. silver, and 0.02 oz. gold per ton. Nothing was paid for the precious metals, excepting in one case, where a carload was found to average 0.12 oz. gold, when \$19 per oz. was paid for it. It is rare that anything has been received by any of the mines on account of the precious metals, excepting in the case of those which have their own smelting works.

It has been generally held that the mines of Copperopolis, as well as the Newton and some others, contained no gold or silver; but more careful work seems to disprove that idea. In some cases there is, it is true, only a few cents per ton in the run-of-mine, but I believe that at least a little of both metals is invariably found. In the Fresno the underlying sulphides carry from 50 to 70c. per ton, the oxides perhaps \$1. As the aggregate tonnage in this property reaches into the hundreds of thousands, the gross value of the precious metals is a matter of considerable importance. The same remark applies equally to many other of the large deposits of the Belt, and accentuates the applicability of the smelting process, by which alone can the gold and silver with the copper be effectually won. I have spoken of the disseminated ores of several mines, including the Olsen and the Valley View, and I am informed that their gold and silver contents remain constant down as far as these interesting bodies have been followed.

## GOLD POCKET MINES

In Mariposa county there are two mines which for their occurrence of gold are decidedly unique. They are gold pocket mines, as well as copper mines, and have been quite productive of the precious metal. Several pockets of gratifying size have been found here, one in the Victory having yielded, according to accounts, about \$5000. Report speaks more explicitly of the Barrett mine, which is credited with the production of \$90,000, most of this large sum having come from a single pocket. In such cases the only appliance used for separating the gold from the dirt or broken rock which embedded it was the pan or rocker.

The Barrett vein is singular in that it contains not only copper ores, but gold in two associations, namely as pocket gold of coarse character, and also in the form of milling rock, which is distinct from the pocket material. Certain banded portions of the vein, the bulk of which is composed of alternate layers of calcite (and barite) and quartz, carry much pyrite, the concentrates from which assay over \$200 per

ton in gold. Thus we find in this one mine copper ores both oxidized and sulphide, devoid of quartz; pocket gold; and milling stuff, all of considerable value. I do not know of another example of this sort in any other district. These two properties lie within two or three miles of the Mother Lode, which probably accounts for their richness in gold. They differ from the majority of copper deposits in the Belt in that their strike, instead of being north 28 or 30 deg. west, is in the one case north 75 deg. west, and in the other north 15 deg. west.

## TREATMENT OF COPPER BELT ORES

Since the earliest times 17 different smelting works of various characters and capacities have been erected to treat the ores of the Copper Belt, 16 of them in the immediate vicinity of the mines which they were to serve, the remaining one, the Copper King plant, at a point 200 miles away. The establishments of the earlier years were of most primitive character, and very small capacity, while those of later design show the benefits of more recent experience and much ingenuity. To this number we might add the eighteenth plant, the great works of the Smelters' Securities Company, now under construction at San Bruno on San Francisco bay. This, plant, the chief purpose of which is the reduction of general custom ores, will handle those of the Trent mine, one of the more prominent Belt properties, which has been purchased and is being developed by this offshoot of the Guggenheims.

## The New Trail from Peace River to the Yukon

## SPECIAL CORRESPONDENCE

Detachments of the Canadian Northwest mounted police have just finished their third season's work on the construction of a trail intended to provide an all-Canadian route from Alberta through British Columbia and thence to the Yukon. Part of the trail heretofore in use in entering the Canadian Yukon passes through United States territory, but the new one will obviate the necessity for going outside Canada whenever such difficulties as, for instance, the conveyance of prisoners shall arise. The chief advantage the accomplishment of this important work will afford, however will be that it will give prospectors and explorers a base line through a large extent of country of which little is known away from the Indian trails.

From Edmonton, the northern terminus of the Canadian Pacific Railway Company's system in Alberta, to St. John on Peace river in British Columbia the distance by wagon road, river and trail is about 775 miles. Between St. John and the old Western Union telegraph line near

Hazelton, on the Skeena river, about 400 miles, a trail 8 ft. wide, clean cut and rough-graded its entire length, has been built. Where necessary, guide-posts have been erected two miles apart while at stream fords lettered instructions have been placed. The trail builders recently went into quarters for the winter.

## Mining in Western Nevada

## SPECIAL CORRESPONDENCE

On the whole, everyone at Tonopah is feeling pretty dismal and the situation at Goldfield is not much better. Both camps are overdone. The mines are turning out a good deal of bullion, and some day the stocks will stop going down and will rise again, but when that will be is the conundrum we are all trying to answer. I hear of no good new camps. Gold Circle, north of Tuscarora (near the Idaho line), is said to have some rich gold ore, and Rawhide, 20 miles south of Fallon, is growing fast. A month ago Rawhide had only three tents, but now there are said to be 250 people there and 30 sets of leasers at work.

The newspapers are trying to boom Manhattan and have some material to work on, inasmuch as three small mills are being put up there, and there is talk of repairing the road, which is the most practical thing the promoters can do.

The new Montana-Tonopah mill, at Tonopah, is running nicely and is obtaining an extraction of about 90 per cent. from the low-grade ore, but it is too soon to talk much about the cost of treatment. At present it is believed to be about \$3 per ton, but doubtless this will be reduced. The 100-stamp mill of the Pittsburg-Silver Peak Mining Company is nearing completion. The Montgomery-Shoshone mill at Rhyolite is running, but information as to the results has not yet been communicated.

## Tin Exports from China

A recent British consular report gives the exports of tin from Mengtzu in 1906 as 3985 tons (of 2240 lb.) against 4462 tons in 1905. The decrease was due in part to the drought and also to the fact that the French railway offered as much as \$1.20 a day in cash and rice for labor, causing a scarcity of miners.

With the idea of applying modern machinery and methods to the tin mines of the Yunnan region a French financier visited the Kochiu mines and subsequently contracted for the privilege of working the tailings. It is feared, however, that unreasonable jealousy on the part of the Chinese will make the introduction of such improvements difficult.

According to *L'Echo des Mines* (Oct. 17, 1907) a tungsten mine is being exploited at Puy-les-Vignes.



## Iron Mine Assessments in Minnesota

By DWIGHT E. WOODBRIDGE

There has lately been a remarkable change in the taxable valuation of iron mines in the State of Minnesota. This has been the result of official action which must be called precipitate and unjust. A brief account of the methods of the tax commission and of the results, so far as they affect individual mine operators, may be of general interest.

### EARLY AND PRESENT TAXATION

The Mesabi iron-ore range was discovered in 1890 and became a shipper in considerable quantity three years later. That was during a period of depression in the iron trade, and for several years mining was carried on with little or no profit; for some years at an actual loss. The properties were placed on the tax rolls and gradually raised in valuation as shipments grew larger or as new mines were discovered and opened, until, in 1898, there was a total assessment of \$5,969,000. Real estate is assessed for taxation every two years in Minnesota, and in the year 1900 I was employed by the State auditor to report on mines for valuation. At the session of the State Board of Equalization that year, before which I reported, the value of mines was increased to \$7,845,168. In 1902 I was again employed and the valuation was then put at \$29,974,470. In 1904 the valuation was raised to \$41,903,778, while last year it was put at \$69,851,845 and should not, under the usual procedure, or in accordance with the law, be changed before 1908. But the legislature of the previous winter had created a tax commission, as a regular branch of the machinery of the Commonwealth, and this commission was anxious to justify its being by making some additions to the tax rolls of the State, and under a strained construction of the law it could make changes in an odd year. Therefore it spent a few days in an examination of the mining properties. It took no expert advice, was accompanied only by a gentleman who is employed to see that all mines on State lands return proper figures of tonnages mined, in order that collections for royalties should be correct, asked all mining companies to return figures of their ore in the ground for its information, and proceeded to make an assessment, to be submitted to the State Board of Equalization as a tentative figure, upon which that body might act as it saw fit. It rather took away the breath of the mining interests when they learned that this figure was above \$225,000,000, more than three times the figure of the year before, and almost six times the highest preceding valuation.

### VALUES AND COSTS

In the earlier years the taxable valua-

tion had been fixed on a sort of combination between the mine tonnage and its relative worth, and the probable shipments during the two years of the assessment period. In those years of comparatively low mineral values, iron ore had been rated as worth about 50c. a ton in the mine, and at this rate the valuation was based only on the amount of ore expected to be shipped the coming season. Undeveloped, but prospected, ore lands were classed at a lower rate than properties actually producing ore and a revenue. This was a reasonable and honest manner of getting the value of the mines, and a gross value of 50c. a ton was ample as a figure for the worth of ore in the mines. Indeed, during much of the period in question ore could not be delivered at lower lake ports and sold so as to permit the use of this figure; the cost of mining, transportation and sale was such that 50c. as a base was too high. For a period of ten years, ending with 1904, Mesabi bessemer brought in Cleveland an average of but \$3.20, while costs against it were at least \$3.05 for the same term.

The method pursued by the tax commission in arriving at its value for the mining industry was radically different. Ores were divided into several classes, based on the ease of mining and the grade of deposits as to phosphorus. Ores easily mined and of bessemer quality were valued at \$1.25 a ton in the ground, and the valuation decreased from this to underground properties of low-grade non-bessemer, which were put at 40c. a ton. It being the custom in Minnesota to assess real estate at 40 per cent. of its actual worth, these figures were then cut to 40 per cent. and the result multiplied by the tonnages that had been returned to the commission by the mining companies. Thus the tax value was placed over the entire orebody, whether it could be mined in one year or in 50 years. It can be seen readily that after a property had been taxed on such a rate as this for 25 to 40 years there would have accumulated against the ore remaining in the ground a pre-payment of taxes almost confiscatory. The whole tendency of this was not to conserve the resources of the State and assist in their exploitation and development, but quite the contrary—to get rid of the resources as fast as might be and to hide any ore not actually discovered as long as possible. In my opinion the functions of government are diametrically opposed to such procedure.

Of course mine-owners were up in arms over such a change in values, and demanded to be heard. They were heard, and the tentative recommendations of the commission were reduced by about \$35,000,000. This amended figure was reported to the State Board of Equalization, then in session, and after a fight there to prevent another and still more drastic raise, they were adopted, a few days ago, and are now the total upon which county auditors must tax mines in their districts,

unless the mining companies appeal to the courts, on the ground of gross injustice, and secure an abatement.

### PRESENT VALUATIONS

The crudity of the classifications adopted by the commission may be appreciated when it is stated that one of its classes was: "Unexplored lands near good mining properties, 10c. per ton." The commission may be able to fix a tonnage on "unexplored lands" that lie near good mining properties, but no one else has that ability. Another instance is "Lands that have not been explored, but are on the well known ore belt, \$5 to \$10 per acre." Now, lands on the "well known ore belt" are valuable for ore or for nothing at all. Explorations show that not to exceed 8 per cent. of the well known ore belt—whatever that may be—contains mines. To tax the rest of the 75,000 or 80,000 acres of the Mesabi range—rocks, cut-over lands, swamps and muskegs, or boulder-strewn clays—at from \$5 to \$10 per acre, is manifestly absurd.

Of course this commission has taken the industry in a year of extreme profit, when the figure of \$1.25 per ton may not be out of the way. Mesabi bessemer ore, of standard grade, sells at Cleveland this year at \$4.75 per ton; estimating cost of mining at \$1 a ton, of freights to lower lake ports \$1.55, of incidental expenses at 15c., and of royalty at 30c., there remains \$1.75 for the value of the ore in the ground. This price of ore at Cleveland is higher than it has been in the past, and perhaps than it will be in the near future. Mesabi ore has never, till this year, sold at any such price.

If the present tax rates are adhered to in the Mesabi region the Oliver Iron Mining Company would pay, under the new rate of valuation, and with the production of 1906, a tax of about 15c. a ton on its output per year, or so long as the conditions remain as now. The Mahoning Ore and Steel Company would pay about 17c. a ton, the Buffalo & Susquehanna about 40c. a ton, Corrigan, McKinney & Co. some 18c., and so on along the list. The company owning large reserves that it proposes to hold for the future, is paying the largest sum per ton each year.

When this matter reached the State Board of Equalization, which is the final arbiter in all such affairs, it was before a body of men only two members of which had ever seen an iron mine, and whose information as to the condition of the steel industry is such that one of the most prominent members asserted in the sessions that there was no competition in the industry, and that the various steel-making concerns were all dominated by the same people.

Most of the turquoise mined in the United States comes from the Burro mountain district of New Mexico.



## The Traylor Concentrating Table

BY REGINALD MEEKS

Two radical departures from the ordinary design of reciprocating, riffled, slime-tables have been made in a new table by the Traylor Engineering Company of New York. One is a diagonal adjustment consisting of a break in the surface, running from the front to the back, which permits the lower part of the table to be tilted, at the same time leaving the upper part or head stationary and perfectly level. The movable part is adjusted so that the rear side may be raised or lowered three times as much as the front side. This movement is accomplished by means of a compound lever situated at the back of the table and permits of an elevation of the rear side up to about five inches.

The second feature involves a new mode of forming the riffles. Instead of

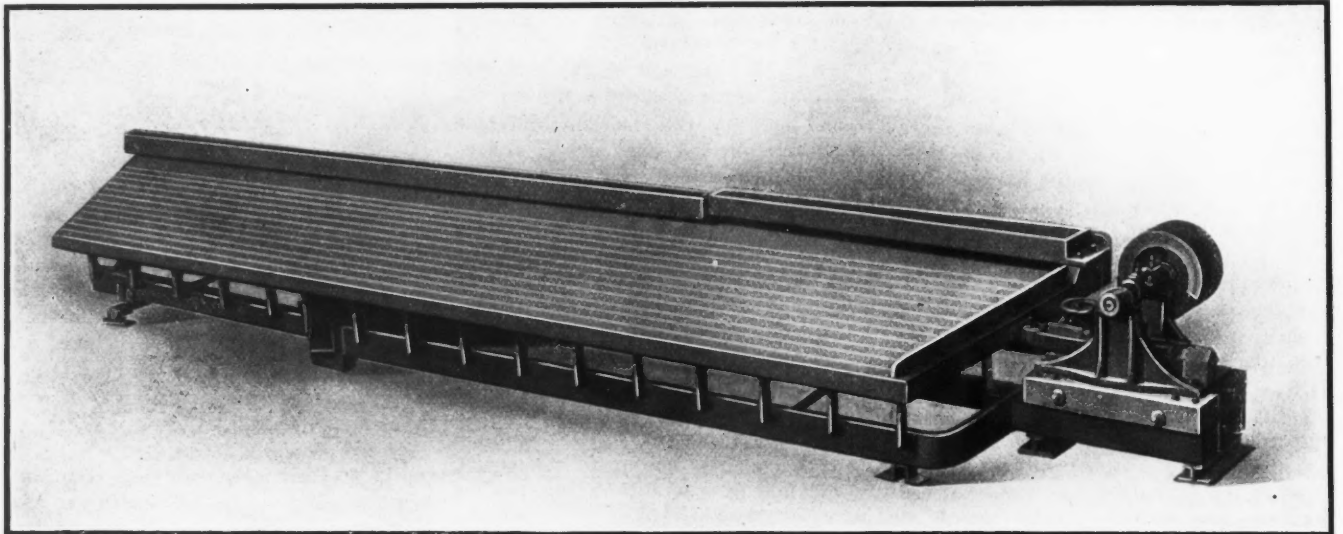
The effect of increasing the load at the head is simply to widen out the concentrates, the point where they begin to come off the table remaining constant. Also any error in the adjustment of the elevation of the table will not result seriously in the concentration because the velocity of the feed water at the head is not changed. Thus the table is largely independent of the "personal equation" and is adjusted to the sands rather than the mineral. The motion of the table is the usual end-bump accomplished by a toggle-joint and is practically the same as in other tables.

The pulp when it flows on the head of the table settles in the upper corrugations, between the riffles, and starts to move across the table very slowly. The bumping motion starts the grains moving in the direction of the length of the table, and when the diagonal line is reached, the minerals are retarded according to

## New Boring Machines for Tunneling

Just now, in Colorado, a great deal of interest is manifested in several newly invented rock-boring machines, designed for use in mining and railway tunnels. They are the result, undoubtedly, of deep thought, hard work and much expense, and deserve encouragement, for if they prove capable of doing only half of what the inventors claim for them, it will mean a tremendous stride in the art of perforating mountains for the ores contained in their rocks, and for building railways in a straight line through, instead of over them by a more or less winding course.

Were it the intention of the inventors and promoters, to prove their capabilities and profitable adaptability on a sufficient working scale before offering them for



TRAYLOR CONCENTRATING TABLE

the usual wooden riffles, tacked on a covering of linoleum or rubber, the Traylor table has the riffles attached to the wooden frame and over this is stretched a thin sheet of rubber, the width of the table. The riffles vary in length and are planed down as in other designs. Thus the sands travel over a corrugated surface, and their progress is gradual and without disturbances.

The feed finds no slope at the head no matter what the inclination of the rest of table may be and therefore the initial velocity of the water is always the same. Very little water flows directly across the head of the table from the feed and the small quantity that does, carries practically no float whatever. That the finest particles are not lost is shown by agitating the concentrates, when a scum of float material is seen to rise to the surface and flow into the concentrate compartment. A similar test at other parts of the table reveals practically no float.

their specific gravities and the lighter grains travel to the front edge of the table.

## Fluorspar in Great Britain

The fluorspar industry of Great Britain has been gradually increasing during the last six years, and for this mineral, which occurs widely in the lead districts of Derbyshire and Durham, there is now a steady demand, and it is no longer a useless by-product. In 1900 the output was 1448 tons; in 1901, it was 4214 tons; in 1903, it was 11,911 tons; in 1905 it rose to 39,446 tons, and in 1906 to 41,849 tons, valued at £20,023. About two-thirds of the production comes from Derbyshire and the remainder from Durham. The largest producing firm is George G. Blackwell Sons & Co., of Liverpool, who own a number of properties in Derbyshire.

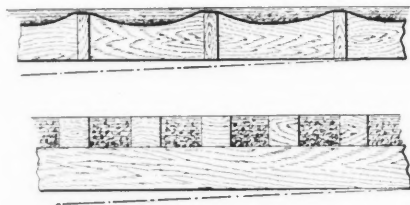
sale, it would be eminently proper to await results before discussion, but as in one or two instances, the inventors and their backers have organized companies, and are offering stock for sale, by the issuing of highly colored pamphlets and prospectuses, in which claims are made for the performances of these only partially tried, and utterly unproved, machines, it would seem in order to make some inquiries which may lead to discussion and enlightenment as to their respective merits.

In Denver, for instance, engineers are now dealing with the boring of a six-mile 18x24-ft. tunnel through the main range of the Rocky mountains, and more than ordinary importance attaches there to the driving of tunnels, and the machines connected therewith. One fact that seems not to be generally recognized is that an ordinary, or may be very excellent and capable, civil, mining, and mechanical engineer, is not a railway tunnel engineer, which is, or should be, a pro-

fession of itself, and entails not only a knowledge of the machinery necessary, but of all the contingencies which may arise in the driving of a six-mile tunnel, such as the difficult matter of ventilation, slips of great rock masses, swelling ground, mud, hot water, foul gases, and the hundred and one obstacles that may be encountered, and of which no indication can be obtained by a close observation and prospecting of the surface, which in ordinary or comparatively short mining tunnels would be easy to cope with.

#### THE SIMPLON TUNNEL

The history of the driving of the 12-mile Simplon tunnel, between Switzerland and Italy, by Sir Douglas Fox and Partners, the greatest railway tunnel engineers of the day, will give some idea of the stupendousness of these undertakings. The completed Simplon tunnel is 16.5x18 ft., the cost \$16,000,000, and it took 6¾ years to build. In this work was used a machine invented by Mr. Brandt, the engineer of the St. Gothard tunnel. The



WOODEN RIFFLES WITH AND WITHOUT RUBBER COVERING

drill was mounted on a carriage, had rotary action, and the pressure on the cutting points of 10 drills driven by hydraulic pressure was 1470 lb. per sq.in., the rock being pierced with from 10 to 12 holes, and fired. The amount of rock pierced daily was about 20 ft. One of the obstacles encountered, 2¾ miles from the portal, was a cold underground river of 12,000 gal. per minute. In another 2¼ miles hot springs, with a maximum flow of 4330 gal. per minute, and a temperature of 45.4 deg. C., were encountered.

These conditions emphasize the fact that such enterprises should not be entered into without due consideration and advice by the highest authority on railway tunnel engineering obtainable. But the veriest tyros are not wanting who will give glib advice as to boring machinery, and even venture to enter upon construction.

We have heard it said, "Oh, we shall contract the work, and these matters are up to the contractors;" but this is a mistake from the fact that the element of time is one of the essential features in such a stupendous undertaking, and if by the installation of a faulty plant of boring machinery, or lack of the necessary technical engineering knowledge, the contractor falls down, it is so much harder to get another firm to take the

matter in hand, and the loss of time means the loss of money. That there are great firms of contractors who will undertake such a work, and push it through successfully, is admitted, but they have skilled railway tunnel engineers in their employment, under whose direction the work is prosecuted, and only such should be selected.

#### THE PROBLEM OF "MUCKING OUT"

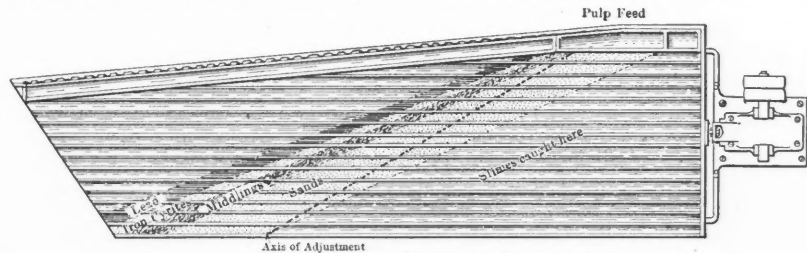
There are two matters to consider: first, the boring qualities and speed, and second, the "mucking out," or conveying to the surface, the rock broken, the latter being sometimes more difficult than the former, to keep pace with the advance.

One of the companies referred to advertises a railroad machine of 18 ft. diameter, with 36 crushing heads or disks, armed with "coarse, blunt teeth," each disk being 27 in. in diameter, the whole machine weighing 65 tons, which machine does its own "mucking" by water perfectly under all conditions, and is run by from 65 to 80 horse-power.

As each disk is stated to strike a 4000-

Now as to this question of "mucking out." Another machine which I will describe later on, advertises in a Salt Lake paper to cut a complete tunnel from 7 to 18 ft. in diameter at the rate of 60 ft. a day, which would mean between 50 and 60 tons of broken rock an hour; but as we have dealt with a possible 1 ft. per hour in a 20-hour day, let us stick to that as a basis of reckoning.

The prospectus of this machine states that the tonnage of broken or pulverized rock will be carried out by using a 3-in. stream of water under 40 lb. pressure, by pumping it through the main center shaft, which is 6 in. in diameter with a 3-in. hole through it, and this stream plays upon the breast or heading. This may possibly wash 21.5 tons of pulverized rock per hour back of the machine, but is not likely to do more, for as the pressure is lost after the water strikes the breast, there is nothing but the volume of water left and the incline (which is 0.5 per cent. in an ordinary railway tunnel) to carry out to the portal about 700 lb. of material per minute, and for a distance of any-



TRAYLOR CONCENTRATING TABLE, VIEW SHOWING AXIS OF ADJUSTMENT

lb. blow, and 200 blows a minute, the total blow of the 36 disks is 7200 strokes per minute of 14,400 tons, or 432,000 strokes per hour equal to a total of 864,000 tons of power expended per hour. The disks are operated by large spiral springs, and it may be asked here, if it is expected that a machine of such a weight, and the springs, are likely to stand the stress of such a blow for any long continued period, and how long the "coarse, blunt teeth" on the face of the disks, are likely to retain their cutting power against hard rock under such conditions?

#### AN ANALYSIS OF ESTIMATES

Then comes the "mucking out" question. The prospectus states that it believes 5 ft. an hour for a 4x7-ft. tunnel possible under favorable conditions, or 120 ft. with three shifts in 24 hours. Therefore it would seem reasonable to reckon 1 ft. per hour for say 20 hours with the 18-ft. diameter bore. The area of the 18-ft. circle is 254 sq.ft., and driving at the rate of 1 ft. an hour, gives 254 cu.ft., which in a day of 20 hours, would be 5080 cu.ft., or 432⅓ tons; or 21.5 tons per hour, which has to be carried back of the machine, and out to the surface.

where between one-quarter of a mile and two or three miles; and this certainly appears, to put it mildly, very doubtful of accomplishment.

Loading the amount of "muck" into cars by hand is out of the question, and it would appear therefore that the only possible plan of conveying the "muck" to the surface would be to carry two temporary railway tracks from the portal to the breast, and as track cannot be laid on a segment of a circle, the same would have to be built on a trestle, with say two trains of 10 one-ton ore cars each, operated by trolley system and electric locomotives, one train loading at the breast, while the other is running out, dumping and returning. How this is to be done at the rate of about a third of a ton a minute, over a distance of say one-half mile to two or three miles is somewhat of an enigma which perhaps the inventors can solve. If it is proved in the trials that the water will carry the muck back of the machine probably some arrangement of a conveyer belt can be devised to load it on the cars. In the JOURNAL of June 22, 1907, there was a description of the Park machine-mucker, which being capable of doing the work of a steam shovel in the narrow space of a tunnel, might possibly be utilized.



## IMPORTANCE OF CONTINUOUS TRIAL

But the point I wish to make here is that though all the apparent difficulties may, and probably will, be overcome in this era of great inventions, in offering for sale these new boring machines, or stock in the companies owning them (which amounts to the same thing), it should first not only be shown definitely in working trials of sufficient duration that the machine will bore a given diameter at a certain rate, but also that the rock so broken, and designated in mining parlance as "muck," can be delivered at the surface so as to keep pace with the stated drivage. A machine that will cut an 18-ft. cylindrical bore at the rate of 40 ft. per hour is of no value if the rock so broken cannot be carried at the same rate to the dump; the mucking machinery, therefore, is an integral part of the boring machine, and should be shown working successfully with it, before people should be asked to invest their money.

The other machine alluded to, instead of having a series of disks for the cutting faces, has one solid face or wheel the diameter of the cylindrical bore to be driven, the same having a series of cutters or chisels on it, which cover the whole face of the bore, and the whole head of the machine takes the full stroke against the breast of the tunnel. On a trial near Denver, this machine, in the presence of several engineers, actually drove a 5-ft. diameter heading 39 in. in 46 minutes, as clean as a gun barrel—a very remarkable performance, and a wonderful machine. This machine is, in fact, to a great extent, a copy of Col. Beaumont's machine, which was used by Sir Douglas and Francis Fox in the building of a three-mile railway tunnel under the Mersey river, between Liverpool and Berkenhead, and in driving the 7 ft. 4 in. diameter bore in sandstone, it did its work well as long as it was at work; but it was so often breaking down, and requiring repairs, that eventually the average speed that was attained was equal only to that of hand labor. This drill was installed in 1883, and for a time made a weekly drivage of 51 feet.

But even this does not warrant the advertisement before referred to, that the machine now being offered will cut a complete tunnel from 7 to 18 ft. in diameter at the rate of 60 ft. a day. It is very like the man who is driving a 7x8-ft. mining tunnel in hard rock with machine drills, and making about 8 ft. per day, but all at once he strikes a zone of picking ground, and on one day only he makes 15 ft. He immediately rushes off to the local paper, and gives it an item to the effect that "the So and So tunnel is making 15 ft. a day." It is one thing to make 20 ft. in one day in an 18-foot bore, and quite another to sustain that pace over a month or a year or more. This latter machine is operated by compressed air, and is fastened to roof and floor in the same way as ordinary machine drills.

## ADVANTAGES AND DISADVANTAGES

One defect in both of these machines is that the operator cannot see the breast. Sometimes in encountering shattered ground, a great mass of rock will drop down from the top of the breast in front of the machine. Sometimes half the breast will be in soft or shattered rock, or even picking ground, while the other half is in hard rock, subjecting the machine to unequal strains.

Another new invention about which little has been said, and nothing advertised, is a rotary percussion drill, similar in some respects to the others, except that the cutting head is in the shape of the spokes of a wheel, armed with moils, having the advantage of the operator being able to see the breast of the bore. This is being quietly and systematically tested in a mining tunnel, and the results will be duly chronicled.

The great advantage of these boring machines when they are fully developed, if ever they are, will be the fact that no explosives are used, thus rendering ventilation—the great bugbear of long tunnels—comparatively easy. Although none of them may as yet be perfected, they are evidently on the right road to success, a consummation much to be hoped for.

### Investigating the Strength of Steel\*

An increased appropriation has been made available for the current fiscal year for the extension of the work carried on in the past at the Watertown arsenal in the investigation of the properties of materials of construction. It is proposed to conduct this investigation along lines of the greatest practical value to users as well as manufacturers of materials. In the experimental study of steel and steel products it is proposed to begin with the metal in the ingot and thence to follow it out to the finished sections and to built members.

By authority of the ordnance department, William R. Webster, consulting engineer, and Edgar Marburg, professor of civil engineering at the University of Pennsylvania, have been engaged to cooperate in the preparation of the program of tests, and in the prosecution of the work. A meeting attended, at their invitation, by about 25 consulting engineers and representatives of leading consuming and manufacturing interests, was recently held at the Engineers' Club, New York, for the purpose of meeting Major C. L. H. Ruggles, commanding officer, Watertown arsenal, and J. E. Howard, in charge of the Watertown testing laboratory, with a view of determining the most desirable program for the initiation of the proposed investigation. This meeting was held in two sessions.\*

\*From the *Iron Trade Review*, Cleveland, O., Nov. 7.

One session, presided over by Dr. Charles B. Dudley, chemist, Pennsylvania railroad, was devoted to a discussion of metallurgical questions applying to ingot structure, blooms, billets, slabs and forgings, and it was the sense of the meeting that it was desirable to make a study of these questions a special feature of the proposed work.

The second session, at which J. V. W. Reynders, vice-president Pennsylvania Steel Company, presided, was devoted to the consideration of a preliminary program for tests of structural members, including columns, riveted tension members, riveted splices, riveted connections in building construction and the general subject of riveting.

At the opening of the meeting Major Ruggles explained that the work was not to be regarded in any sense a Government investigation of steel, but that it was the desire of the Ordnance Department to utilize the increased appropriation with a view not only to the needs of the Government, but also to make the results as valuable as possible to all persons interested in the subject of steel, whether as consulting engineers or as representatives of consuming or manufacturing interests.

J. E. Howard, in charge of the testing laboratory at Watertown arsenal, presented in abstract his report to the Ordnance Department in which attention was drawn to the desirability of making provision for the extension of the usefulness of the testing laboratory, and indicating in detail numerous lines of research that might be taken up to advantage.

It was the sense of the meeting that the extension of the testing facilities in this country had not kept pace with the advance in engineering construction, and a resolution was adopted by unanimous vote that the enlargement of the present facilities at the Watertown arsenal by the erection of a testing machine of at least 10,000,000 lb. capacity was desirable. It was also decided to authorize the chairman, Dr. Dudley, to appoint two committees, subject to the approval of the Watertown authorities, one on ingot structure, billets, blooms, slabs, and forgings, and the other on tests of structural materials. These committees have since been appointed and much preliminary work has already been accomplished, which will be submitted at an early date to the engineering profession for criticism and suggestions.

Experience with automatic door-closing devices has shown the following points to their disadvantage: 1. The door may not open promptly and the mules and cars may suffer. 2. The door may be closed by the driver before the cars have all passed through. 3. A lump of coal on the roadway may keep the door from closing or prevent it from being opened. 4. The automatic devices are complicated, expensive and apt to get out of order or to become clogged up with coal and dirt.



# Hoisting Ropes for Mines—II

Report of the Transvaal Commission. Best Material for Hoisting Ropes. Their Care and Preservation. Tests and Examinations

BY U. P. SWINBURNE AND ASSOCIATES

In the first portion of this important report<sup>1</sup> the methods of manufacture of steel wire ropes for hoisting was considered. The second part takes up the materials of which they are made.

## STEEL FOR HOISTING ROPES

The various grades of steel used in the manufacture of winding ropes are designated in an arbitrary and somewhat misleading fashion. Such terms as "improved patent crucible," "best patent crucible," "mild, best, or improved plow," are used by many makers, but not as denoting any exact standard of tensile strength.

The fundamental difference between so-called "crucible" steel and "plow" steel is that the iron bases used in their manufacture are not the same. Plow steel is made from a base of the finest quality, and crucible steel from some cheaper iron, these two varieties being represented respectively in English practice by "Swedish" and "Cleveland." The open-hearth process is used, either acid or basic. In the basic process a low-grade iron may be used, possibly highly phosphoric, while the acid process is suitable for the higher grade only. Other differences between "crucible" and "plow" steels are the outcome of manufacture, the heat treatment, and the number of passes through the dies. Continued drawing will increase the breaking stress of a wire. The lower the quality of the iron from which the steel is made, the quicker will this steel harden up, that is, the fewer draws will it require. The heat treatment, or tempering process, is introduced to give toughness to the wire, and not to increase the tensile strength. Owing to the fact that the manufacture of high-grade wire is practically a secret process, it has not been possible for the Commission to get anything more than the barest information.

## TESTS OF STEEL WIRE

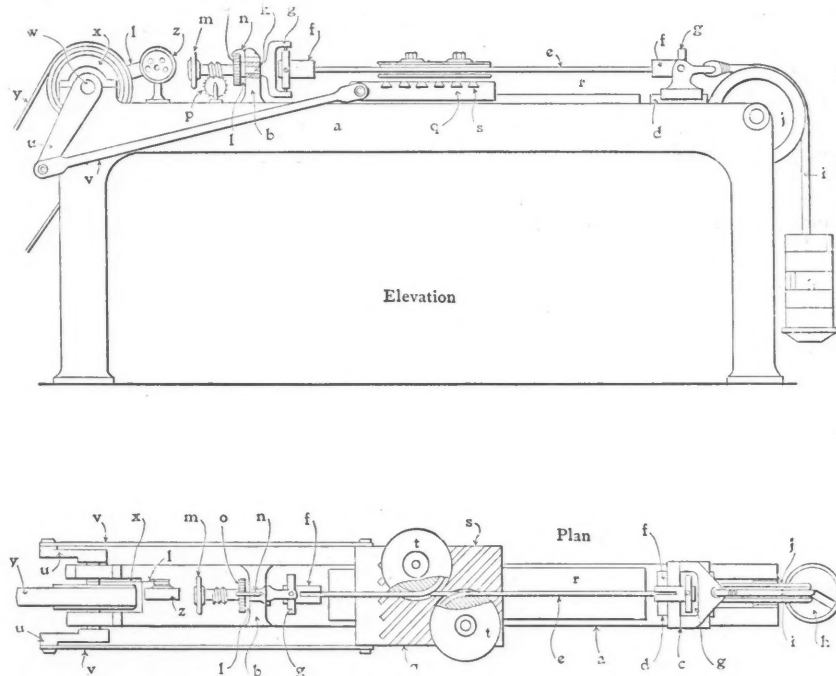
It is known, however, with certainty, that wires which are called the same, and which test the same, are yet very different in price, and give very different results in work, especially when the working conditions are severe. The tests alluded to here are the old-fashioned chemical and mechanical tests. In the chemical test, carbon, silicon, manganese, sulphur, and phosphorus are first determined, and the amount of iron then arrived at by difference. From the results of recent

researches, it appears that hydrogen and nitrogen exist in steel and deleteriously affect the quality, so that the complete ignoring of these elements is no longer possible.

In the mechanical test, steel wire is tested as to its ability to stand separately tension, torsion, and bending. Recent investigations have shown, however, that wires in reality of poor quality, and which still come well up to the standard of these tests when conducted separately up to breaking load, have had their inferiority disclosed by means of combined tension.

atus is constructed to subject the specimen simultaneously to tension, to intermittent flexure through any desired angle and re-straightening, with or without reversed bending, applied successively over a substantial portion of its length; to friction upon pulleys, and also, if desired, upon itself, and in some cases also to torsion. In the drawing, Fig. 1 is a side elevation and Fig. 2 a plan of one embodiment of the invention, constructively suitable for testing single wires or strands.

Therein *a* indicates a main framework, *b* a fixed headstock, and *c* a tailstock



FIGS. 1 AND 2. VAUGHAN & EPTONS' ROPE-TESTING MACHINE

torsion, and bending tests rapidly repeated in a manner which closely resembles working conditions at stresses below the elastic limit of the material.

## A ROPE-TESTING MACHINE

A testing machine for wire ropes, devised by Vaughan & Epton, is shown in the accompanying drawings. This machine is for the testing of ropes intended for winding, hauling or like purposes, or the separate strands or wires of or for the same, the object being to provide an apparatus, such that the conditions of the test and the stresses produced in the specimen, during testing, approximate closely in character and effect to those occurring under ordinary working conditions in mine and similar work, although differing in degree. The appar-

ately freely movable longitudinally on the table upon a guide *d*. The specimen *e* is held in grips *f* of any convenient construction, which are secured to the stocks by universal joints, such as the gimbals *g*. The purpose of these connections is to obviate bending of the specimen at the mouth or the grips. Tension is applied to the specimen by means of the adjustable weight *h*, connected on the tailstock *c* by a flexible connection *i* which passes around an idler pulley *j*; but it will, of course, be understood that the means for applying and indicating the tension would be largely modified according to the size of the specimen which the machine is designed to test.

To enable the specimen to be twisted, the head gimbal has a journalled shaft *k* which passes revolvably through the headstock *b* and is secured therein by a collar

<sup>1</sup>ENGINEERING AND MINING JOURNAL, Nov. 16, p. 927.

l. To the shaft is keyed a hand wheel *m* for rotating it, and a detent *n* and a detent wheel *o* are provided to hold the shaft in the desired position. An indicator *p* shows the angle through which the specimen has been twisted. The table *q* is mounted on a suitably constructed guide *r* to slide freely in a longitudinal direction upon the frame *a*. The upper surface of the table has a number of undercut grooves *s* by which one or more grooved pulleys *t* may be secured to the table at any desired point, to revolve freely thereon. About such pulley or pulleys *t*, the specimen is lapped in such manner as may appear desirable for any individual test. In the illustration, two pulleys are shown and the specimen is lapped completely about each one in succession, but, of course, any other arrangement may be made. The table is caused to reciprocate upon the guide *r* by cranks

table is now started and continued until the specimen fractures. In the event of the specimen becoming unduly heated, suitable steps would be taken to remove the heat and maintain the temperature at the normal level. The second specimen being then treated in an exactly similar manner, the number of reciprocations of the table in each case will furnish a measure of the relative efficiencies under the actual working conditions simulated in the form of the test. Many other methods of using the machine will suggest themselves, as, for example, the determination of the efficiency of identical samples under diverse working conditions.

#### DUCTILITY OF STEEL WIRE

With regard to the ductility, or non-brittleness, of the finished wire after the drawing and heat treatment, this depends on the care and skill exercised, as also on

produce a certain maximum stress in the finished wire, and at what point the process of reduction should cease, so as to get the most useful amount of work out of the finished rope. Further, it shows that it is possible to increase the specific gravity of steel from 7.768 to 7.998 by cold work, and when it reaches this point and is again subjected to a crushing action by pulling through a die, as in wire-drawing, it actually gets lighter, showing that it is impossible by this means to make it more dense. It must be borne in mind that the results here given will probably not apply to steel made by different processes and of different chemical compositions. Further, it shows that the usual methods of obtaining the best wire by means of torsion and tensile tests are not altogether a trustworthy method of determining the best point for the wire to perform useful work."

#### TESTS OF STEEL IN WIRE ROPES

No.	TESTS IN CHEMICAL LABORATORY.				Conclusions drawn from Chemical Test.	DIAMETER AND DESCRIPTION.	TESTS IN MECHANICAL LABORATORY.			
	Strength of Sulphuric Acid.	Time of Exposure	Loss of Iron in gms per sq in.	Remarks.			Breaking Load in lbs.	Percentage Elongation.	No. of Torsions in 8 ins.	No. of 180° Bends over 1/4 in. Radius.
IMPROVED PLOUGH STEEL										
1	0.071% at 66° F.	49 hrs.	0.0181	Plain	This acid is about five times as strong as most mine waters, and had dissolved most of the zinc coating.	0.080 in. plain	1,200	3.1	38	9
			0.0176	Galvanised		0.083 in. galvanised	1,220	6.9	32	7
2	0.025% at 70° F.	21 hrs.	0.0081	Plain	Acid in thin layer just covering wires in a flat dish. Practically same results as in No. 4, therefore contact with air makes no difference.	0.092 in. plain 0.095 in. galvanised	1,580 1,620	3.4 7.5	36 29	9 7
			0.0009	Galvanised						
			0.0231	Plain						
			0.0033	Galvanised						
MILD PLOUGH STEEL										
3	0.071% at 67° F.	48 hrs.	0.2255	Plain (not aerated)	Aeration has therefore very little effect on the corrosion. This wire is much more easily attacked than No. 1.	0.103 in. plain 0.105 in. galvanised	2,020 2,000	4.4 7.8	31 24	7 5
			0.0679	Galvanised "						
			0.1972	Plain (aerated)						
4	0.025% at 68° F.	43 hrs.	0.0094	Galvanised "	Zinc apparently unaffected.	0.092 in. plain 0.096 in. galvanised	1,560 1,640	3.7 7.5	37 29	8 6
			0.0097	Plain						
			0.0011	Galvanised						
			0.0231	Plain						
5	0.071% at 66° F. with ferrous sulphate added.	48 hrs.	0.0067	Galvanised	A much more marked corrosion resulted in the unprotected wires, but the galvanised ones were little attacked, although they lost most of their zinc.	0.080 in. plain 0.083 in. galvanised	1,160 1,180	3.4 7.5	40 32	11 8
			Not measured, owing to added iron.							
SPECIAL IMPROVED PATENT CRUCIBLE STEEL										
6	0.025% at 70° F.	21 hrs.	0.0108	Plain	This wire is more easily corroded than Nos. 1 or 4.	0.103 in. plain 0.105 in. galvanised	1,540 1,660	3.7 7.5	30 24	7 6
			0.0009	Galvanised						
			0.0151	Plain						
			0.0021	Galvanised						

u and connecting rods *v*, the cranks being keyed to a shaft *w* by a band *l* and indicates the number of reciprocations of the table in a given time.

While the nature of the tests may, obviously, be varied to a very large extent according to the results desired, a typical procedure in comparing the working values of two specimens obtained from different sources would be as follows: The pulley or pulleys *t* of the requisite size having been secured to the table *q* in such position as may be desired, a specimen of the desired length is fixed at one end in one of the grips, passed about the pulley or pulleys *t* to the extent and in the manner predetermined and thereupon fixed into the remaining grip. A measured tensional stress is then applied by means of the adjustable weight *h* and, if desired, torsional stress is produced and noted. Reciprocation of the

a knowledge of the drawing steps and limits suitable for the particular class of steel used. With this qualification, it may be stated that ductility is not sacrificed in the gain of tensile strength. Seeing, however, that the large majority of rope manufacturers purchase the finished wire, they are not in the best possible position to apply the results of experience gained as to the working life of various qualities. J. Dixon Brunton, of Musselburgh, Scotland, furnished the commission with a copy of his paper, "The Heat Treatment of Wire, particularly Wire for Ropes," which gives the result of research work undertaken with the view of ascertaining the correct heat treatment of wire. The following is an extract of his conclusions: "It will be seen that a somewhat simple method has been arrived at whereby a manufacturer can determine what is the correct carbon his steel should contain to

#### STRENGTH OF STEEL WIRE

For winding ropes on the Rand, manufacturers recommend steel wire of an ultimate stress of 105 to 135 short tons, and it appears that 120-ton steel is most commonly used, the lower and higher limits being advised for working conditions as regards bending stresses either unfavorable or very favorable. There are cases in which 150-ton material has given quite satisfactory results.

The experiments with nickel steel and vanadium steel for winding ropes have not proved successful, and no manufacturer appears to be able to recommend these alloys.

#### GALVANIZING WIRE ROPES

The effect of galvanizing "plow" steel wire and the amount of protection this treatment affords, even when some of the coating has been broken, has been investi-



gated locally by W. M. Epton and Dr. Moir. Their experiments go to prove that: (1) the ultimate tensile strength is not lowered, while the elongation is doubled; (2) the capacity to resist torsion is reduced 20 per cent.; (3) the capacity to resist bending is decreased 25 per cent.

The corrosion of partly galvanized wire proved to be only about one-eighth of that of plain wire with the same surface exposed. It must be stated, however, that the wires experimented with were not of the ordinary commercial quality, as the experimenters prepared their own samples by dipping.

With respect to galvanized winding ropes, opinions are divided, but the weight of evidence is against using them. Galvanized ropes have given good results in wet up-cast shafts, but if the water is acidulous, it is stated that brittleness may result in the wire owing to galvanic action and the formation of hydrogen. Experiments carried out in the Mines Department Chemical and Mechanical Laboratories, however, go to disprove this contention.

On this point the commission quotes from the *Proceedings* of the Transvaal Institute of Mechanical Engineers, a reply to discussion on the paper read by J. A. Vaughan and W. Martin Epton on "Wire Ropes used for Winding: their Strength and some Causes of its Reduction." The authors reply to criticism that their paper intended to introduce the chemical aspect of rope deterioration. No misconception appears to have arisen owing to the step—the chemists have come forward with alacrity to assist in the inquiry, and they have attacked each other, and not the writers. The experiments of Mr. Heymann go to show that even the most acid mine water has very little more corrosive action than plain water, and that the primary cause of the corrosion of the wires of winding ropes is contact with air or deleterious gases. This is a most important point, in that it allows of experience gained in Great Britain with respect to the efficiency of galvanized wire rope to be referred as holding true for the Transvaal. Dr. Moir's experiments have entirely disposed of the scientific fallacy that during the life of a galvanized wire rope, when the zinc was worn off in places, the galvanic action would then lead to more rapid wasting of the steel. Dr. Moir and the writers were able to repeat the experiments, dealing with the effects of galvanizing as a preservative and as a deteriorating agent with respect to the ductility of the steel. The samples forwarded represented identically the same wire, plain and galvanized, so that an exact comparison was possible. The table on page 972 shows the results obtained. The method of preparation of the specimens for the chemical test was the same as previously described by Dr. Moir. It is evident that a coating of zinc has a protective action on steel, even when the

latter is exposed to the acid. Generalizing, results show that plain wire suffers about 30 times as much corrosion from fairly strong acid as the same wire does when it has a coating of zinc near the exposed surface of the iron, and about 10 times when the acid is weak.

The galvanizing in these instances was, of course, of the ordinary commercial character, and not home made as in the case of the previous experiments, the reason for repeating the tests being that the latter improvised method of galvanizing had, it was suggested, possibly spoiled the wire. The effect on the ductility and on the other desirable qualities that the hard drawn steel originally possessed is fairly clearly set forth in the tabulated results. The elongation is increased nearly 100 per cent., while the tensions and bendings obtained are reduced, the former rather less and the latter in a rather greater degree than was anticipated from the results recorded by previous investigators.

#### PRESERVATION OF WINDING ROPES

All evidence goes to show that the preservative treatment of a rope during its manufacture is a matter of the highest importance, and has a considerable influence on the life of the rope. The core, of tarred Russian hemp, should be thoroughly soaked in an acid-free lubricant. The wires should also be well lubricated while they are being laid-up, and the whole rope then, if the dressing is sufficiently thick and heavy, is well prepared to resist the corrosive action of a damp atmosphere. For shipment abroad, ropes are usually coated with a black (plumbago) varnish; such a rope should be well treated with a lubricating dressing before being put to work, and this is a wise plan to adopt with all winding ropes.

#### ROPE DRESSINGS

Regarding the composition of a suitable dressing, there are several recipes put forward. Most manufacturers favor plumbago, or graphite mixed with vaseline, linseed oil, palm or other vegetable oil. Three riggers who gave evidence differed entirely on this point; one favored Stockholm tar with grease, a most objectionable compound; another favored a mixture of one part cylinder oil to two parts of truck grease, while the third was in the habit of using a patent composition.

Experience in Australia, in a Queensland colliery, showed cases where corrosion and breakage of a hoisting rope could be traced directly to the nature of the dressing used.

It should be pointed out that if a rope dressing is used which hardens on exposure to the atmosphere, care should be exercised to see that the pit-head sheave is kept cleaned out in the groove of the rim, as it has been proved by more than one accident that the winding rope can be thrown off the sheave by reason of ac-

cumulation of hardened lubricant in the tread.

A. McArthur Johnston, metallurgical chemist of the Consolidated Gold Fields of South Africa, Ltd., gave the following results of analyses of rope dressings:

Rope Dressing No. 1—Acidity equivalent to 0.19 per cent. sulphuric acid.

Rope Dressing No. 2—Acidity equivalent to 0.21 per cent. sulphuric acid.

Rope Dressing No. 3—Contains traces of alkalinity.

Rope Dressing No. 4—Acidity, traces (less than 0.01 per cent. sulphuric acid).

Rope Dressing No. 5—Acidity equivalent to 0.30 per cent. sulphuric acid (of this acidity, mineral acid accounts for 0.11 per cent. sulphuric acid). This preservative also contains finely divided graphite substance.

Rope Dressing No. 6—This would seem to be petroleum jelly (vaseline), flavored with a little nitro-benzene. It is free from mineral acids.

It is obviously desirable that rope dressings should be free from all acidity, and, from the quoted results of tests, it appears absolutely necessary that tests should be made from time to time by qualified persons to see that this freedom exists.

#### QUALITIES OF A GOOD ROPE DRESSING

A good rope dressing wards off corrosion and reduces frictional wear. It should be applied every fortnight in dry, or nearly dry, vertical shafts, but more frequently in inclined shafts on account of its getting rubbed off by friction sooner. In wet shafts the dressing should be applied weekly, or even oftener, if found to be necessary from the condition of the rope. The dressing should be applied hot to the cleaned rope by slowly passing the latter through a box containing the composition. J. M. Wright exhibited a model of a mechanical rope cleaning and oiling machine, but no opportunity offered to try the device under working conditions. A simple machine should certainly tend to secure the regular and thorough cleaning and dressing of the winding ropes. J. B. Pitchford states: "In order to make a proper examination of a rope, it is necessary to clean it properly and remove all the tar, etc., from the wires, leaving them as bright as possible. One method of doing this is to pass the rope through a trough of hot oil, which removes all the tar. The trough is made of steel, and can be from 15 to 30 ft. long. It is of U shape in section, and has a steam space of  $1\frac{1}{4}$  or  $1\frac{1}{2}$  in. around the bottom and sides. It is fitted with a relief valve and a drain, so that the condensation can be taken to the hot-well. The trough is filled with oil and heated, and the rope to be cleaned is passed slowly through it under depression pulleys by being wound from one rope drum to another. By providing two sets of rope-handling engines, the ropes can be passed back and forth, through the oil, till they are quite clean enough for examination."

## The American Mining Congress

EDITORIAL CORRESPONDENCE

The 10th annual session of the American Mining Congress was held at Joplin, Mo., Nov. 11-16. The meeting was well attended, both by the citizens of Joplin and by members and delegates from other places. If the number of visitors was not so large as expected, it may fairly be said that the deficiency in quantity was amply made up by the superiority of the quality. In the latter respect each meeting of the American Mining Congress shows a distinct gain. The organization has an extraordinarily great field of usefulness and it is gratifying to observe that its almost boundless possibilities toward the improvement of the general welfare of the mining industry are being recognized by the best men engaged in the latter. We were able to report this of the meeting at Denver last year and are glad to be able to report this year further progress in this respect.

The reception on the part of the people of Joplin was noteworthy for its warmth. By Joplin we mean here the Joplin district, the people of Galena, Webb City and Cartersville joining with those of the City of Joplin. Their hospitality was boundless, the interest which they showed in the transactions of the Congress was flattering, and the entertainments which they provided for the visitors were attractive. There has never been a meeting of the American Mining Congress at which the hosts have been so cordial or of which the guests will have so many fond remembrances.

The members and delegates who arrived early on Monday spent the day in visiting Galena, Kan. The convention was formally opened on Monday evening at which the usual addresses of welcome and responses were made. The chief speech of the evening was delivered by Governor Folk, of Missouri. The session was enlivened by songs by a chorus in miners' costume.

Among the entertainments provided by the citizens of the Joplin district were a reception at the Elk's Club, Tuesday evening, a smoker given by the Engineering Society of the Southwest, Wednesday evening, and a ball at the Elk's Club, Friday evening. On Saturday morning the visitors were shown some of the mines at Webb City and Cartersville and were entertained at luncheon at Webb City by the citizens of the twin towns. These social functions were uniformly enjoyable and displayed the solicitous care of the hosts that the visitors should have a good time. The Joplin Commercial Club was thrown open during the meeting as was also the Elk's Club.

There was an interesting exhibit of the ores and minerals of the district, and several private exhibits of machinery manu-

facturers. Visits to the various mines of the district were instructive as well as entertaining. In brief the people of Joplin threw open their doors to the members and delegates and if anything contributing to their comfort and enjoyment was left undone none of the visitors at least noticed any omission.

The serious work of the convention comprised the reports of committees, the passage of resolutions, and the reading of papers. W. R. Ingalls, chairman of the committee to draft a uniform law governing metalliferous mining and quarrying, reported progress. James D. Hague, chairman of the committee on the question of a side-line law vs. the law of the apex also (by letter) reported progress. H. Foster Bain, chairman of the committee to consider improvement in the laws governing coal mining in the various States, reported that it seemed impracticable to bring the States together for a consideration of this subject. Charles J. Downey, chairman of the committee for the purpose of devising and demonstrating methods of preventing fraudulent mining schemes, presented a long report, the basic idea of which is greater publicity to be exacted by law from promoters and corporations offering stock for sale, and greater caution on the part of the public in investigating before buying. A type of an adequate corporation law was presented in the report, and also a circular of advice to investors to be issued and circulated in the name of the American Mining Congress. This report was adopted.

H. S. Joseph, chairman of the committee to investigate the relations between miners and smelters, presented a report of the majority of that committee. This report recited with considerable detail the grievances of miners against the smelters, particularly against the American Smelting and Refining Company and called attention to the great improvement in conditions in districts, especially at Salt Lake City, where competition has developed. The great profits of the American Smelting and Refining Company were remarked as an evidence that the smelters receive more than their fair share in the treatment of the ore produced by the miners. The chief complaints of the miners were formulated as follows: Excessive deductions for losses in smelting and refining, and cost of selling products; arbitrary valuations of metals as the basis for settlement. Exorbitant smelting charges; arbitrary and unfair rules governing sampling and assaying. The committee admitted its inability to present conclusive opinions upon these and other points, the replies to its inquiries addressed to miners not having been sufficiently numerous, or its other sources of information sufficiently authoritative, but assuming that there was basis for some of the complaints, it suggested that they might be remedied by Government or State intervention, or by the producers of

ore entering into the smelting business on their own account. In the latter connection producers were advised to refrain from entering into long-time contracts with existing smelters. Finally it was recommended that a new and stronger committee be appointed to investigate the question further and report at the next session. A report signed by E. A. Colburn was also presented. After some discussion the latter was laid on the table and the report presented by Mr. Joseph was adopted with an amendment as to the constitution of the new committee.

In later issues we shall report more fully and discuss the reports of Mr. Downey and Mr. Joseph, which the limitations of space do not permit this week.

Among the new resolutions adopted at the Congress, the more important included one that a tariff should be imposed on zinc ore; one calling for a revision of the public-land laws; one that the conditions governing the exploitation of oil and gas lands in Oklahoma should be improved by action of Congress respecting the Indian ownership; and one that the Federal Congress should at its next session provide for the organization of a national bureau of mines with a very broad scope. The last was by all means the most important action of the meeting. The resolution was the result of a visit of Judge J. H. Richards to Washington, where he had conferences with the President, with the Secretary of the Interior, and with members of Congress. He (Judge Richards) announced in his address, Wednesday evening, that the President had stated that he would recommend in his next annual message the organization of a bureau of mines and asked if the American Mining Congress would be satisfied with that, to which Judge Richards replied in the affirmative. The matter was also discussed with Secretary Garfield, who promised cooperation and wrote a long letter outlining his views, which was read at Joplin. It is confidently expected as the result of these developments that the Federal Congress will at its next session pass a law providing for a bureau of mines.

The tenth meeting of the American Mining Congress was particularly noteworthy for the high character of the industrial and commercial papers that were presented. Those that were read were as follows: Erasmus Haworth, "Prospecting for Gas and Petroleum," including a discussion of the origin and manner of occurrence of these fuels. Dr. E. R. Buckley, "Lead and Zinc Mining in the Ozark Region," which was illustrated by lantern slides and is a particularly valuable technical contribution, displaying careful geological investigation, keen observation, and a thorough understanding of the conditions. S. Duffield Mitchell, "Tariff on Zinc Ores," arguing that a duty should be explicitly placed on their importation. Waldmar Lindgren, "Will the



Production of Gold in the World Keep Pace with the Increasing Demands of Commerce and Trade?" E. W. Parker, "How long will the Supply of Coal Meet the Increasing Demands of Commerce and Trade?" E. G. Acheson, "The Deflocculation of Non-Metallic Amorphous Bodies." J. A. Holmes, "The Waste of the Nation's Resources." Victor C. Alderson, "The Scope and Present Status of Mining Engineering Education in the United States." H. H. Stock, "The Value of Correspondence Instruction to the Mining Man." George Otis Smith, "The Relations of the United States Geological Survey to the Mining Industry." H. J. Cantwell, "The Importance of the Mining Industry to the Industrial and Commercial Life of the Nation." L. D. Huntoon "The Royalty System." James Douglas, "A Remedy for the Law of the Apex." These names and titles sufficiently indicate the high class and great value of the papers. An important paper by James W. Malcolmson, on "The History of Gold and Silver" was not read, but will be published in the JOURNAL, as will also some of the other papers mentioned above.

The choice of the next meeting place of the American Mining Congress developed a hot fight, which was won by Columbus, Ohio, chiefly on the ground that it was advisable for the Congress to go East in order to broaden its scope and become really a national organization.

### Steel in Great Britain

The production of steel ingots in Great Britain, as reported by the British Iron Trade Association for the half-year ended June 30, shows the following division as to processes used:

	Acid.		Basic.		Total
	Tons.	Per Ct.	Tons.	Per Ct.	Tons.
Open-hearth	1,682,019	49.4	655,775	19.2	2,337,794
Bessemer...	762,193	22.4	306,779	9.0	1,068,972
Total	2,444,212	71.8	962,554	28.2	3,406,766
Total, 1906.	2,273,505	73.0	842,968	27.0	3,116,473

The increase in open-hearth steel over 1906 was 140,941 tons, and in bessemer, 149,352; open-hearth ingots forming 68.6 per cent. of the total of this year and bessemer 31.4, against 70.5 and 29.5 per cent., respectively, last year. The proportion of basic steel showed a slight gain in 1907.

The total number of open-hearth furnaces in operation in the first half of 1907 was 392, against 375 in the first half of 1906. The average number of bessemer converters in operation was 57, of which 35 $\frac{3}{4}$  were acid and 21 $\frac{1}{4}$  basic.

Marquette charcoal blast furnace of the Cleveland Cliffs Iron Company, has made a record of 4 $\frac{1}{2}$  years of continuous operation. More remarkable still is the record of Gladstone furnace of this company, which has been in continuous operation six years and seven months. The average campaign of a Lake Superior charcoal furnace is about two years.

### A Remedy for the Law of the Apex.\*

BY JAMES DOUGLAS†

While there may be difference of opinion as to the wisdom of amending the existing mining law, known as the Law of the Apex, by reason of the fact that court decisions have settled so many of its ambiguous features, and that its provisions have been applied, and rights under it secured over so large an area as the United States, few people would be found to defend the law on its own merits, and fewer still, if the law did not stand on the statute books, would frame or vote for the passage of such a law today. It was based on false geological assumptions, and has retarded mining in many districts. Apart from its baneful effects in this respect, it has been the cause of bitter ill-feeling among neighbors, and has created a widespread feeling of hostility where there should have been cooperation, self-help and mutual aid and counsel.

The remedy for neighbors who do not wish to avail themselves of their rights under the apex law is a contract to apply to their surface the common-law rule; and abolish, so far as their adjacent property is concerned, their rights under the law of 1873. In 1881 Wm. E. Church, of the Detroit Copper Mining Company, whose operating headquarters were at Morenci, near Clifton, Arizona, made an arrangement with Freudenthauer & Lezinsky, who owned the Longfellow and a number of other claims in the Clifton district, to abolish the apex law as applied to their claims, and to confine their operations in depth within the end and side lines carried down vertically. In 1882 Freudenthauer & Lezinsky sold their property to the Arizona Copper Company. The arrangement had worked so well that the Arizona Copper Company was willing to make a similar contract with the Detroit Copper Mining Company. As a result, during the 26 years that have intervened between the first contract and today there has been no litigation in the Clifton District growing out of the law of the apex. A number of other companies have since then begun operations in the district. I am not aware whether or not similar contracts have been made among them, but a spirit of friendliness instead of distrust pervades the whole corporate mining community of that district, which may or may not have been brought about by the action of the two most prominent mining companies.

In the still more productive Warren district of southern Arizona, whose center is the town of Bisbee, the Copper Queen was for many years the only company working actively, or producing much copper; but

when the Calumet & Arizona Company acquired property and became an important factor in the copper production of the Southwest, the same spirit possessed the companies, and the method of avoiding litigation growing out of the direction in which orebodies extended, was adopted. In the Warren district the profitable ore as yet discovered and developed is confined to beds of limestone of the Carboniferous age, whose thickness is about 400 ft., and which have a southerly dip. Probably under the ruling in the famous Eureka-Richmond case, the Copper Queen, which has worked continuously from a marvellously rich outcrop, exposed in 1880, along the dip of the ore-bearing strata of limestone to a distance of over a mile from its outcrop to a depth of 1200 ft. below the surface, might have fought, with a reasonable expectation of winning, for all ore on the dip. But the result of litigation would have been curtailment, if not stoppage of work, by injunction, paralysis of the whole district, bitter feeling and the transfer of profits, and perhaps of capital, to the legal profession instead of the owners. And therefore the Copper Queen Company, guided by the success of the experiment in the Clifton district, was quite willing to follow the same procedure and make side-and-end-line agreements with the neighboring companies.

The wonderful development of mining in the district has unquestionably been brought out through this liberal policy, for not only has litigation and its consequent bitterness of feeling been eliminated, but the underground development has progressed more rapidly than in proportion to the number of companies engaged in exploration, inasmuch as any discovery made by any one of the companies, instead of being concealed, is loyally published to the others, and the neighbor is thus directed to the point where he should with most probability of success find ore. This benefit has been felt to the utmost advantage in the Warren district, where the orebodies appear to be eccentrically distributed within the area of the limestone above referred to. So loyally do the companies live up to the spirit as well as the letter of the mutual engagements, that when one of the companies works up in ore to the side-line of his neighbor and his neighbor's ground slides across the line into his own—an event which not seldom happens in ground so soft and shifting—no question has arisen as to the right of the original owner of the ground either to remove it from the adjacent claim which he does not own, or to receive its full value from the owner of the claim on to which it has slid. From every point of view, therefore, I believe the companies of both districts have benefited and undoubtedly the population at large of both have prospered; and the whole of southern Arizona has advanced with rapid strides through this abolition

\*Paper read before the American Mining Congress, November, 1907.

†President Copper Queen Consolidated Mining Company, New York.

of the Law of the Apex and the voluntary adoption of the common-law rule.

Under the old Spanish mining law, as applied to their American colonies, the ownership of the mineral in depth beneath the actual surface of the claim is vested in the possessor of the surface, but if he were negligent and tardy, and his neighbor reached the ore in depth below his surface before he did, that neighbor might extract the ore, accounting to the owner for a certain share in the profits. In that way the Spanish Government, which depended for revenue on the export duty on minerals, protected itself against the absorption of unused mining property by unproductive owners; but the eagerness with which we push forward toward every indication of ore, and the haste which we are in to extract it, supply sufficient remedy against so remote an evil.

As I have already remarked, except by voluntary contract such as above described, one can see no means of radically amending the mischievous workings of the Law of the Apex; but this remedy is available to all neighboring mine owners who wish to act in a neighborly manner and forego a possible advantage, which may be secured after great loss of money and temper, for an assured benefit.

### Calcium Cyanamid in the United States

The American Cyanamid Company, 100 Broadway, New York, announces its intention to build a plant for the manufacture of calcium cyanamid at Muscle Shoals on the Tennessee river in northern Alabama. The initial capacity will be 40,000 tons per annum.

Calcium cyanamid or "lime-nitrogen" is an electro-chemical product formed according to the Frank and Caro process by the action of an electric current upon lime and coke. It is valuable as a source of nitrogenous compounds, its chief use being as a fertilizer as a substitute for Chilean niter, but it may also serve as a basis for the manufacture of ammonia and ammonium salts, sodium and potassium cyanides and various other compounds.

The Società Generale per la Cianamide of Rome, Italy, holds all patents covering the manufacture and use of the product, and has had an experimental plant in operation for the past three years. Licenses for the manufacture of calcium cyanamid have been sold in all civilized countries, and plants with capacities of 40,000 and 50,000 tons per annum are projected in Europe. The product is expected to be especially valuable as a fertilizer in combination with prepared phosphate rock.

The tonnages indicated in the last column represent initial capacities; the ultimate capacities will be about twice the amounts shown. The plant at Piana d'Orta is now in operation producing at the rate of 4000 tons; the others will begin about Jan. 1, 1908, or within a few months of that time.

### What Yukon Miners Want

SPECIAL CORRESPONDENCE

Dr. Alfred Thompson, representative of the Canadian Yukon in the Dominion House of Commons, will endeavor to obtain at the ensuing session of Parliament a number of concessions desired by those engaged in mining in Yukon Territory. He will continue his fight against the collection by the Government of a royalty on gold recovered, contending that this impost is a burden from which prospectors and miners should be relieved. A lower schedule of fees will also be asked for, the official charges in the Canadian Yukon of \$10 to \$13 for making certain records being considered illiberal in comparison with fees of \$1 and \$2 in Alaska for filing of each instrument. A cash bonus will be sought for the erection of a copper smelter at Whitehorse, southern Yukon, where several copper mines are being opened, which find ore transportation charges to outside smelters almost prohibitory to profitable production. Further subsidies for the encouragement of the prospecting of new placer and quartz fields will also be asked for, while the necessity for establishing a gold purchasing office at Dawson whenever preparations for minting gold at Ottawa shall be forward enough

to warrant this step, will be represented. Additional mail facilities, wireless telegraphy, reduction in money-order charges, local examinations for land surveyors, appointment of a pure-food commissioner, and other needs will be urged upon the Government as well.

### The Alaska-Yukon Boundary

SPECIAL CORRESPONDENCE

It is stated that as a result of the work of the international boundary survey parties representing the United States and Canada, respectively, a strip of territory 600 ft. wide and several hundred miles long, heretofore regarded as part of the Canadian Yukon, has been shown to belong to the United States. The line of demarcation in the north is the 141st meridian, starting from the coast at Mt. St. Elias and crossing the Yukon river at a point about 90 miles below Dawson. The previous location of the line was under the direction of Wm. Ogilvie, a Canadian official, who in 1908 did this work, but accuracy was not then possible. The completion of the telegraph line through the district has facilitated the exact determination of the line, which, as jointly determined by the survey parties, transfers to the United States the strip of land alluded to. During the field-work season of 1907 the line was determined and a topographical survey made of the country four miles on each side of it, for a distance of about 125 miles south from the Yukon river. It is estimated that it will take three years to complete the work to Mt. St. Elias, after which the delimitation of the line northward from the Yukon river will be undertaken and carried as far as possible for men to proceed with it.

### Mine Labor in California

SPECIAL CORRESPONDENCE

In the past month there has been a great change in the labor situation at California mines. Since the closing down of work at the mine and in the smelter at Coram, in Shasta county, and the shutting down of several large sawmills in the same county, some hundreds of men have been thrown out of employment and are seeking work at the mines and smelting plants. Only a few months ago men were quite scarce and were being advertised for. And now comes a report that the Mountain Copper Company will close down its plant at Keswick, started up not long since, and 200 or 300 more men will be out of work. It was expected that this plant would continue work all winter despite the financial depression.

CYANAMID WORKS IN COURSE OF CONSTRUCTION IN EUROPE.

Name of Company.	Location of Works.	Annual Capacity in Tons.
Northwestern Cyanamid Company of London.....	Odde, Norway.....	13,750
Ostdeutsche Kalkstickstoffwerke vom Berlin.....	Muhlthal, Prussia.....	3,300
Société Suisse Probera Azotati.....	Martigny, Switzerland.....	4,400
Société Française Pour Produits Azotati de Paris.....	{ Notre Dame de Brianon, Savoy, France.....	13,200
Cyanid Gesellschaft vom Berlin.....	Trosberg, Bavaria.....	16,500
Società Italiana pel Carburato di Calcio di Roma.....	Callestati, Italy.....	13,750
Società Italiana pel Carburato di Calcio di Roma.....	Sebenico, Dalmatia, Austria.....	27,500
Società Italiana pel Carburato di Calcio di Roma.....	Almissa, Dalmatia.....	50,000
San Marcel Compagnia.....	Italy.....	8,250
Società Italiana per la Fabricazione di Prodotti Azotati di Roma.....	Piana d'Orta, Italy.....	11,550
Società Italiana per la Fabricazione di Prodotti Azotati di Roma.....	Flume, Dalmatia.....	4,400



## Mining and Labor in the Transvaal

SPECIAL CORRESPONDENCE

The re-patriation of the Chinese as their contracts fall due is being carried out. Those coolies who have been fortunate enough to get together fair sums of money, either by hard work or through gambling, are eager to get back to China, while the majority of coolies who have not saved up much money, because they considered they would be allowed to sign on again, are not at all anxious to leave the Rand. So far no trouble is being experienced in getting sufficient Kafirs to replace the coolies. Just now a very satisfactory class of Kafirs is coming to the mines. From all appearances there will be no difficulty in getting sufficient labor this year.

But the labor trouble will surely arise later on, when all the Chinese are sent away. The Kafirs are coming to work just now because most of their crops have been destroyed by locusts. In the lean years they come to the mines for employment, but when the crops are plentiful there is no necessity for them to work, and the mines suffer from a dearth of labor. After all the Chinese leave the Transvaal, it is probably that the mining industry will fall back to the position held just before the arrival of the coolies; many of the mills will be able to run only half time, and the development work in the mines will fall behind.

Mr. Taberer, the recently appointed director of the government native labor bureau, has been on a mission to Basutoland, to see what the prospects are of getting Basutos for the gold mines of the Rand. The Basutos are growing more independent every day, and told Mr. Taberer that the Rand was not very attractive, and that they did not care to sign on for more than three or four months at a time. They much prefer the diamond mines of Cape Colony and the Transvaal, to the gold mines. It is not likely, therefore, that we will get many Kafirs from Basutoland for the mines of the Rand.

There is always a certain amount of anxiety this time of the year about water for the mines. If the rains are late the dams get very low, and sometimes the mills are hung up for want of water. This year, however, we need not worry about water, for the rains have come early, and have filled most of the dams. It looks as if the season will be a wet one.

The outlook for the unemployed whites is somewhat brighter. Not only has the Government made a bold move in deciding to place some of the unemployed on the new tinfields, north of Pretoria, to work them as a government concern, but the municipality of Johannesburg has started over

500 of the out-of-works on road making, and excavating for the new sewerage scheme. The pay is small, about \$1.25 per day, but so hard pressed are the men that they are pleased to accept work even at this rate.

Cables have been sent to Canada and Australia asking if there are any openings in these countries for the men who have been thrown out of employment by the late strike. The reply from Canada was unfavorable, while from Australia the news came that there was an opening for good miners in that country, but the men would have to pay their own passage. As most of the unemployed are penniless, there is not much hope of their reaching Australia.

The distress in Johannesburg today among the unemployed is probably as great as in any part of the world. Men who a few years ago were in lucrative positions now find themselves in straitened circumstances. Mine managers, surveyors, assayers, etc., have for weeks and months looked for positions without success.

But this experience has done the community some good. It has taught people the lesson of frugality. In the past the white people of the Rand have been accustomed to live extravagantly in many ways, and have not recognized the necessity of saving anything. In the present hard times they are finding that expenses can be reduced and economy practiced in many ways. It is not a pleasant lesson, but a useful one in many ways.

## Duty on Vanadium Ore

In the matter of a consignment of vanadium ore which had been assessed for duty at 20 per cent. *ad valorem* under paragraph 183 of the tariff act as a metallic mineral substance in a crude state, the Board of General Appraisers has given the following decision:

"We find that this ore is a mineral substance in which metals are not present in a metallic state. A chemical analysis of the mineral indicates the presence of traces of various metals and an appreciable percentage of vanadium. No metals are in this ore as metals or in a free state. They are in chemical combination with all the other elements which go to make up the mineral in question, and the evidence is to the effect that an elaborate chemical process is necessary to extract or isolate such contained metal. We are of the opinion that vanadium ore is not a metallic mineral substance within the ruling of this board as to tungsten ore. The merchandise would thus appear to be entitled to free entry as claimed under paragraph 614, as a crude mineral, not advanced in value of condition by refining or grinding or by any other process of manufacture, and we so hold."

## Gold Robbers in the Yukon Territory

SPECIAL CORRESPONDENCE

The mystery of the disappearance of Tanana gold to the value of \$40,000 included in the registered mail delivered at the post office Dawson, Yukon Territory, on July 29, last, appears to have been solved. Several of the robbers have been arrested, but not much of the gold has been recovered. The head foreman of the public works department at Dawson is believed to have stolen the gold from the post office, where he worked in the Government service, and then with the assistance of confederates, carried it away and either sold it gradually to local banks or arranged with persons going to Seattle to take part of it with them for sale there, practically all of the Alaska and Yukon gold being eventually received at the United States assay office in that city. The chief robber was arrested on a steamer after he had left Dawson. While being taken back he seems to have committed suicide, for a phial containing a poisonous drug was found in the bunk in which his dead body was found. Further sensational developments are expected and it is stated that further arrests, of both women and men, will be made in connection with this big robbery.

## Tin Mining in the Erzgebirge

The revival of tin mining in the Erzgebirge is reported in the *Montan-Zeitung* (Sept. 15, 1907). Operations have been carried on since early in the present year by the Schurf company in abandoned workings on the ridge of the Erzgebirge at Frühbuss near Neudek. During the seventeenth century tin ore was extracted by open-cut mining. The Schurf company, in exploring the old workings, recently sank a main shaft 23 m. deep and began drifting. One drift cut through five tin streaks, some nearly a half meter thick. The veins carry beautifully crystallized tin-stone and assays are satisfactory.

Even better results were secured in the old workings at Hirscheustand. Here the abandoned galleries were more than 1000 m. in extent and in good condition, and were quickly reopened for about 500 m. These galleries are so disposed as to be of considerable use in draining upper workings; the installation of a pumping plant is not necessary. The veins here range in thickness from a half to more than three meters. It is intended to begin active production early in 1907. For the past 65 years the deposits were controlled by Baron Kleis, but exploitation was abandoned on account of the low price of tin.

# Montana's Great Coalfields and Its Collieries

The Coal Areas Are More Extensive Than Those of Any Other State, but the Production Does Not Satisfy the Local Demand

BY FLOYD W. PARSONS

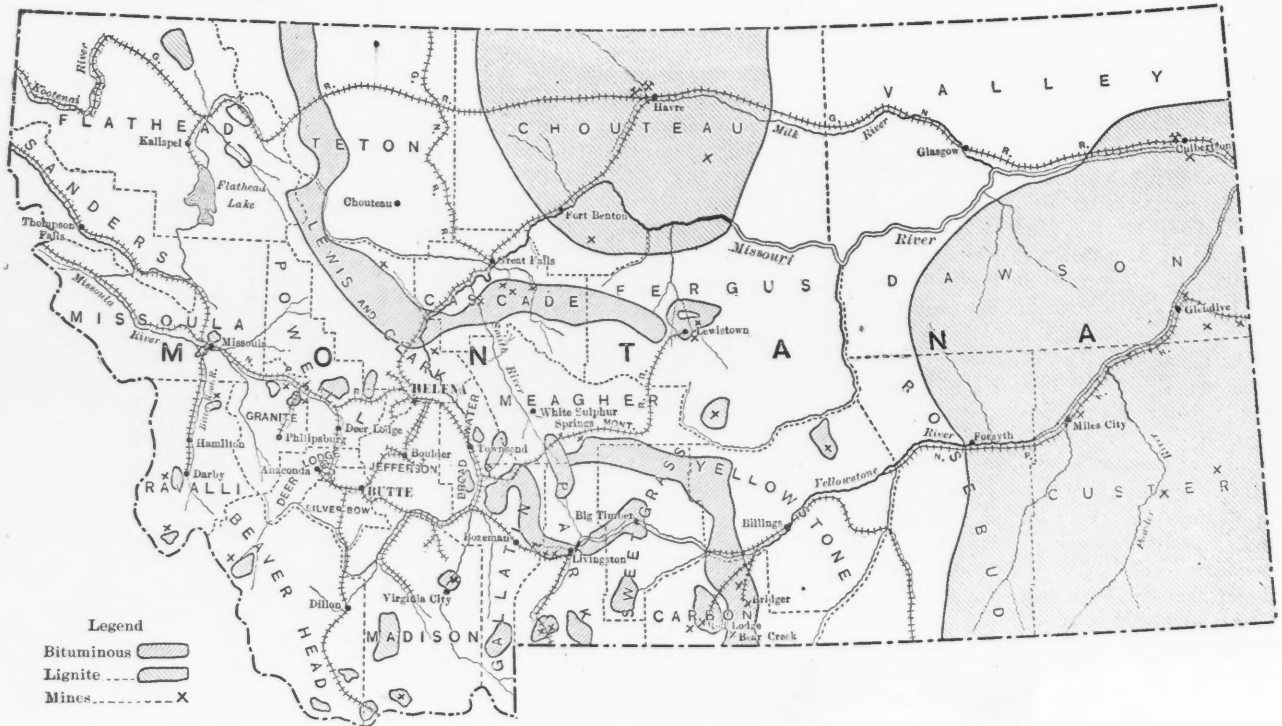
In the Sheridan district of Wyoming, the only producers of coal besides the Sheridan Coal Company, are the Carney Coal Company at Carneyville, and the Wyoming Coal Mining Company at Monarch. The Carney company is working in the No. 3 seam which varies in thickness from 6 to 19 ft. There is electric haulage and fan ventilation. The mines are dry and non-gaseous. The coal, although clean, is an inferior steam and domestic fuel, being high in moisture and low in fixed carbon. The company employs 300 men and seems to have no diffi-

culty in securing miners. The No. 4 seam lying just below the No. 3 bed is worked here. The coal in some places is 28 ft. thick and has few partings. Conditions as to labor and car supply are similar to those existing at Carneyville. The plants of the Carney and Wyoming companies are shown in the accompanying illustrations.

### IMMENSE COAL AREAS IN THE WEST

The State of Montana contains 47,200 square miles of coal lands, while Texas, which contains the second largest area has

with a coal are of 140 square miles. The figures here given will no doubt be a surprise to many who have never realized that Pennsylvania with its enormous output contains less than one-third the coal included within the boundaries of Montana. It is of course true that the character and quality of the coal contained in the seams of the two States cannot be compared, for much of the fuel of Montana is of an inferior quality, often grading into the lower forms of lignite, while in many places the seams are not commercially valuable. The fact remains, how-



MAP SHOWING COAL AND LIGNITE AREAS IN MONTANA

ty in securing miners. When the new tippie that has just been completed is put in operation, it is expected that the production will be more than 3000 tons daily. The method of mining employed is the room-and-pillar system, the rooms being driven 26 ft. wide and 300 ft. long.

The car supply from Nov. 6, 1906, to Sept. 19, 1907, could not have been better. Since the latter date, however, the company has been permitted to ship but little coal over the Northern Pacific, which road supplies the cars. The markets for Carney coal are in Washington, Montana, South Dakota and Nebraska.

The Wyoming Coal Mining Company's mines and plant are similar to those of

41,300 square miles of undeveloped coal. The other important States arranged in the order of their coal areas are: Illinois, 35,600 square miles; North Dakota, 35,500; Missouri, 23,000; Iowa, 20,000; Kansas, 20,000; Wyoming, 19,900; West Virginia, 17,000; Kentucky, 16,670; Indian Territory, 14,850; Pennsylvania, 14,680; New Mexico, 13,500; Ohio, 12,660; Colorado, 11,600; Michigan, 11,300; and Alabama, 8,430 square miles.

The remaining States and Territories arranged according to their coal areas are: Alaska, Indiana, Utah, Tennessee, South Dakota, Virginia, Arkansas, Washington, North Carolina, Maryland, California, Oregon, Georgia, and lastly, Idaho

ever, that the coal seams in these Northwestern States have hardly been touched, and when the railroad and labor problems have been better solved, those regions now facing a coal famine will not only be able to supply their own demands, but will be in a position to ship coal to adjacent territory.

It is at present impossible to determine the exact extent and commercial value of these northwestern coalfields. In North Dakota, which contains an extremely large coal territory, the fuel so far as present knowledge determines is wholly lignite and of comparatively little value. On the other hand, the extent of some of the coalfields is largely hypothetical, as in



the case of Washington, where the present estimate of 1100 square miles is undoubtedly far below the actual extent of the fields. Although Washington has been carefully explored, the peculiar conditions which prevail on the west slope of the Cascade range make it practically impossible to settle the question at the present time. The surface is deeply covered by glacial drift and vegetation, and it is only where great streams have cut deep ravines through this drift that the coal beds are exposed. For this reason it is probable that they are present in some of the covered areas, which question will not be settled until the State has been more carefully prospected.

The known coalfields of Alaska which at present have practically the same area as the bituminous field of Alabama, will probably be greatly enlarged when future exploration has taken place. The few

is mined in the Rocky mountain region. Although there are 35 or 40 producing properties in the State, the greater part of the tonnage is taken from ten of the larger mines. Most of the seams are horizontal and were probably laid down in shallow fresh or brackish water. The material forming the lignite grew during the later Cretaceous period and the deposits lie mostly in the Laramie formation. Although the State of Montana has not been thoroughly exploited geologically, enough work has been done to show the outlines or limits of the principal coal areas: The Bull Mountain field lying in Yellowstone county, 45 miles northeast of Billings, is the most isolated district in the State. This field contains about 55 square miles, but has not been largely developed because of a lack of railroad facilities. The best beds are found in the Fort Union formation and

tract. The coal is semi-bituminous in character.

The Yellowstone field lies principally in Gallatin and Park counties and is 30 miles in length and from 5 to 18 miles in breadth. This district lies directly on the route of the Northern Pacific Railroad, and because of this proximity has received much attention. The coal varies from a coking variety at Cokedale and Storrs to a dry steam coal at Timberline and farther west.

The Trail Creek field, situated 10 miles south of Bozeman, contains a seam of semi-bituminous coal varying in thickness from 5 to 11 ft. A branch of the Northern Pacific Railroad connects this field with the main line at Mountain Side.

The Cinnabar field, located in the southern end of Park county, contains one of the best grades of coal in the State, but the district is isolated and at present un-



TIPPLE AT MONARCH NO. 1 MINE, MONARCH, WYOMING

areas of anthracite coal that have been found in the Western States and Alaska, are generally the direct result of volcanic activity and consequently are limited in extent. Colorado contains anthracite coal in Gunnison county and in the Yampa coalfields of Routt county. These same coal beds, only a short distance away, are bituminous in character, showing that the anthracite in this field is principally due to igneous intrusions which have baked the coal and driven off its volatile matter. The largest anthracite field outside of Pennsylvania occurs near Controller Bay in Alaska. The change in the character of the coal in this district is said to be due more to the intense folding to which the rocks have been subjected, than to volcanic activity.

#### COAL RESOURCES OF MONTANA

Montana at present produces about 18 per cent. of all the coal and lignite that

the character of the coal is lignitic-bituminous.

The Clarks Fork field is at present the district of greatest activity. The coal seams here contained extend through Meagher, Sweetgrass, Yellowstone and Carbon counties. The continuation of this field south from Bear creek into Wyoming forms the Big Horn Basin field of that State. The coal seams of the southern part of the Clarks Fork field vary from 5 to 7 ft. in thickness. The Butte and Anaconda smelting works consume a large amount of the coal mined in this district.

Rocky Fork is one of the smallest but most important fields in the State. It is located in Carbon county only a few miles from the Clarks Fork field and contains several good seams varying from 4 to 8 ft. thick. The Red Lodge property owned by the Northern Pacific Railway Company is the principal operator in this dis-

important. The West Gallatin field is located in the southwestern part of Gallatin county, and due to its limited area and inaccessibility has not been exploited. The Toston field located three miles from the town of Toston on the Northern Pacific, and the Ruby Valley district, situated 30 miles west of the Gallatin field, have no mines of particular value or large output.

The largest field in the State is known as the Belt or Great Falls district and runs through Teton, Lewis & Clark, Cascade and Fergus counties. The coal is not only acceptable for steam purposes, but it can be coked. The largest part of the output goes to the Great Northern Railway. The Belt mine is owned by the Anaconda Copper Mining Company, and produces 550 tons daily. In addition, the Great Northern mines ship 300 tons to Butte and Anaconda and from 200 to 250 tons to the Great Falls smelting works.

One independent operator in this district produces 100 tons a day, which is used for commercial purposes at Great Falls.

Other coal areas in Montana are the Flathead field in the county of that name; the Sweetgrass Hills field in Chouteau county, the Judith Basin field in Fergus county and the Smith River district lying along the high divide east of the South river. Up to the present time these districts have not shown any material development.

#### MONTANA'S FUEL FAMINE

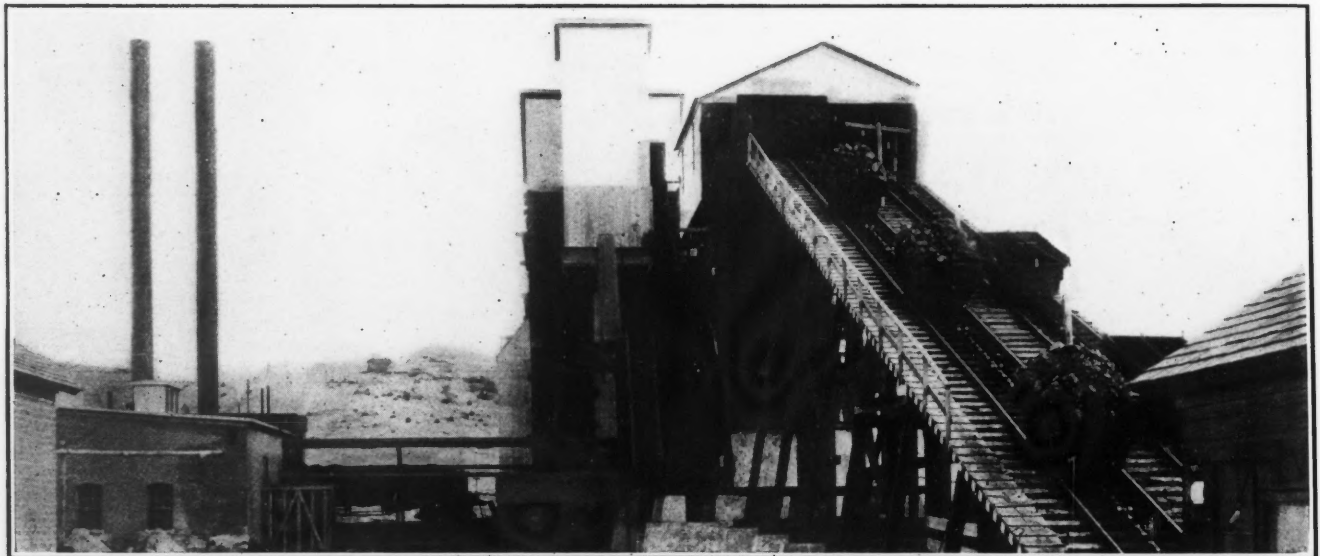
The scarcity of fuel in Montana during the past winter was so acute in some districts that it caused considerable suffering. Besides the output from local mines, coal to the amount of about 1,500,000 tons was imported during the year. These importations were principally from Canada and southern Wyoming. A considerable tonnage was also brought in

than anything else. The great curtailment in the mining industry now permits the product formerly used at the smelters and power plants to be employed for domestic and commercial purposes. One other item that must be considered as favoring better transportation for coal is the smaller grain crop, which will require fewer cars to transport it.

#### RECENT LEGISLATION

The largest mines in Wyoming, Montana and Utah are either owned or controlled by the various great railway systems. Although I have not yet compiled exact tonnage figures, I believe that 60 per cent. of the output of the Northwestern States is produced by companies controlled by these railroads. What policy they intend to pursue next year when the recent enactments prompted by the Interstate Commerce Commission become active laws, it is at present impossible to

Wyoming, has already declared that it will use its entire production to supply fuel for its locomotives. As the company is now purchasing coal from foreign companies, this statement is not idle talk. The railroad can easily utilize the entire output in the locomotives of its various systems. The Utah Fuel Company, which is controlled by the Denver & Rio Grande Railway Company, disposes of the larger part of the output to local consumers for domestic and steam purposes. This company has been offered \$1 per ton more for its coal by consumers outside of Utah, than the local trade has been paying. It has, however, been shipping only approximately 15 per cent. of its coal output to neighboring States. This same company, however, has been shipping 350 tons of coke daily to Anaconda, and this business will not be possible unless some reorganization is made. Should the various railroad companies decide as the Union Paci-



CARNEY NO. 1 COAL TIPPLE, SHOWING METHOD OF HOISTING LOADS FROM THE SLOPE

over the Burlington Railway and distributed in the towns along the lines of this system. In North Dakota, where the coal famine was also severe, it is reported that prominent citizens wired their governor asking him to consider the advisability of using the State militia to force the railways to transport coal.

The railroads traversing the State of Montana have added largely to the number of cars and engines employed on their systems and could come nearer to affording satisfactory transportation for the coal output if the Eastern roads would endeavor to make prompt returns of Western cars. Although the traffic congestion is acute in many places it is probable that conditions will generally be much better than last winter. Climatic conditions and the great prosperity enjoyed by the various mining and smelting companies during the winter were more directly responsible for the fuel shortage

foretell. That this law is sweeping in its character and will be difficult to evade is evident from a perusal of the following brief extract:

"From and after May 1, 1908, it shall be unlawful for any railroad company to transport from any State, Territory, or the District of Columbia, to any other State, Territory, or the District of Columbia, or to any foreign country, any article or commodity, other than timber and the manufactured products thereof, manufactured, mined, or produced by it, or under its authority, or which it may own in whole, or in part, or in which it may have any interest direct or indirect except such articles or commodities as may be necessary and intended for its use in the conduct of its business as a common carrier." Approved June 29, 1906.

The Union Pacific Railway Company, which operates large mines in southern

Wyoming is already reported to have done, to use the coal output of their mines for their own and local uses, it is difficult to tell what serious and aggravated conditions may arise.

If the railroads affected by this new legislation, have decided on the course they will pursue, their intention, even at this late date, is known only to themselves. There is no doubt that many interesting problems will arise. Should the railroads sell their coal to jobbers in their own State, it is a question whether the latter could in turn ship the coal to consumers in other States.

#### ECONOMICS OF COAL MINING IN THE NORTHWEST

Thousands of acres of coal lands in Montana, Wyoming and Utah, are held by independent companies who hesitate to commence development work for fear that the railroads will not furnish them



cars. Their fears are no doubt well grounded, for the roads are certain to supply their own needs first, and frequently they find even this difficult.

In a recent visit to the mines owned by one large Western railroad, a train of empty cars was pulled into the camp, 30 miles from the main line. The following systems were represented in this one trip: Wabash; Pennsylvania (latest steel open coal cars); New York Central; Chicago, Milwaukee & St. Paul; Colorado Midland; Union Pacific; Toledo, St. Louis & Western; Burlington; Hocking Valley; Fort Smith & Western; Baltimore & Ohio; St. Louis & Southwestern; Chicago & Eastern Illinois; and Chicago & Northwestern. These cars were less than 1000 miles from the Pacific coast, and some

mines are working full time. Is it not reasonable then for holders of coal lands to fear to undertake development? The railroad companies do not fear the competition, nor any over production, for the Western market could easily consume in addition, the output from many new mines without reducing prices. It is simply a case of utter inability on the part of the roads to handle the traffic demanded.

In Goldfield, Nev., last winter, coal sold for \$70 a ton, and \$40 was charged for a cord of wood. The stringency was so acute that all the sage brush within miles of the town was torn up and burned as fuel. What they will do this winter is hard to predict, and conditions in Nevada are not going to be much improved.

far West is double what it is in Pennsylvania or West Virginia. On the other hand, Montana coal sells in Butte for from \$5 to \$6 per ton, while southern Wyoming coal brings \$5, f.o.b. cars in this same market and retails for \$7 per ton. The market at Portland, Ore., is supplied principally by Oregon and Washington mines, the coal bringing from \$5 to \$7.50 per ton. Considerable Australian coal is also used in this market, being brought over in ships from New South Wales as ballast. The coal from Rock Springs, Wyo. (Union Pacific mines), brings about \$10 per ton in Washington. The Rock Springs coal is the best fuel produced in the West and is in demand as far East as Kansas and Nebraska, where consumers would rather pay \$7 per ton for this coal than \$3.50 and \$4 for the inferior Iowa and Missouri coals. The West has the coal, and when there is sufficient certainty of adequate transportation, the required number of mines will be opened, and the question of a fuel supply will be solved.



STYLE OF COMPANY HOUSES OCCUPIED BY MINERS AT CARNEY-VILLE, WYOMING



TOWN OF CARNEY-VILLE, WYOMING

### Centennial of Anthracite

Announcement that the one hundredth anniversary of the first burning of anthracite coal in a grate will be celebrated at Wilkes-Barre, Penn., on Feb. 11, 1908, by the Wyoming Historical and Geological Society of Wilkes-Barre, which at the same time will celebrate the fiftieth anniversary of its organization.

Coal was first burned by Judge Jesse Fell, of that city, in a grate at the old Fell tavern on the night of Feb. 11, 1808. Up to that time the coal, called generally stone coal, owing to its hardness, had no commercial value. People of those times said it would not burn sufficiently to make it of any service, but Judge Fell believed it would. He built a simple grate of iron bars and in the presence of some of the prominent men of that city made the experiment. It was a bitterly cold winter night with a high wind blowing and there was a fine draft up the big chimney. It was not long before the coal glowed and gave forth a comfortable heat. News of the experiment spread quickly, people built grates in their homes and dug in the outcroppings for the new fuel and in a short time the commercial value of it was recognized and it began to be an article of trade.

In the Missouri coalfield numerous irregular isolated deposits of coal are found near outcrops. These deposits are very often of great thickness (as much as 80 ft.), compared with the thickness of the bed in which they occur. They seem to be remnants of previous measures which have been removed by erosion. The coal of these deposits is generally of poor quality resembling lignite. In its characteristics and appearance, it often approaches the quality of cannel coal.

of them were 3000 miles from home. The superintendent of the company whose attention I called to the assortment of cars, laughed and said, "When do you think they will get home?" Many of the cars had probably come West loaded with machinery and merchandise and would soon be resting on a siding loaded with coal, and not necessarily headed toward the Atlantic seaboard.

Why the railroads in the West discriminate against independent shippers, is therefore not hard to determine; they are merely following the rather selfish, but universal law of self-preservation. In at least a half dozen instances I can point at present to small companies whose output is limited by the car supply, while only a few miles distant, the railroad

Roughly estimated, the cost of mining a ton of coal in this western country is as follows:

#### COST OF PRODUCING COAL IN THE WEST.

Inside labor.....	\$0.45
Outside labor.....	0.17
Driving gangways and entries.....	0.63
Supplies.....	0.17
Preparation.....	0.08
General expenses, repairs and insurance.....	0.14
Total.....	\$1.64

It costs about one-half cent per ton per mile to convey coal to its destination, so that on the face of things, it would seem that operators should be able to more than make both ends meet. However, it costs considerable to build the initial plant which after a time must practically be discarded. In fact, the cost of opening and equipping a coal mine in the

# Colliery Notes, Observations and Comments

Practical Hints Gathered from Experience and from the Study of Problems Peculiar to Bituminous and Anthracite Coal Mining

## DEVELOPMENT AND MANAGEMENT

When laying railroad tracks at tipples, scales, washeries, breakers, etc., curves should not be constructed within 20 ft. of the buildings. All tracks in buildings should be tangent, for curves so situated incur the risk of demolishing chutes from the passage of unusually large cars.

British coal is now shipped to Jerusalem, being delivered by vessel at the port of Jaffa and carried from there to the Holy City by rail. Some business is also done with other parts of the surrounding country, coal being carried by camels. The cost of freight by rail from Jaffa to Jerusalem, 54 miles, is \$3.50 per ton.

Fans used in the coalfields are either of the forced or exhaust type; the latter is by far the more common, for it is more convenient to seal the up-cast than the down-cast shaft. The fan may be connected to the up-cast by means of a drift, a little to one side of the up-cast so that, in case of repairs to the shaft, the fan need not be taken apart.

Some of the advantages of machine holing are: More round coal is made, in some cases amounting to 10 per cent. increase; the cost of mining is somewhat reduced, much depending on the nature of the seam; the output per man is increased; the length of face required for a given output is lessened and the workings can be concentrated and the length of the roads reduced.

Pennsylvania's coal output has fallen below 50 per cent. of the total production of the United States. In the combined production of bituminous and anthracite in 1880, Pennsylvania produced two-thirds of the total output, but its percentage has been gradually declining. In 1906, Pennsylvania's share was 48.4 per cent. of the total production, of which 31.2 per cent. was bituminous and 17.2 per cent. anthracite.

The first cost of an endless-rope system is greater than that of any other haulage installation, for the plant itself is costly and the roadway must be made wide enough for a double track or driven double when the roof will not permit of this. Operating costs are also high because of the wear of the rope and the rollers and the heavy loss from friction. This is excessive on a long or crooked line with many curves. Still for roadways with heavy grades it is the only system that has proved satisfactory.

Coal-cutting machines are driven either by compressed air or electric current; the former, at present, is the more common

motive power but electric current is rapidly gaining ground. The advantages of electric machines are that they are more economical than compressed-air machines, and the cables along which the power is transmitted are more convenient than air pipes. On the other hand, compressed air has advantages which counterbalance its low efficiency and inconvenient pipe lines. It is absolutely safe in a gassy mine, while electric current is not.

Coal-cutting machines are most successful where seams are thin and expensive to work by hand. If the cost of working by hand is low, machines effect little saving in cost, but they increase the amount of round coal. Where cutting machines are used it is desirable but not absolutely essential, that the roof should be good and the incline not excessive. Owing to the more rapid and more regular advance of the face the roof is often better when the coal is worked by machine. The seams should be fairly free from faults if the most efficient work is to be done.

Errors in an outside survey are more frequent and the discrepancies more pronounced in the winter and spring than in the summer and autumn. These errors may be due to several causes, the chief of which is attributed to the snow and frozen ground. When a tripod is set on frozen ground or snow the ground begins to melt under the pressure and the instrument is thrown out of adjustment. To avoid errors as much as possible the back-sight and fore-sight should be taken about five minutes after the instrument is set on the ground. In about three minutes the melting begins to cease.

In leveling with an instrument care should be taken to bring the cross hairs precisely into focus and the object clearly and distinctly into view, so as to avoid all errors of parallax. In every case the hairs and object should be brought into view so clearly that the cross-hairs appear to be a part of the objective surface, and remain in that position however the eye may be moved. Another thing that should be borne in mind is that the back-sight and fore-sight should be taken at points nearly equidistant from the instrument in order to avoid errors due to the curvature of the earth and also to correct the errors of adjustment in the instrument.

In longwall mining the greatest breakage of props occurs at the working faces, especially when the bottom is of hard

sandstone. This is due to the settling of the roof, which invariably takes place as the face advances. The pressure which causes this settling is so great that no timber can withstand it. Tapered props have recently been introduced in England for use at the faces of such workings. They are ordinary props, with one end tapered down to about one-half the original diameter, the tapered end being about 12 in. long. As the weight of the roof settles on the prop the tapered portion bursts under the pressure and thus the prop is saved from being crushed.

Among the many advantages to be gained by splitting the air in mines, are the following: A fall or cave of roof only affects the territory in which it occurs. Each territory is ventilated by fresh air. The smoke resulting from blastings and the fire damp generated in the workings cannot be carried through the whole of the workings. The efficiency of the ventilating fan may be increased or the total quantity of air increased with the same power. But if splitting is carried too far, the velocity of the current in each territory may be so reduced that the current will not be brisk enough to carry away gas generated in the working faces. On the other hand, a high velocity should be avoided as it increases friction. In working faces, the speed of air should be from 150 to 350 ft. per minute; in the main air-way it should be 700 to 900 ft., and in the shaft, 800 to 950 ft. per minute.

Some of the advantages of electric current for mine operations are as follows: It is economical to produce. Losses in the modern electrical generator are reduced to a minimum, while losses in an air compressor form a comparatively large percentage of the total power of the machine. The total losses in electric transmission seldom exceed one or two per cent. when distances are comparatively short, while with compressed-air installations the transmission losses are large and increase rapidly with the number of elbows, valves, and pipe lengths used. Besides the expense of installing compressed air is greater than the cost of an electric plant, and the cost of repairs to wrought-iron pipes, valves, etc., is a considerable item. As soon as a dynamo begins to operate, the current is available for running a motor, while the compressed-air engine must be run at least  $\frac{3}{4}$  hour before the air is available for the motor.



# THE ENGINEERING AND MINING JOURNAL

Issued Weekly by the  
**Hill Publishing Company**  
 JOHN A. HILL, Pres. and Treas. ROBERT MCKEAN, Sec'y.  
 505 Pearl Street, New York.

London Office: 6 Boulevard Street, London E. C., Eng.  
 CABLE ADDRESS "ENGINIMJOUR, N. Y."

Subscription, payable in advance, \$5.00 a year of 52 numbers, including postage in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines, \$6.50 in Canada.

To Foreign Countries, including postage, \$8.00 or its equivalent, 33 shillings; 33 marks; or 40 francs.

Notice of discontinuance should be written to the New York office in every instance.

Advertising copy should reach New York office by Thursday, a week before date of issue.

For sale by all newsdealers generally.

Entered at New York Post Office as mail matter of the second class.

During 1906 THE ENGINEERING AND MINING JOURNAL printed and circulated 462,500 copies, an average of 8896 per issue. Of this issue, 9500 copies are printed. None sent regularly free. No back numbers beyond current year.

Contents	PAGE
<b>Editorials:</b>	
Reducing Iron Production.....	983
Zinc Smelting and Ore Conditions in the Southwest.....	983
The Interstate Coal-mining Agreement	984
Changes in Plans, Overestimates, etc.	984
*Dredging Beach Gravel Deposits Near Nome.....	955
.....John Power Hutchins	
The Steel Rail Question.....	961
*Copper in Northern Arizona.	
.....Robert B. Brinsmade	962
Mineral Production of New Jersey.....	962
Gold Mining in Great Britain.....	962
*The Copper Belt of California—II.	
.....Herbert Lang	963
The New Trail from Peace River to the Yukon.....	966
.....Special Correspondence	
Mining in Western Nevada.	
.....Special Correspondence	966
Tin Exports from China.....	966
Iron Mine Assessments in Minnesota.	
.....Dwight E. Woodbridge	967
*The Traylor Concentrating Table.	
.....Reginald Meeks	968
Fluorspar in Great Britain.....	968
New Boring Machines for Tunneling....	968
Investigating the Strength of Steel....	970
*Hoisting Ropes for Mines—II.....	971
The American Mining Congress.	
.....Special Correspondence	974
Steel in Great Britain.....	975
A Remedy for the Law of the Apex.	
.....James Douglas	975
Calcium Cyanamid in the United States	976
What Yukon Miners Want.	
.....Special Correspondence	976
The Alaska-Yukon Boundary.	
.....Special Correspondence	976
Mining and Labor in the Transvaal.	
.....Special Correspondence	977
Duty on Vanadium Ore.....	977
Gold Robbers in the Yukon Territory.	
.....Special Correspondence	977
Tin Mining in the Erzgebirge.....	977
*Montanas Great Coalfields and Its Collieries.....	978
.....Floyd W. Parsons	
Centennial of Anthracite.....	981
Colliery Notes.....	982
Correspondence:	
Peters' "Principles of Copper Smelting" and the Metric System.	
.....E. D. Peters	985
The Card System in Colorado.	
.....Engineers	985
Negative Results in Pyrite Smelting.	
.....Walter S. Keith	986
Tube Mill Lining.....	986
.....H. W. Hardinge	
Erratum.....	986
Asphalt Mining in Syria.....	986
New Publications.....	987
Personal, Obituary, Societies and Technical Schools, Industrial, Trade Catalogs, Construction News.....	989
Special Correspondence.....	990
Mining News.....	992
Markets, etc.....	997
*Illustrated.	

## Reducing Iron Production

The curtailment of raw iron production, which is the first step toward reducing the output of finished iron and steel, has started in a sharp and decisive way. It began in the last week of October, and up to date over 50 furnaces have been blown out, reducing the weekly productive capacity for pig iron by about 10 per cent. By the end of November this reduction will probably reach 20 per cent. A considerable proportion of the furnaces which have gone out of blast are the older and smaller stacks which can only be operated at a profit when pig iron is at a high price; but a number also are larger furnaces, owned by the steel companies.

How little the present condition—or at least its near approach—was anticipated, is shown by the fact that the production in October was pushed, the total for the month having been about 2,372,000 tons of pig iron, the largest monthly output ever reported; exceeding by 116,000 tons that of July. There is little doubt that the larger interests have been expecting and preparing for a reduction in demand; but probably few expected that it would come so suddenly and sharply as it did. The larger companies, however, are meeting the conditions promptly, and apparently they do not intend to let stocks of iron accumulate to any considerable extent.

## Zinc Smelting and Ore Conditions in the Southwest

The increase in smelting capacity in the Southwestern district is not yet entirely completed and new plants are coming into operation, as demand is declining. Thus the works of the Bartlesville Zinc Company and the National Zinc Company, at Bartlesville, Oklahoma, will be ready to begin operations about the end of November. On the other hand, at Iola, Kansas, only about 36 out of 42 furnaces are in operation. The Cockerill plant is entirely idle.

Most of the smelters are accumulating stocks of unsold metal, and are consequently not keen about taking in supplies of ore; and this is the reason of the present weakness of the ore market in Joplin. In consequence many of the producers in the Joplin district have suspended, or

are suspending operations, as they are not able to operate at a profit on the lower scale of prices. Others are meeting the case by reducing wages. The miners generally recognize the conditions, and have accepted the reductions without opposition. Indeed, they have, in some cases, themselves proposed a cut in wages, in order to avert the entire stoppage of work.

## Decision on Placer County, Cal., Mineral Lands

Secretary Garfield has rendered a decision regarding the rights of holders of mineral lands in Placer county, Cal., which has created considerable stir in that vicinity. The case involves the rights of rival claimants to 600 or 800 acres of land and has been before the officials of the land office for several years. A group of timber claimants filed applications in March, 1903, and furnished data and arguments to show that the land was of the sort that could be taken under the timberland act. Ten days later representatives of two mining companies filed protests setting forth that the lands in question contained gold in paying quantities, quartz veins and silver, and that the tract was properly mineral in character. Testimony was taken and the receiver of the local land office recommended that certain sections of the tract should be adjudged mineral land and that the application applying to these parts should be rejected. The register of the local land office, on the other hand, held that all timber applications should be rejected. This brought the matter before the general land commissioner, who decided that the lands were non-mineral. Now Secretary Garfield reverses this decision, declaring that the lands are largely mineral.

The decision involves no knotty points of law, but seems to hinge upon questions of fact and the relative importance of the evidence presented. It is, however, believed to have an important bearing upon disputes in Plumas, Butte, Mariposa, Calaveras and other California mountain counties where lands which have been mined for years have been taken by timber and homestead entrymen in the hope of getting Government title. If the interpretation set forth in the Garfield decision is followed in other cases in which it is possible to make a similar showing of facts, the interests of owners of mineral

lands will prove to be better secured than has been supposed, and one cause of complaint against the general land office on the part of miners will have been removed. Perhaps some day we may have laws which do not permit of as many different interpretations as there are officials who may chance to pass upon them. In the meantime anything that is definite and promises to add to the general sense of security and finality is welcome.

### The Interstate Coal-mining Agreement

The movement to replace the independent agreements, under which mining has been conducted in a large part of the West since April, 1906, by a new general agreement, seems to have made considerable progress. Recently a preliminary conference was held at Indianapolis, which did, at least, indicate the probabilities of the restoration of the old general contract. The invitation to this conference came from the officers of the United Mine Workers, and was accepted by the operators of several of the States. As the present agreements do not expire until next April, there will be plenty of time for discussion, and opportunity for compromise and for the harmonization of conflicting views. The conference just held took no positive action, but its general results were favorable, and provision has been made for another meeting in December.

What was known as the interstate agreement, covered wages and other details of mining in the Pittsburg district of Pennsylvania, in Ohio, Indiana, Illinois, a small part of West Virginia and a large part of Kentucky and east Tennessee. It also largely controlled the miners' agreements in the Southwestern district, which includes Missouri, Arkansas, Kansas and the Indian Territory. While its general terms were the same everywhere, there were many local differences, some of them important. For instance, all through its continuance the Illinois miners were paid on the run-of-mine basis, while in the other States wages were based on weights of screened coal.

In 1904, after a long discussion, the agreement was closed for two years, the miners agreeing, in view of the conditions then existing, to accept a reduction

amounting to about 5.55c. per ton in pick-mining rate on the screened-coal basis. This agreement expired April 1, 1906, and early in the year a conference was arranged for the renewal. The miners' representatives came prepared to insist upon the 1903 scale; that is, upon the restoration of the reduction to which they had consented two years before. The operators were not united on any definite program, and some of them had special objects in view; thus the Illinois operators wanted to do away with the run-of-mine basis and adopt the screened-coal basis as in the other States. There were other complications, such as the differential between pick and machine mining, which, it was urged, was so small as to discourage the introduction of machines. The shot-firer question was a minor disturbing element. The first conference failed entirely to reach an agreement, and a general strike was threatened. A second conference also failed, and was broken up by the withdrawal of the Pittsburg men, under the leadership of Francis L. Robbins. The Pittsburg operators then proceeded to make an independent agreement on the basis of the 1903 scale. After a good deal of friction and some suspension of mining, the other States also made independent contracts on the basis of the 1903 scale, Ohio operators coming in last of all.

It is urged on behalf of the interstate agreement that it has more weight than any district contract; that in formulating it a broader view of the situation is generally taken; and that it prevents unfair advantages being taken in the competition for trade among different districts. Upon the whole it worked well during its existence, though doubtless many improvements could be made. Perhaps the most important one can be found in the suggestion made at a recent conference in Chicago, that a tribunal be constituted for the settlement of disputes arising under its terms. A body somewhat analogous to the Anthracite Conciliation Board would undoubtedly be useful. Like that board, it could be composed of representatives of miners and operators, with a disinterested expert as chairman, to have a casting vote in cases where the board is equally divided. It is to be hoped that some such provision will be made, in case the interstate agreement is restored; which also seems to us desirable.

### Changes in Plans, Overestimates, Etc.

The suspension of construction by the Balaklala Copper Company at Coram, Cal., which was reported recently, appears to be due chiefly to lack of funds, it being stated by the company in a circular letter to its stockholders that the estimates of the engineers have been exceeded, and on this account, together with the adoption of plans increasing the size of the smelter, it is now found that about \$525,000 will be required to complete the works. A new bond issue is consequently to be made, but under present conditions, it is hardly likely that money will be quickly forthcoming.

Occurrences of this kind are an aftermath of the recent era of extravagance; we hope we are justified in saying "recent." The ideas of wild finance have unfortunately extended to metallurgical construction, as well as to the promotion of new enterprises. In the interest of good engineering, it is to be hoped that we may soon see the time when a new works may be properly planned before the construction is entered into, when an enlargement of the plant will not be decided upon before the original plans have been carried out, and when there will not be the repeated report that "the estimates of the engineers have been exceeded."

MEMBERS OF THE American Institute of Mining Engineers will be gratified to know that hereafter the libraries of the three engineering societies in the United Engineering Building will be open until 9 p.m. all days of the week except Sundays and holidays. This greatly increases the usefulness of the combination which constitutes one of the great technical libraries of the United States, and is an example of the wider scope of the assistance that the American Institute of Mining Engineers has been able to give its members since acquiring its new headquarters.

THE RECORDER OF WHITE PINE COUNTY, Nevada, reports that not less than a million dollars must be expended in money or labor in that county between now and Jan. 1 in assessment work upon mining claims. There are on the books 10,000 claims upon each of which at least \$100 worth of work must be done. Of this amount fully one-half will be done by the owners themselves.



# Views, Suggestions and Experiences of Readers

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal, and Inquiries for Information

## CORRESPONDENCE AND DISCUSSION

### Peters' "Principles of Copper Smelting" and the Metric System

The following is a translation of a review of Dr. Peters' "Principles of Copper Smelting," written by Dr. Schiffner, professor of metallurgy at the Royal School of Mines, Freiberg, Saxony. The review appeared in the quarterly bulletin of new publications issued by Craz & Gerlach, Freiberg, Saxony.

"A new book on copper by Peters is certain to arouse pleasing expectations in the profession; for the author of "Modern Copper Smelting" has already proved himself a most reliable guide in this branch of metallurgy. This new book fulfils these expectations in the highest degree, and will be found an indispensable adjunct to the former book. At the same time it may be regarded as a model for the writing of similar books on kindred subjects.

"In the exposition of his subject, the author uses totally different methods from those which are habitually employed in treatises upon the individual metals. He presupposes, on the part of the student, some slight knowledge of furnace operations, and concentrates his efforts upon a minute and searching investigation of the various chemical and physical principles upon which the processes of copper smelting are based. The properties and behavior of materials which come to the furnace, of the between products, and of the finished products are studied with great thoroughness, and are used as factors upon which to base illustrations of the reason why any given result has been obtained, or how it may be modified at will. All the ordinary steps in the smelting of copper ores, roasting, blast and reverberatory smelting, matte concentration, pyrite smelting, and copper refining, are exhaustively studied in this manner.

"Many practical questions which one seeks vainly in most text books are here discussed; such as transportation, principles of furnace-building, establishing of smelter tariffs, presentation of results, etc. There is a notable chapter entitled 'A Practical Study of Slags,' and Prof. J. W. Richards of Lehigh University has contributed a chapter on 'Thermochemistry,' which is so written as to be intelligible to those who have but little familiarity with the subject.

"As the author points out, the practical

value of the book has been enhanced by the friendly coöperation of the managers of some of the great copper smelters in America and elsewhere. The important chapter on 'Pyrite Smelting' owes much of its material to the paper of Robert Sticht which appeared in *Metalurgie* in 1905, and the entire chapter has had the benefit of Mr. Sticht's criticisms and additions.

"The exposition of the various subjects, and the numerous calculations are occasionally, perhaps, a little too elementary for any but readers possessing little chemical or metallurgical training. I do not feel inclined, however, to regard this as any serious drawback, for the overworked metallurgist may often find it highly agreeable to have his tedious furnace calculations shortened by tables and factors to his hand.

"If anything is calculated to impair the usefulness, and the general introduction of this work, it is the fact that American measures and weights are employed throughout the book. Leaving aside the question whether the English-speaking nations are justified in clinging so obstinately to their own weights and measures, a technical or scientific work which appeals to the metallurgists of all nations should certainly employ the metric system, if only in the interests of its own circulation. The latter system has already supplanted the old-fashioned unpractical systems of many nations, and, in spite of all opposition, is destined in time to supplant them everywhere."

Dr. Peters replies to Prof. Schiffner's remarks about the system of weights and measures employed in his new work as follows:

Professor Schiffner's review of my new book is very gratifying, but I must assure him that the substitution of the metric system for American weights and measures would curtail greatly its sale and its usefulness with the very class of people whom I am most desirous to reach.

For instance: the expression 0.0068572 per cent. of gold in ore, would convey absolutely no meaning at all to English-speaking miners or metallurgists; while its equivalent (0.2 oz. per ton) would instantly convey to their minds a clear and accurate statement of the value of the ore. It would not be reasonable for me to make my technical books inconvenient for 95 per cent. of their readers for the accommodation of 5 per cent. I am inclined, further, to believe that if

the foreign reader will spend a few moments in studying the tables of weights and measures on page 568 of "Principles of Copper Smelting," he will soon come to the conclusion that, for ordinary commercial purposes, the English or American method of expressing the values of precious metals in ore is much more simple and useful than the meaningless fractions of the metric system, with their six or seven places of decimals.

E. D. PETERS.

Dorchester, Mass., Oct. 22, 1907.

### The Card System in Colorado

It would appear to us that the reply of the secretary of the Cripple Creek Mine-Owners' Association, to the editorial in the JOURNAL, Sept. 14, is disingenuous. He begins by admitting the truth of the statement that the card system has been abolished at the Smuggler Union mine, but adds that "it has been succeeded by a more stringent and effective system," the principal object of which appears to be the exclusion of Western Federation miners, without reference to their ability, honesty or integrity.

It must be admitted that the Smuggler Union Company is acting strictly within its right as an employer in examining closely the men whom it employs, but to delegate such duties to a central bureau common to all the mine-owners of a given district, is simply blacklisting the workmen, and is so designated in the 1903 report to the President of the United States on "Labor Disturbances in Colorado," page 226, from which we quote as follows: "The members of the Mine-Owners' Association having decided, as announced in their statement of March, 1904, to blacklist all members of the Western Federation of Miners, employees and all applicants for work were required to answer the questions on a blank form, etc., etc."

Now, no blacklisting methods have ever been effective in the United States, not even the card system introduced in the San Juan by Mr. Wells, which Mr. Passmore frankly admits was "suddenly dropped"; and for what reason? "A threatened boycott by the local branch of the Western Federation of Miners," thus showing the card system to be absolutely ineffective as against the very people it was designed to squelch. On Mr. Passmore's own showing then, this card sys-

tem not only failed in its object at Telluride, but was also succeeded by a more stringent and effective system. If, then, such a one can be introduced, and one which at the same time is unobjectionable, why continue at Cripple Creek this un-American and unsatisfactory card system, which is repugnant to all honest miners?

Concerning the purpose of the card system, we are left in no uncertainty, for from page 225 of the report already referred to, giving the original statement of the Mine-Owners' Association, we quote as follows: "The avowed purpose of this association is to drive the disturbing and dangerous element of the Western Federation of Miners from the district, and from the State if possible." And farther on: "With the determination to eliminate all dangerous characters, it is our purpose to establish a central bureau of employment, which shall receive and act upon all applications for work in all the mines connected with this association."

On page 227 of the same report to the President, we find the following in a circular by the Mine-Owners' Association: "We have from time to time urged that no leases be made in the Cripple Creek district to persons not in sympathy with the purposes of our association, and to this end we suggest the following: That no lease be let to any person unless the applicant shall have a recommendation card from the Association."

Thus we see that the mine-owners, not content with exercising authority over their own mines and employees, demanded that lessees operating in the district should not only adopt their card system, but also "promptly discharge any man so employed" on request.

We hold no brief for the Western Federation of Miners, and condemn just as emphatically its card system in use before the strike, as we do that of the mine-owners. Both are wrong, contrary to good government, the freedom of the citizen, and to his pursuit of happiness. Two wrongs never make one right.

"High grading" and other thievery is amenable to the common law. Over a thousand years of Anglo-Celtic jurisprudence has established the wisdom of holding every man innocent until proved guilty, and we therefore deny the right of any body of employers or employees to set themselves above the law, and pass snap judgment upon their fellowman without giving him his day in court.

In the interest of good government, therefore, and the furtherance of peace and good will among men, we hope soon to see Cripple Creek join Leadville and Telluride, and cease to have the malodorous distinction of being the only mining camp in the great State of Colorado, to adhere to the effete and obnoxious card system.

ENGINEERS.

Denver, Colo., Nov. 12, 1907.

## Negative Results in Pyritic Smelting

I have read Mr. Koch's letter of Oct. 3 in the JOURNAL and must beg to disagree with one of his statements, as follows: "And I have noticed repeatedly with warm blast that 7 per cent. of lime is as much as the slag will carry and keep clean."

I give below results for the month of September at the Oregon Smelting and Refining Company's smelter at Sumpter, Oregon, with warm blast:

Average slag analysis, 0.034 gold, 0.271 silver, 0.122 copper, 42.65 SiO<sub>2</sub>, 20.69 FeO, 23.54 CaO.

The matte produced showed 19.28 oz. gold, 76.92 oz. silver, 26.15 per cent. copper. Concentration was 13 into 1.

With 23.54 per cent. lime, our copper loss was only 0.122 per cent, and approximately the same recovery has been made for several months, as shown in the table below:

	CaO.	Cu. loss.
June.....	24.60	trace
July.....	25.00	"
August.....	23.71	9.1980
September.....	23.54	0.1220
October.....	18.35	0.0725

Mr. Koch does not understand "why those Canadian ores cannot be smelted pyritically." The Canadian (British Columbia) ores carry only about 3 per cent. sulphur, and I have run the furnaces at the Boundary Falls smelter for months on a charge carrying not over 2 per cent. sulphur. Is it any wonder then that even partial pyritic smelting cannot be indulged in at the British Columbia smelters? WALTER S. KEITH.

Sumpter, Oregon, Oct. 25, 1907.

## Tube-mill Lining

There has appeared in two technical journals devoted to mining a description of the lining of a tube mill by one of the largest mining companies in Mexico. The method, as shown by photograph and description, is one in which longitudinal bars or plates are placed within the mill for the purpose of retaining the pebbles between these ribs, which are attached to the inside of the shell.

This device was granted to me (being part of a still greater improvement in machinery for the grinding of ores) under Mexican patent No. 6354, dated Feb. 22, 1907. It was the outcome of improving upon the fact that pebbles within the silex-lined mill were firmly lodged within all open crevices between the bricks or iron plates. A part of claim 3 of this patent reads:

—"y estando la superficie interior del barril provista de proyecciones longitud-

inales entre las cuales se alojan los trozos o piezas del material que se esta triturando o los cuerpos trituradores que se emplean para ayudar a afectar la trituracion, o ambos, los cuales constituyen un forro que peoteje el interior del tambor o barril y que se renueva constantemente por si solo tal como en substancia se ha expuesto."

Which being translated reads:

"—the inner surface of the barrel provided with longitudinal ribs or flanges between which lumps, or the pieces of material undergoing disintegration become lodged, or crushing bodies employed to assist in the disintegration or both, forming a lining which protects the interior of the barrel or drum, and constantly renews itself as set forth."

The evident simplicity of this device for covering a much felt want, suggests our being rather liberal in according to others the same ability to see requirements through practical work, but it is these simple devices that sometimes astonish us by not having presented their efficiency to us before, and it would not take a wide-awake engineer very long to make application of the idea. Be that as it may, this is a utilization of my invention, and my attorney assures me, a strict infringement of my patent, and it is from this point alone that I now consider it.

H. W. HARDINGE.

New York, Nov. 4, 1907.

## Erratum

In the article on "Operations and Tendencies of Modern Mansfeld" by P. A. Wagner and J. S. G. Primrose in the JOURNAL of Oct. 12, on p. 673, col. 2, line 10, the word "well" should be "wall"; p. 674, col. 1, line 21, should be "sluicing of slimes" instead of "sliming"; p. 674, col. 1, line 38, should be "surplus" instead of "sulphur."

## Asphalt Mining in Syria

An asphalt mine in Syria described by W. A. T. Allen, in the *Egyptian Gazette* lies near Kferie village, 30 miles north-east of the Port of Latakia on the Aleppo road. The deposit is estimated to contain from 150,000,000 to 200,000,000 tons. The mine was surveyed several years ago by two or three engineers, and an Englishman in Constantinople obtained a concession for working the mine from the Ottoman government, but never succeeded in raising sufficient capital. It is reported that negotiations are under way to obtain permission from the Government to construct a light railway from the mine to Latakia, as well as to erect harbor works at that port for shipping purposes.



## New Publications

ILLINOIS BUREAU OF LABOR STATISTICS, TWENTY-FIFTH ANNUAL COAL REPORT for 1906. Also the Eighth Annual Report of the Illinois Free Employment Offices for the Year Ended September 30, 1906. David Ross, Secretary. Pp. 504. 5¼x8¾ in.; cloth. Springfield, Ill., 1907: Bureau of Labor Statistics.

THE SAN FRANCISCO EARTHQUAKE AND FIRE OF APRIL 18, 1906, AND THEIR EFFECTS ON STRUCTURES AND STRUCTURAL MATERIALS. Reports by G. K. Gilbert, R. L. Humphrey, J. S. Sewell and Frank Soule, with preface by J. A. Holmes. U. S. Geological Survey, Bulletin No. 324. Pp. 170, 54 plates, 1 map. 6x9 in.; paper. Washington, 1907: Government Printing Office.

MYSORE GEOLOGICAL DEPARTMENT. RECORDS, VOL. VI, CONTAINING GENERAL AND SPECIAL REPORTS OF WORK DONE FROM JULY, 1904, TO JUNE, 1905. Pp. 93; illustrated. 7x10 in.; paper, two rupees. Bangalore, India, 1907: Mysore Geological Department.

PROCEEDINGS OF THE NATIONAL ASSOCIATION OF CEMENT USERS, THIRD ANNUAL CONVENTION, JANUARY 7-12 1907, Volume III. Edited by the President. Pp. 340; illustrated. 6x9 in.; paper. Philadelphia, 1907: Published by the Association.

THE SANTA CLARA VALLEY, PUENTE HILLS AND LOS ANGELES OIL DISTRICTS, SOUTHERN CALIFORNIA. By George H. Eldridge and Ralph Arnold. U. S. Geological Survey, Bulletin No. 309. Pp. 266; illustrated. 6x9 in.; paper. Washington, 1907: Government Printing Office.

RECORDS OF THE GEOLOGICAL SURVEY OF INDIA, Vol. XXXV, Part 3, 1907. Pp. 14 with 23 plates. 7¼x10½ in.; paper, price one rupee. Calcutta, India, 1907: Office of the Geological Survey.

Contents. Preliminary survey of certain glaciers in the northwest Himalaya. Notes on certain glaciers in Northwest Kashmir, by H. H. Hayden.

ELECTRO-ANALYSIS. By Edgar F. Smith. Fourth edition, revised and enlarged. Pp. 336; illustrated. 5¼x7½ in.; leather, \$2.50. Philadelphia, 1907: P. Blakiston's Son & Company.

Contents. Introduction. Sources of electric current. Reduction of the current. Measuring currents. Historical sketch. Theoretical considerations. Rapid precipitation of metals in the electrolytic way. Use of mercury cathode. Determination of metals. Separation of metals. Additional remarks on metal separations. Determination of the halogens in the electrolytic way. Determination of nitric acid in the electrolytic way. Special application of the rotating anode and mercury cathode

in analysis. Oxidations by means of the electric current. The combustion of organic compounds.

MINING IN MALAYA FOR GOLD AND TIN. By C. G. Warnford Lock. London, England: Crowther & Goodman.

Mr. Warnford Lock has been in the Federated Malay States and the Eastern mining districts generally for the past few years, and has traveled extensively through the various tin and gold districts. In this book he gives the results of his own observations, together with information supplied by the managers of practically all of the mines under European control. Special mention is made of the assistance given him by the Government geologist, J. B. Scrivenor, and by W. H. Martin, manager of the Raub Australian Gold Mining Company. The book is made particularly interesting by a series of over 100 photographs taken by the author. These are clearly printed on special paper and give an excellent idea of the ore deposits and the methods of working. The book deals with alluvial mining methods, lode mining, milling, dressing and smelting. There are chapters on climate and health, on mining laws and regulations, labor, transport and travel. Mr. Lock's account of the social and racial conditions is interesting, as is also his onslaught on the methods pursued by the British Government officials. It appears that the Chinaman generally secures preferential treatment and obtains the deposits that are more easily worked, while the Englishman only gets the lodes and the alluvial deposits which present difficulties and require larger expenditures for their exploitation.

A MANUAL OF FIRE ASSAYING. By Charles H. Fulton. Pp. 178; illustrated. 6⅞x9⅞ in.; cloth, \$2. New York, 1907: Hill Publishing Company.

Contents. Preface. Assay furnaces and tools. Reagents and assay of reagents. Sampling. Weighing; balances and weights. Reduction and oxidation reactions. The crucible assay; assay slags. Cupellation. Parting. The assay of ores containing impurities. Special methods of assay. Errors in the assay for gold and silver. The assay of bullion. The assay of ores and alloys containing platinum, iridium, gold, silver, etc. The assay of tin, mercury, lead, bismuth and antimony.

The number of works on fire assaying is legion. Many professors have felt called upon to publish their laboratory notes in book form, and in general they have followed the stereotyped style. We think that Professor Fulton's book marks a new era in the treatment of this subject.

The ordinary text book on assaying is of the "cook book" order. It describes the crucibles, scorifiers, slag molds, tongs, weighing balances, and other well known apparatus, and then gives a series of re-

cipes for assaying various kinds of ores, without going much into the "reasons why" and the physical and chemical principles which govern the operations. In reading Professor Fulton's treatise we feel that we are being introduced to a discussion of refined metallurgy, performed on a miniature scale, which indeed fire assaying really is. His book is closely confined to this subject, and treats of it with much detail. It is to be welcomed as an exposition which will enable the student to obtain a really scientific grasp of the subject instead of the imperfect knowledge that comes from the "rule of thumb" and "cook book" methods of old.

Professor Fulton, besides his well known experience as a practising metallurgist, has had ample experience in the instruction of students, being president of the South Dakota School of Mines, and also professor of metallurgy in that institution. As he says in his preface, he has had experience with practically all of the methods of assaying discussed in the book; first as a manipulator, then as a teacher, and finally in charge of works. His book is intended for the use of students in technical schools and for the assayer in actual daily practice, who frequently feels the need of a reference book. We venture to predict that it will meet with the high degree of appreciation that it deserves.

THE ONTARIO MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS. Pp. 89; illustrated. Toronto, Ont., 1907: *Canadian Mining Journal*.

This publication has been issued as a souvenir of the gathering of the members of the American Institute of Mining Engineers at Toronto in July last, and the subsequent visit of many of the party to the Cobalt and Sudbury districts and other parts of northern Ontario. The reading matter comprises a summary of the convention and its attendant festivities; an account of the tour to the mining districts of northern Ontario, undertaken under the auspices of the Provincial Government, and historical sketches of the Cobalt and Sudbury districts, full of valuable and carefully prepared information as to the development and present condition of these important mining centers. The work is profusely illustrated throughout, containing views of the many leading mines and portraits of a number of prominent mining men, together with colored plates showing specimens of ore. In point of arrangement and appearance it leaves nothing to be desired, while pains have been taken to secure accuracy in the data presented. A valuable feature is a pocket map of the Cobalt camp, showing the various mines and the geological formations. The work will be appreciated by mining men not only as a record of an important event in the mining industry of Ontario but for the useful information it contains.

### Personal

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

C. H. Hitchcock is inspecting mines at Eldora, Colorado.

J. C. Murray, editor of the *Canadian Mining Journal*, Toronto, is at Larder Lake.

Fred. G. Farish has returned from the Dutch East Indies and is at present in Denver.

R. Alvin Weiss, of New York, has gone to Montana and Idaho, to examine several mining properties.

J. K. Muther, of New York, is at present in the United States of Colombia examining placer properties.

Mortimer A. Sears, has opened an office as consulting mining engineer at 45 Broadway, New York City.

President Anthony Blum, of the Laurentian gold mine, Manitou Lake district, Ont., visited the mine recently.

A. E. Wetherbee, of Cleveland, Ohio, recently examined iron-ore propositions in the Rainy River district of Ontario.

Dr. A. E. Barlow, of the Dominion Geological Survey, was in Toronto this week on his return from a trip to Cobalt.

L. G. Beaumont, of Liverpool, England, is investigating mining propositions in northern Ontario with a view to investment.

H. P. Garthwaite, resident director of Butters Salvador Mines and Butters Divisadero Company has arrived in New York.

Alexander Dick has resigned his position as general sales agent of the Dominion Coal Company, of Sydney, Nova Scotia.

Richard Y. Park has been chosen president of the Tonopah-Belmont Mining Company, in place of John W. Brock, resigned.

George A. Packard, of Boston, passed through New York last week on his way to Sonora, Mexico, to examine mining property.

James F. Smith, mining engineer of Cripple Creek, Colo., is examining mining properties in the Salmon River country, Idaho.

Dr. H. M. Payne has been elected dean of the department of mining engineering, recently inaugurated by the University of West Virginia.

Walter B. Rountree has resigned his position as smelter superintendent with the Mountain Copper Company, at Martinez, California.

Wm. Gill, formerly with the American Metal Company, is now chemist for the National Zinc Company, Bartlesville, Indian Territory.

G. D. Doveton, of Denver, Colo., who has been conducting metallurgical examinations in Zacatecas, Mexico, has returned to Mexico City.

Col. Carroll D. Wright, formerly Commissioner of Labor, has received the decoration of the Legion of Honor from the French Government.

S. A. Worcester has completed designs for a new surface plant for the Henry Adney mine, Cripple Creek, Colo., and is now at Victor, Colorado.

F. R. Bell, formerly with the American Mine Engineering Company, of Joplin, Mo., has accepted a position as chemist with the Bartlesville Zinc Company.

Ellis P. Goedecke, George Gaskill and William Metzger have been appointed superintendents of mines owned by the Fairmont Coal Company in West Virginia.

A. J. Greit, of New York, is now superintendent of mines for the Colombia Gold Placer Company, and has sailed for Colombia, South America, to begin operations.

Alex. Gray, formerly editor of *South African Mines*, a mining journal of Johannesburg, South Africa, was in Toronto this week in the course of a Canadian tour.

George H. Ashley, of the United States Geological Survey, will assist State Geologist W. S. Blatchley in the special survey of the coalfields of Indiana, soon to be begun.

Archibald L. Black, late at Van Meter, Penn., has been appointed superintendent of the Cranberry and Prosperity mines of the Cranberry Fuel Company at Beckley, West Virginia.

Thomas J. Downing, of Pottsville, Penn., formerly with the Reading company, has been appointed superintendent of the Kaska William colliery of the Dodson Coal Company.

Anthony J. McMillan, managing director of the Le Roi Mining Company, left Rossland, B. C., for London, England, on Oct. 30. He will probably be absent from the province about three months.

J. K. L. Ross, son of President James Ross, of the Dominion Coal Company, of Sydney, N. S., who has been with the company since 1900, has been appointed commercial manager of the company.

E. S. Moore, who for two years has been in charge of exploration work for the Ontario Department of Mines in northern Ontario, has accepted a position as fellow in the Department of Geology, in Chicago University.

Warren R. Clifton, general superintendent of the Carnegie blast furnaces at Sharon, Penn., has resigned to become superintendent of the furnaces of the Jones & Laughlin Steel Company at its new plant at Aliquippa, Pennsylvania.

Charles A. Moffett has resigned as chief engineer of the blast-furnace department

of the Republic Iron and Steel Company and has taken the post of superintendent of machinery for the Birmingham Coal and Iron Company, Birmingham, Alabama.

Dr. G. W. Maynard has returned to New York, after an extended trip to the North on professional business, during which he visited Butte and other districts in Montana and Utah, much of the time having been spent in the Yukon, especially the Whitehorse district.

James D. Hurd, of Illinois, in company with several of the Crow's Nest Pass Coal Company's officials, recently examined a fissure in the mountain near the company's Coal Creek colliery that had been reported to the British Columbia Department of Mines as fraught with danger to the Coal Creek mines and town.

Wm. Anderson, of Cascade, Boundary district of British Columbia, for about nine years superintendent of the Cascade Water, Power and Light Company, Ltd., has been appointed hydraulic engineer of the West Kootenay Power and Light Company, Ltd., and has removed to Rossland. The latter company has acquired all the property of the former.

George G. Crawford, has been chosen president of the Tennessee Coal, Iron and Railroad Company. He has been connected with the National Tube Company as general manager of the McKeesport district since before its acquisition by the United States Steel Corporation. He is a native of the South and was at one time identified with the Sloss-Sheffield interests.

H. B. Ayers has assumed his new duties as general manager of H. K. Porter Company, locomotive manufacturers, at Pittsburg, Penn. Mr. Ayers comes well qualified to take up his new labors. For the last two years he has been in charge of the Canadian Locomotive Works at Montreal, and previously held the position of general manager of the Pittsburg Locomotive Works.

### Obituary

George L. Hibbs died in Philadelphia, Nov. 1. He was largely interested in coal mining in western Pennsylvania and was president of the Wheeling Coal and Coke Company.

James F. Jones died suddenly in Philadelphia, Nov. 7, aged 69 years. He was for many years connected with the Philadelphia & Reading Company, and had charge of coal lands in the Pottsville and Ashland districts.

John C. Kruse, superintendent for the Oliver Iron Mining Company, at the Forrest mine, Iron Mountain, Mich., was accidentally killed while hunting Nov. 1. He had long been in the employ of the Steel Corporation and was from a family of mining men.



Charles H. Morris died at Des Moines, Iowa, Oct. 26, as the result of wounds inflicted by a gambler whom he tried to arrest. He was largely interested in coal-mining enterprises, and was recognized as one of the most experienced coal operators in the State; for six years he was president of the Iowa Coal Mine Operators Association. He enjoyed a large acquaintance throughout the State.

Harvey Graham, assistant general manager and director of the Nova Scotia Steel Company, died at his home in New Glasgow, N. S., Oct. 31, after a year's illness. He had been for many years connected with the coal, iron and steel industries of the Province, and was prominent in commercial and political affairs. He was also widely known as an active worker in connection with religious and reformatory movements.

Tod Ford, who died in Pasadena, Cal., Nov. 4, aged 53 years, was long prominent in the iron and steel industry of the Mahoning valley. He was connected with the Youngstown Steel Company, from its organization in 1882, serving as its general manager from 1885 to 1892, and as its president from 1892 to his death. He was also a large owner of stock in the Brier Hill Coal and Iron Company. His career in the iron and steel industry, great in promise, was interrupted about ten years ago by his physical collapse, from which he never fully recovered.

Charles Joseph Nourse, who died in New York, Nov. 18, aged 58 years, was largely interested in Mexican mines. He was secretary of the Teziutlan Copper Company, treasurer and director of the Alvarez Land and Timber Company, secretary and director of the Compania Metalurgia Mexicana, the Fresnillo Mining Company, the Mexican Lead Company, the Mexican Mineral Company, the Mexican Northern Railway, the Montezuma Lead Company, the Potosi & Rio Verde Railway, and the Sombrerete Mining Company. He was a member of the St. Nicholas and Church clubs, the Century Association, and the Sons of the Revolution.

## Societies and Technical Schools

*California State Miners' Association*—It has been found necessary to postpone the annual convention of the California Miners' Association from Nov. 25, subject to the call of the executive committee. In view of the present financial crisis, everybody seemed busy with personal affairs, and a number of those asked to prepare papers for the convention excused themselves as too much occupied. The delegates from the interior counties asked for a postponement until late in the year for similar reasons. For these

reasons the convention has been postponed.

*American Chemical Society*—The winter meeting of this society will be held at Chicago, Ill., Dec. 31 to Jan. 3, inclusive. The meeting will be a joint meeting with Section C of the American Association for the Advancement of Science. The Society of Biological Chemists will also hold joint sessions with the biological section, and President Chittenden will preside over both. The following persons have consented to preside over the sections and to aid in the preparations for the meeting: Agricultural and sanitary chemistry, W. D. Bigelow; biological chemistry, R. H. Chittenden; industrial chemistry, William H. Ellis; inorganic chemistry, A. W. Browne; organic chemistry, Julius Stieglitz; physical chemistry, Herbert N. McCoy. Members desiring to present papers are requested to send titles and brief abstracts to one of these persons, or to the secretary of the society, Charles L. Parsons, Durham, New Hampshire.

## Industrial

The Allis-Chalmers Company has opened a new branch office at Deadwood, S. Dak., with O. F. Purnell as district manager.

The old firm name of S. B. Stine & Son, of Osceola Mills, Penn., has been changed to S. B. Stine, J. C. Stine having disposed of his interest. The business goes right on as before, building mine cars, mine fans, incline machinery, etc.

The new foundry of the Clyde Iron Works, Duluth, will be operated by alternating-current motors and will be equipped with two 10-ton and one 15-ton electric traveling cranes, furnished by the Northern Engineering Works, of Detroit, Michigan.

Principio furnace, near Elkton, Md., has been sold by the Whitaker Iron Company, and will be torn down and removed to Michigan, where it will be placed in shape to produce charcoal iron. The first blast furnace was built at Principio in 1781 by an English firm. In the war of 1812 cannons and cannon balls were cast at the furnace. The Whitaker company will continue to maintain at Principio its forge for the manufacture of charcoal iron blooms.

The new board of directors of the Republic Iron and Steel Company has elected the following officers: John A. Topping, chairman; T. W. Guthrie, president; T. J. Bray, vice-president; S. P. Ker, vice-president; H. L. Rownd, secretary and treasurer. While a change has been made in Mr. Topping's title, he will remain the active executive officer of the company, with headquarters in New York. Mr. Guthrie, heretofore assistant to the president, with office at Pittsburg,

where the general offices of the company are located, will continue his operations from that point as president of the company; but aside from the change in title and some extensions of his duties, there will be no change in the general management of the company and no reorganization of the working forces. The executive committee, consisting of Grant B. Schley, Leonard C. Hanna, Earl W. Oglebay, John W. Gates and John A. Topping, was reelected.

## Trade Catalogs

Receipt is acknowledged of the following trade catalogs and circulars:

Buckeye Engine Company, Salem, Ohio. Buckeye Electric Blue Printing Machine. "Testimonials." Pp. 92, illustrated, paper, 5x7 inches.

Ingersoll-Rand Company, 11 Broadway, New York. Form 53A. Economical Machinery for the Coal Mine. Pp. 24, illustrated, paper, 3½x5½ inches.

Allis-Chalmers Company, Milwaukee, Wis. No. 4009. Allis-Chalmers Corliss Engines "Reliance" Pattern. Pp. 4, illustrated, paper, 3½x6½ in.; September, 1907.

York Manufacturing Company, York, Penn., Vertical Single-acting Ice Making and Refrigerating Machines. Bulletin No. 10. Pp. 16. Bulletin Nos. 11, 12, 13, 14, 17, 18, 19, 20. Pp. 2, illustrated, paper, 6x9 in.; July to September, 1907. Horizontal Double-acting Refrigerating and Ice Making Machines. Bulletin No. 15. Pp. 12. Bulletin No. 16. Pp. 4, illustrated, paper, 6x9 in.; July and August, 1907. Ammonia Absorption Refrigerating Machines. Bulletin No. 22. Pp. 4, illustrated, paper, 6x9 in.; June, 1907.

## Construction News

*Spanish Ranch, California*—The Red Mountain Mining Company is preparing to install a new 10-stamp mill.

*Grizzly Flat, California*—The Eagle mine is to be reopened and new equipment provided. T. D. Dow and E. D. Hammond are lessees.

*Madera County, California*—The Chiquita Mining and Power Company is preparing to work its property on the headwaters of the San Joaquin river, and will put in machinery. C. A. Telfer, Fresno, Cal., is secretary of the company.

*Georgetown, California*—The Gold Elk Mining Company has purchased the Porter hydraulic mine near Georgetown, and work will be commenced at once on the construction of an impounding dam for the debris. W. E. Schultz, of San Francisco, is president of the company.

# Special Correspondence from Mining Centers

News of the Industry Reported by Special Representatives  
at Denver, Salt Lake City, San Francisco and London

## REVIEWS OF IMPORTANT EVENTS

### San Francisco

Nov. 14—Both the Mammoth and Mountain copper companies, of Shasta county, have done more or less prospecting work with diamond drills, greatly to their advantage. The Arizona Diamond Drill Development Company, operating in the Bully Hill section, under superintendency of O. H. Reinholt, now has contracts for diamond drilling work for both these companies. Other interests are also preparing to have their groups tested by diamond drilling. Considerable prospecting by ordinary methods is now going on in the Red Cap copper district between Hoppa and Orleans in Humboldt county. Several ledges or deposits are known and others are being sought for.

Henry Blumenberg, of the American Borax Company, Daggett, San Bernardino county, has secured for his company a new and extensive borax deposit in Soledad cañon, near Langs station, southern California. A few hundred tons have already been taken out ready for shipment. The deposits are more important and richer than those the company has been working near Daggett. At the latter place they have been utilizing the low-grade "muds" while the new find is a vein.

The Newton Mining and Development Company, operating surface deposits seven miles from Bucks Ranch, Plumas county, is handling the dry hillside gravel by means of a steam scraper. Three more of the scrapers will be installed in similar ground in Long Valley in the same county. The scrapers handle the gravel on the hillsides and flats, and take it to points where the washing can be carried on. The system is claimed to be economical.

In the old Ibex district, Inyo county, mining affairs are looking up once more. Nevada men have purchased some of the properties and are developing them. Some of the ore sacked and shipped has given very good returns indeed. Mines were worked in this district a long time ago, but lack of transportation facilities caused a cessation of work. The district is on the Death Valley slope of the Funeral range between Ibex and Sheepshead springs.

At Darwin, also in Inyo county, several companies are at work, including the New Coso Mining Company. The Giroux copper mines will also be started up this fall. The New Coso Mining Company has struck another body of lead-silver ore in the 450-ft. level, in addition to the big

body of ore which was uncovered by the elements, and laid so long idle, and which was unknown by the former owners of the property. Now that new machinery and two big gasoline hoists are installed on the property, they expect to be able to ship from \$20,000 to \$25,000 worth of ore a month, instead of \$3000 worth.

The tailings left after extracting borax from its ore will be made of practical use. A company operating at Daggett, San Bernardino county, has spent some time and money in experimenting, and is producing bricks of good quality.

The Champion Mining Company, of Nevada City, has now 70 stamps at work on ore from the Champion and Home mines. The shaft in the Home has been sunk to the 900-ft. level and drifting commenced. These companies had litigation lasting a year or more and during that period they were unproductive; but since the decision in favor of the Champion, the Home claim became part of the Champion property, and the mines have since become again productive.

W. H. Pinkston has bought for \$150,000 the Chloride-Bailey and Globe quartz mines at Dedrick, Trinity county. The two mines will now be worked as one, though one of them is so situated as to be worked all the year, while the other is closed down in winter. The mines are in the high mountains not far from Weaver-ville. There are 30 stamps on the two mines with cyanide plant, electric power, etc. It is considered rather important in Trinity county for these two mines to be under one ownership.

Up on the Forest Hill divide in Placer county, the center of the drift-mining industry of the State, considerable attention is being given to quartz mining, which has not heretofore been the case. Several promising veins have recently been put in a stage of development.

### Salt Lake City

Nov. 16—With two smelting companies ceasing the smelting of ore in the Salt Lake valley, the mining industry of Utah has suffered a severe blow. Following the announcement that the Bingham Consolidated had given orders to cool the furnaces of its plant at Bingham Junction came a like one from the head officials of the United States company, and steps are now being taken to clear the yards of ore and blow out the lead and copper smelters of this corporation, also situated at Bingham Junction. This action is a

result of the drastic decision of Judge John Marshall, of the Federal Court sitting here in Salt Lake, which has been affirmed by the Court of Appeals at St. Paul. Although the mandate of the court had not been given, it was anticipated, so the United States company decided to quit business and so notified the ore shippers with whom it had contracts. Managing Director A. F. Holden says: "The position of the United States Smelting Company, in the matter of smoke suits is, of course, that it will follow absolutely the decree of the courts. Since the suits were filed, certain devices have been installed to avoid the escape of injurious matter and we do not believe that the United States plant at Bingham Junction is now causing material damage to vegetation. Nevertheless, the company is now preparing for a shut-down of its smelting operations in the Salt Lake valley. At Bingham, we shall cease the mining of both lead and copper ore. At the Centennial Eureka we are already shipping a portion of the ore to our Mammoth works in California and the entire product can be smelted there at little additional cost to the company. This statement, without an understanding of the cost of fluxes, may seem unreasonable, but it is nevertheless a fact, as iron, which is expensive in Utah, is without value there. We have been obliged to notify various producers to discontinue shipments of ore to our Bingham Junction smelter. We regret the consequences thereof to the mining industry, but necessity for the move is evident in view of present conditions. The cessation of smelting operations in the Salt Lake valley will not materially affect the earnings of the company, as it will be able to treat the largest portion of its own ores in other plants. The new Mammoth smelter at Kennett, with a capacity of 2000 tons per day, will be in partial operation Dec. 15 and in full operation by the middle of January."

The smelter of the Utah Consolidated is still running at full blast; but if the court's mandate must be obeyed, it will be the next plant to suffer the consequences. The Garfield copper plant of the American Smelting and Refining Company was not affected in the smoke litigation and will not be subject to the court's decree; while the lead smelter of the same company at Murray was a subject for attack by the farmers of the Salt Lake valley, a stipulation was entered into with each of the defendants subsequently,



and in consideration of \$40,000 in money in partial settlement of old claims, the balance to be adjusted by an arbitration committee with any future damage that might be done to be left to the committee, the farmers were to join in asking for a modification of the court's decree. The smelting company agreed to build a bag-house and provide other mechanical means of arresting the substances in the smoke which might do damage to vegetation. The farmers have been particularly antagonistic to the United States and Utah Consolidated companies.

The Daly West mine at Park City has resumed operations with about the normal number of men employed. The miners accepted the reduction in wages of 25 to 50c. a day. Business men of the camp, however, have agreed with the operators that concessions will be granted in the way of reduced cost of supplies.

The Tintic Mining and Development Company, operating the Yampa mine in Bingham, will probably resume operations before the end of the year. The smelter improvements are nearly finished, as well as the aerial tramway and electric equipment ordered for the mine.

The new mill of the Phoenix Mining Company, in Bingham, will be ready for commission some time in December. The plant will handle 200 tons of ore daily.

The mill of the Markham Gulch Milling Company, in Bingham, has been closed temporarily to make improvements.

### Denver

Nov. 14—The statement has lately been made in a certain technical journal that, owing to the reduction in rates by the United States Reduction and Refining Company, on Cripple Creek ores, it is made "the more doubtful that the Golden Cycle plant will resume operations." As a matter of fact, at this writing the latter has orders placed for machinery, and is building slowly, but we hope surely, and if any hindrance or stoppage of construction should occur, it would, in all probability, be due to other causes.

In the Cripple Creek district the gold bars that are being produced by the various reduction mills, and shipped to the United States Mint at Denver, are being returned to the camp in specie, and the pay-rolls and labor checks are being promptly met with the same. Production is on the increase again, and the railways are taxed to the utmost to haul the ore, and Victor is now the focal point of the entire mining district.

In the proposed taking over of the plant of the Denver Union Water Company, by the city of Denver, the five appraisers selected by the city and the water company, are now here, and are working on the appraisalment which is to determine the price the city should pay.

The financial situation in Denver is about as follows: The banks have put

up certain good securities with the Clearing House Association, against which they are permitted to issue cashier's checks to the extent of 75 per cent. of the value of these securities. This plan has been cheerfully accepted by the merchants generally, labor organizations, the Chamber of Commerce, Real Estate Exchange and others, and a calm and unruffled state of affairs exists, not only in Denver, but throughout the State. In fact, a general undercurrent of optimistic feeling seems to prevail, and as such a financial stringency in the face of general prosperity as at present exists, is largely a matter of sentiment, it looks as though it will not be long ere the "clouds roll by."

A meeting of the president and directors of the Continental Tunnel Railway Company was held Nov. 9, and it was decided to let matters rest in abeyance until money centers loosen up a bit, and the feeling of returning confidence is more definitely established. It will be remembered that the object of this company is the building of a tunnel 6.25 miles in length through the Front Range of the Rocky Mountains, through which will ultimately pass the trains of the Denver, Northwestern & Pacific Railway, commonly known as the "Moffat road."

### Scranton

The Anthracite Conciliation Board met in Wilkes-Barre last week, to hear testimony on the part of the respondents in the case of the contract miners at No. 9 colliery of the Lehigh Coal and Navigation Company. The company in answer to the demand of the men for a higher scale of wages for driving and cutting back breasts in the Mammoth vein declared that the rate, now in force, has been in operation since June, 1905, and that there was no complaint of injustice at that time; also that the rate was established in conformance with an invariable rule of the company which has been in effect for more than 30 years, that the same rate shall be paid for driving pillar breasts as for driving in the solid. The various witnesses were examined at great length and President Fahy, on behalf of the men, asked for an additional statement from the company, showing the method of computation used in figuring the men's wages when they fail to work the full nine hours each day. The board will meet in Wilkes-Barre on Nov. 25.

The fire burning in the Summit Hill mines for the past 50 years is not yet under control. It has been cut, for some time, from the other workings, but has extended in other directions. Several machines are constantly at work drilling holes in the mountain through which coal dirt and water are forced into the workings, but the fire is spreading over such an immense area that slow headway is being made.

Announcement has been made by a

number of the coal companies that their collieries will work full time until Christmas. The orders are so heavy that they cannot be filled at many of the collieries.

According to the statement recently issued the United Mine Workers have \$750,000 in the treasury. From June 1, 1907, the surplus has grown from \$623,993 to \$741,354.

### London

Nov. 9—A year ago I mentioned in the JOURNAL that the prospects of the Electrolytic Alkali Company, which operates the Hargreaves-Bird process for producing soda and bleach, were very much improved, owing to an entire reorganization in the management. For the last 18 months the management has left nothing to be desired. Economies have been introduced in every direction and the works put on a business footing. In spite of all this, the force of circumstances has been too strong, and a profit of only £8212 has been made for the year ended Aug. 31 last. Out of this one-half year's dividend has been distributed on the preference shares and the ordinary shares are still without a dividend. There have been many reasons for this unprofitable result. In the first place it was found necessary to write down the value of stores and plant, which had figured in former balance sheets at too high a value. Secondly, the price of fuel has advanced lately, and the process, being essentially a fuel process, has been hard hit accordingly. In the third place, the prices obtained for bleach and soda have had to be cut in order to meet powerful opposition of the United Alkali Company for bleach, and Brunner, Mond & Co. for soda crystals. It is not profitable to discuss here the details of this struggle in the chemical trade, and I will only say that if the directors of the Electrolytic Alkali Company keep a stout heart, they will yet earn a dividend for their ordinary shareholders.

The report of the Tomboy Gold Mines Company, of Telluride, Colo., for the year ended June 30 last shows that 110,597 tons of ore were milled, from which bullion realizing \$1,281,688 was obtained, at a cost of \$516,388, a profit of \$765,300 being obtained. Out of this the shareholders in the English company have received £112,500 dividends, being at the rate of 37½ per cent., and the remainder has been employed, some in writing off expenditure on capital amount, and the remainder added to the balance of cash in hand which now stands at £78,653. The Cincinnati group of mines, which is the chief asset of the company, now that the original Tomboy property is exhausted, has continued to open up well, and the ore reserves are at about the same figure as a year ago, 408,000 tons. At both the upper part and in the lower levels the orebodies are opening up well, and there is every indication of the presence of large bodies of ore, not yet reckoned in the reserves.

# Mining News from All Parts of the World

New Enterprises, Installations of New Machinery, Development of Mines and Transfers of Property Reported by Special Correspondents

## THE CURRENT HISTORY OF MINING

### Alaska

#### KETCHIKAN DISTRICT

*Princeton Mining and Milling Company*—This company continues operations at the Valparaiso mine, where a force of 20 men is employed drifting to the westward on the 200 level, and in hoisting ore to the surface, where it is being piled up to await the erection and completion of the milling plant the company expects to install early next spring. The vein at the Valparaiso holds a strong and uniform width as far as drifted upon, and its value has been augmented by the discovery of a cross vein recently encountered in the drift which is about 6 ft. in width, carrying good pay values in gold.

#### PRINCE OF WALES ISLAND

*American Marble Company*—This company will continue work all winter at its quarries at Calder, northwest side of Prince of Wales island. The company is now employing 30 men, as many as can at present be comfortably provided for, but the president, C. G. Johnson, is now making arrangements for material for the erection of additional buildings, including dry houses and baths, with a view to a considerable enlargement of operations early in the spring. The product of the quarries is shipped to the mills at Tacoma and San Francisco, where it is sawed into merchantable shape and finds a ready market. It is of fine quality.

### California

#### BUTTE COUNTY

*Mammoth Channel*—The manager of this company at Magalia has gone East to purchase an outfit of machinery. The main shaft is down 400 ft.

#### CALAVERAS COUNTY

*Napoleon*—This copper mine near Telegraph City has closed down for the season, after having shipped this year by traction engines and rail some 6000 tons of ore to the smelters.

#### DEL NORTE COUNTY

*Salt Lake-California Copper Company*—This company has paid for the Union copper mine in full and has cleared out the old workings, finding the main ore-body. There are three parallel veins on the property. The mine is eight miles from the ocean.

#### EL DORADO COUNTY

*Roundout*—At this gravel mine, owned

by A. S. Bosquit, of Placerville, operations of an extensive character will shortly commence.

#### HUMBOLDT COUNTY

A copper deposit, supposed to be extensive, has been discovered on ranch land at Patrick's point, six miles above Trinidad, close to the coast. The discoverer, D. W. Stapp, of Santa Cruz, succeeded in purchasing several hundred acres of land from the owners before they knew of the existence of the copper ore. A cable line can be built from the bluff and the ore delivered on board of steam schooners to be carried to the smelters. This method is used at several points on the northern coast to ship lumber.

*Red Cap District*—Recent investigations as to copper in this district, on the Klamath river near Orleans, have resulted in numbers of prospectors coming in, and numbers of new locations are being filed. Mr. Hussman, a field assistant of the State Mining Bureau, will shortly complete a report on the copper mines of this and adjoining counties.

#### INYO COUNTY

*Greenwater*—Several hundred miners and prospectors continue to work in this district, where affairs are reported to be more active than was supposed.

*Mount Whitney*—Creditors in Los Angeles county have brought involuntary bankruptcy proceedings in the United States Circuit Court against the Mount Whitney Mining Company, operating the Bronco and December mines at Lone Pine. There are a number of creditors but only three of them have filed the petition.

#### MARIPOSA COUNTY

*Chowchilla*—A three-stamp mill at Grub Gulch has been purchased by Webb, Hall, Skelton and Green to be placed on a group of mines in the Chowchilla district.

#### NEVADA COUNTY

*Ancho*—At this mine, near Graniteville, adjoining the Erie, they have completed a 10-stamp mill, assay office, boarding house, etc., and a compressor and electric motor have been shipped. A new road is to be built to the Republic mine, there to connect with the main road from Nevada City. The ledge in the mine is a large one.

*Bowman's Dam*—Five claims located recently at Bowman's dam, northeast of Nevada City, are showing up ore which

is rich in galena and gold. One of the locations made includes the old Jeffersonian, which many years ago yielded a large sum from surface workings only. A. D. McMillan, A. D. Kellen and Emil Allison are the three prospectors who discovered the ledge, which is a large one, with gold as the predominating metal.

*Eagle Bird*—The eastern company holding the bond not having come to time, W. M. Wilson is now in possession of this mine and is planning to start it up as soon as title can be established. The mine was formerly a good producer.

*Golden Gate*—A number of men now working on leases in this mine are doing well. The mine is owned by C. C. Haub, of San Francisco, and W. P. Martin is manager. Some very rich ore has been struck in the course of development work.

*Keller*—This mine, Eureka district, was recently sold to F. A. Garbutt, of Los Angeles, who is running a tunnel to strike the ledge 700 ft. below the old works. T. J. Torpie is superintendent.

*Mayflower*—This mine, east of Nevada City, has been bonded by W. H. Martin and others to W. G. Motley and associates, of New York.

#### PLACER COUNTY

*Dairy Farm*—Work has been discontinued for the present at this mine until matters are settled by the Guggenheims as to the new smelter at Baden, San Francisco bay.

#### PLUMAS COUNTY

*Indian Valley*—Considerable lumber is being supplied for this quartz mine, where a new mill is to be erected and a cyanide plant installed.

*Walker*—This gold and copper mine in Grizzly Valley near Beckwith, Plumas county, has been closed down by an order from the headquarters of the company at Salt Lake, Utah. They recently struck a good vein of copper ore in this property, and the shut-down is caused by the general financial stringency.

#### SAN BERNARDINO COUNTY

*Golden Harvest*—This company has resumed work on its mines near Daggett and the body of ore struck is lasting well. E. L. Parch is manager.

#### SAN DIEGO COUNTY

*Colorado Mining Company*—At this property, Grapevine district, the 1000-foot tunnel being run is now nearly 600 ft. in.



*Encinitas*—It is understood that these copper mines are to be worked by R. J. Coleman. Better facilities will be provided.

#### SISKIYOU COUNTY

*Blue Ledge*—Superintendent F. W. Carnahan, of this copper mine at Eileen, near the Oregon border, says there is no intention of closing down work. The company now has about 100 men employed. Buildings are being erected for the workmen, a new school-house has been constructed, and the camp is building up very fast. The company, it is said, will continue to employ as many men as can be used in the several levels of the mines, and will run day and night. The Blue Ledge now has a large amount of ore in sight and blocked out. All of the other mines in the district are being developed as fast as possible; work will continue throughout the winter.

#### TRINITY COUNTY

Gerald O'Shea, of Alaska, formerly of Trinity county, has returned to that county and is about to open the Red Hill hydraulic mines near Junction City, which have been some time closed down by litigation as to water rights. The disputes having been settled, the extensive gravel deposits will now be utilized. There are large bodies of gravel in the banks of the river, although they are not ancient channels as understood in the central portion of the State. The banks are quite high, and with water rights assured, work should be successful. There is no difficulty in that section of the State about having to impound debris, the Caminetti law not applying in the northwestern counties of California.

### Colorado

#### DOLORES COUNTY—RICO

*Group Mill*—As soon as the Pro Patria mill is finished, the United Rico Mines Company will transfer the force now overhauling that plant to the Group mill with a capacity of 100 tons per day and make it ready for operation. This mill will be supplied with hydro-electric power. The flume which supplies the water has been put in thorough repair. The plant will have 250,000 tons of stope dirt to start with, all of which shows a good net value.

*Pro Patria Mill*—This 60-ton plant of the United Rico Mines Company which has been undergoing a thorough refitting, will be put in operation not later than Jan. 1. A large tonnage of high-grade milling ore has been blocked out in the Ute mine and the entire available force of miners has been put on to keep the developments ahead of the demands of the mill. The revenue of the mill is expected to be largely in excess of the present payroll.

*Ute*—Owing to a scarcity of miners work on the Potter tunnel which was

being driven into Expectation mountain, and winzing on the Shamrock claim in zinc blende ore have been temporarily abandoned. Every raise and drift in the Ute is in ore.

*Ute Contact*—An unusual discovery of ore has been made in raise No. 17 of the Ute mine where a flat body of mineral was found lying on the sandstone and under a stratum of black shale. The ore was from one to four inches thick and assayed \$174 per ton with the principal value in silver. Of the 30 miles of underground workings on Newman hill no contact ore was ever before found in this formation, but always between a lime and sandstone formation, both of which overlie the black shale.

#### LAKE COUNTY—LEADVILLE

The drop in the price of silver has for the present cut off shipments of low-grade silicious ores from several properties on Fryer hill. These are the only mines in the district that have been seriously affected by the drop in the price of silver. The different smelters scattered over the country are buying at present considerable iron and this has stimulated the output.

*Alhambra*—The shaft on this property, Rock hill, is down 550 ft. and from the bottom several prospect drifts have been run into the country. Bunches of good ore have been found in several places, but as yet the main orebody has not been encountered.

*Bug Gold*—The property, Big English gulch, is owned by Milwaukee people and recently the company was re-organized and is now known as the Gold Nugget Mining and Milling Company. The new company decided to run a tunnel from the foot of the mountain to tap the large deposit of low-grade gold ore opened in the shaft. This tunnel is called the Milwaukee, and will be driven a distance of 2000 ft. The work is in charge of John McInnis. Work has been started and will be continued during the winter.

*Highland Chief*—The lessees on this property, Breece hill, are shipping steadily a good grade of oxidized iron and at the same time carrying on considerable development work. The property adjoins the Little Jonny.

*Hope*—On this property, at the head of East Seventh street, the lessees are developing at the 310-ft. level. The work is being carried on in the quartzite, which is heavily mineralized, and the indications point to a good body of ore being opened. The property is near the Hibsche shaft.

*Tucson*—This mine on Iron hill, belonging to the Iron Silver Mining Company, is shipping 100 tons daily of a fair grade of zinc-lead sulphide to the mills at Cañon City. An immense body of this ore has been opened in the white lime below the parting quartzite. The Tucson is the eastern extension of the Moyer.

#### TELLER COUNTY—CRIPPLE CREEK

*Callie*—The new hoisting plant is nearly installed and it is understood that the work of sinking will soon be commenced from below the level of the Ophelia tunnel, with which this shaft is connected. The mine is being run by H. D. Thompson and associates under lease; they having also a lease on the Little Clara, Lucky Corner and other properties in the vicinity. The property belongs to the Stratton Estate.

*Findley Consolidated*—It is understood work will soon be resumed on this property on Bull Hill. It has been closed down for some time on account of the burning of the Golden Cycle Mill. The property has been one of the heaviest producers in this section of the district in the past. L. G. Carlton, of Cripple Creek, is in charge of the property.

*Ophir*—Work is progressing favorably on the new shaft on this property. Heretofore it has been worked through an incline shaft to considerable depth. The new shaft, however, is to be a vertical one and will greatly facilitate the work of handling the ore from the mine. Nothing has been heard lately of the rumored apex suit of the Jennie Sample and this company. The suit was tried in March and resulted in a disagreement of the jury. James F. Smith, of Cripple Creek, has charge of the mine.

### Indiana

#### GREENE COUNTY

*Linton District*—This promises to be one of the most successful mining years in the history of this district. Every mine in the field, 22 in number, is working almost full time and the operators report that indications point to full time for some time. The car situation has improved to such an extent that there is not an independent mine in this field lacking in transportation facilities.

### Michigan

#### IRON

During the year the Maas, Smith, Stevenson, Empire, Breitung Hematite No. 2 and Boston mines were added to the list of producers of Marquette county, and the Rolling Mill, Star West, Mitchell and Conrad were re-opened after periods of idleness. The Michigan gold mine is also resuming after many years of quietude. Of the new mines the Maas is easily the most important. Development of this property began near the close of 1901 and in July, 1907, it hoisted its first ore. It took more than two years to ledge the shaft, due to heavy quicksand, and 30 months more to get to the ore, equip the mine and begin stoping. The annual report of the county inspector of mines states that more men were employed during the year than in any preceding sim-

ilar period and that more mines were running than ever before.

**Loretto Iron Company**—This company, of Loretto, has let a contract for the reformation of the channel of the Sturgeon river, covering the removal of about 500,000 cu.yd. of earth and rock. This will mean the construction of a channel one mile long, 45 ft. wide on the bottom, 200 ft. wide at water level, and 10 ft. deep. From 10 to 60 ft. of excavation above water level will be made. This mine is situated on the Sturgeon river, and is almost surrounded by that stream and two smaller tributaries.

**Caspian**—An interesting operation is to be undertaken at this mine, belonging to Pickands, Mather & Co., at Stambaugh. A sublevel is being driven 25 ft. under the bottom of the overburden of wet quicksand, and from this drill-holes will be run up into the sand, in order that the water may drain down into the level so that it can be handled by pumps. If successful the mine will then be worked by the caving system.

## Nevada

### NYE COUNTY—BULLFROG

**Beatty Mountain**—A crosscut is being run from the 100-ft. level in the main shaft in order to develop the vein. Shaft sinking will be resumed.

**Gibraltar**—Lessees on this mine have opened up a streak of ore running high in assay values. A large amount of ore is being sacked for shipment averaging \$200 per ton. In addition to this rich ore, the mine contains an immense deposit of low-grade milling ore.

**Mammoth**—A new shaft is being sunk under the supervision of J. N. Scott, with the object of developing the vein developed in the Chieftain mine, which has been proved to extend into the Mammoth. A tunnel is also being run into the hill.

**Mayflower**—The 500-ft. level has cut the main ledge which is 22 ft. in width. The quartz carries sulphides and the shaft is making about 12,000 gal. of water daily. The company has decided to erect a mill.

**Shoshone**—The cyanide plant at the new mill is now in full working order. The mill is treating 100 tons of ore daily and the usual amount of shipping ore is going forward to the smelters.

**Starlight**—Development operations are being started on this property, which consists of twelve full claims adjoining the Mayflower.

**National Bank**—A new vein has been cut in the lower workings about 22 ft. from the "east vein." The returns from recent ore shipments to the smelters show an average value of \$485 per ton.

### NYE COUNTY—MANHATTAN

**American Flag**—A crosscut is being run through the vein which was cut by the

shaft at the 75-ft. level. The ore is of good milling grade, and is composed of quartz with a large amount of manganese and iron pyrite.

**Cram-La-Lime**—The recent rich strike in this property continues to develop and ore is being sacked daily.

**Rose-Nash**—Shipping ore is being broken in the east drift on the 70-ft. level. The vein is 8 ft. wide.

**Toquima**—Mining has been resumed on this copper property which is situated in east Manhattan. The shaft is down to the 175-ft. level and is in ore all the way.

**Gold King**—Shaft sinking will shortly be resumed on this property and continued to the water level. The upper levels are being worked by lessees with encouraging results.

**Granny**—The shaft is down to the 300-ft. level and is in a formation largely seamed with quartz stringers. A crosscut is being started at this level to cut several distinct veins. Drifting on a payable ore-body is being pursued at the bottom of the incline shaft.

### NYE COUNTY—TONOPAH

**Belmont**—It was rumored locally that a contributing cause to the decline in stock value was the pinching out of the vein in the lower levels. The vein in the lower levels is looking better than at any previous period. The fall in share values is due purely to the general financial stringency.

**Jim Butler**—The new compressor has been completed and is now in commission and operating five drills. It is driven by an electric motor of 100 h.p. A large tonnage of milling ore is being extracted and stored on the dump; while about 100 tons of \$90 ore is being shipped to the smelters weekly.

**Tonopah**—Steady development work is going on in this mine and regular supplies for the new mill are going forward daily. Both dump and freshly mined ore is being milled. The company's quarterly report for the quarter ending August 31 shows a surplus of \$3,413,332. The net value of ore treated in this company's mill and at the smelters was \$902,664 and the net earnings for the same period amounted to \$393,256.

### WHITE PINE COUNTY—ELY

**Giroux Consolidated**—The Alpha shaft is down to the 1050-ft. level and is in ore running to 15 per cent. copper. About 250 tons of ore are being shipped to the Salt Lake smelters monthly; but after Jan. 1 next, 700 tons will be shipped monthly. The new concentrating mill will be completed before the New Year, and the management expects to obtain sufficient water from the mine to operate it. At present this Alpha shaft is making 46,000 gal. of water per day. A new steel gallow's frame is being built for the

Alpha shaft and the hoisting plant on the Morris shaft is being enlarged.

## New Mexico

### TAOS COUNTY

W. J. Floyd has been working his claims at Red river, while at the mouth of the Columbine, seven miles farther south, J. S. Heathman has sold an interest in his Bertlett mine to Eastern people.

### SOCORRO COUNTY

**Mogollon**—The Top company, controlled by D. R. Brownell and John Coffey, is equipped with a compressor and machine drills and is sinking to reach the level of the rich Last Chance tunnel on the east. The Last Chance is equipped with a concentrator and cyanide mill of 80 tons daily capacity. About 80 men are employed in mine and mill. East of the Last Chance mine is the Deadwood. The 100-ft. shaft is now idle, but 20 men are employed in driving at the bottom of the 250-ft. shaft. Just below Mogollon village, Louis Gramas has been working the Eberle group, but the Little Fannie is still idle. The latter mine was equipped last year with a large head-frame and hoisting engine to work to 1000-ft. depth.

### COLFAX COUNTY

**Gold and Copper Deep Tunnel Company**—This company at Elizabethtown has cut a 6-ft. gold-copper vein at a distance of 2300 ft. from the portal. Considerable gold has been found in the placers of Ute, Willow Moreno and Ponil creeks, on the flanks of Baldy, and the company hopes to discover the mother lodes.

### SANTA FE COUNTY

**Santa Fe Copper Company**—The smelter has been closed since the drop in copper but the development of the mine continues.

### SAN MIGUEL COUNTY

**Tecolote**—The Blake mill near Tres Hermanos is closed; the sandstones are so low-grade and irregular that they can only be exploited when copper is high in price.

### DONA ANA COUNTY

**Las Cruces Copper Company**—This company has bought the Breen mine in the Black Mountain district near Organ

### GRANT COUNTY

**Santa Rita**—Northern & Head have re-timbered the 200-ft. level of their Chino lease. The shipments of concentrate, made by Crawford & Portwood and the Trevarrow company, cannot be continued unless copper advances in price.

**Silver City**—At the Comanche smelter, the second new 300-ton blast furnace is working. As the chief product is gold, this smelter is little affected by the copper



flurry. The Comanche company is pumping out its Gillet & Pacific shafts at Pinos Altos, to a depth of 800 ft.; with a view or satisfying the increased ore demands due to the new smelting stack.

*Copper Flat*—The operations of the exploration syndicate have uncovered copper ore in No. 4 shaft at a depth of 200 ft.

*Carlisle*—The output of the Spence mine here is being shipped to the smelter at Clifton, Arizona.

*Fierro*—S. M. Lee, of Bisbee, purchased from George Kresge, a group of five claims near the Old Hanover mine, of which the Rattler and the Muckley show good shipping ore. The Philadelphia mine has opened up a body of chalcopryrite ore of shipping grade. To the northeast of the Old Hanover, L. P. Cramer has been shipping ore from the Emma mine. John Brockman has been exploring the Continental ground and has exposed in an open cut a body of copper-iron ore.

### New York

#### ONEIDA COUNTY

*Franklin Iron Mines*—A temporary shut-down of the plant at Clinton is reported, the cause being the difficulty in disposing of the output. During the suspension needed repairs at the mines and smelter will be made.

### North Carolina

#### ROWAN COUNTY

*Union Copper Company*—The plant at Gold Hill will be abandoned for the present and the reopening of the mines will depend on the course of the copper market.

### Pennsylvania

#### ANTHRACITE COAL

One point is added to the miners' wages for the month of November, Commissioner Neill having reported that the average price of coal at tidewater was \$4.84 a ton, which makes the wages 6 per cent. above the \$4.50 per ton basis.

*Bear Creek Colliery*—General Manager W. J. Richards, of the Reading coal department, lately visited the Bear Creek colliery, near Pottsville, where a new breaker is to be built. This is one of the largest operations of the company.

*Delaware & Hudson*—This company has made another purchase of coal lands in Schuylkill county, thus adding to its already large anthracite holdings there. The latest purchase embraces 180 acres in Tremont borough. The land is underlain with valuable coal seams, six being close to the surface and can be worked with no difficulty. The consideration paid was \$150,000. The company now controls 5000 acres in Schuylkill county.

*Lehigh Valley Coal Company*—A suit has been instituted by this company, in the Luzerne county court, for a reduction of mining royalties on the coal mined in the Coxe collieries. The tract is at Oneida, and is owned by a Philadelphia company. Under the terms of the lease the company must pay a royalty on a minimum of 50,000 tons a year. The company asked for a reduction in this amount for several years on the ground that the quantity cannot be mined at a profit under existing conditions. The owners, however, have refused to make any reductions, although the larger veins have been largely exhausted and it is more difficult and expensive to mine the smaller veins.

*Maryd Coal Company*—At its property between Pottsville and Tuscarora, this company has succeeded in opening up one of the finest veins of coal ever found in the neighborhood. For a long time water has been drawn off from the old No. 3 slope operated 50 years ago, when it was known as the Potts Red Ash slope. The work has been expensive, it being necessary to drive a gangway under the vein through which the water was tapped by nine holes varying from 50 to 100 ft. As soon as the black damp is removed a force of an additional 100 men will receive permanent work.

There is a report that negotiations are pending for the sale of this company's property to the Delaware & Hudson; but it cannot be substantiated at present.

*Philadelphia & Reading Coal and Iron Company*—This company is planning to extend activities in the Mahanoy valley. It is proposed to erect a mammoth breaker in the vicinity of Big Mine Run, between Girardville and Ashland, and two shafts will be sunk, the double compartments to be used for hoisting coal and water. It is proposed to abandon the east colliery, at Ashland, and from the new shafts open the veins once reached by the old tunnel colliery at Ashland, the Girard and Preston, Nos. 1, 2 and 3 at Girardville. The basin is rich at these points, the underlying seams of the Mammoth, Buck Mountain, Primrose, Seven Foot, Skidmore, Holmes, and Diamond being the most valuable. All of these veins have been worked at one time or another by the Reading or the Lehigh Valley, operating under a lease from the Girard Estate, but only the upper lifts have been exhausted. One big problem that faces the officials is the water underground. All the lower lifts from the old Lawrence place near Gilberton have been allowed to fill with water. The Bear-Ridge, Beattie, three Prestons, and others abandoned long ago, will have to be pumped out and the task will be an immense one. Several years ago shortly after the erection of the new breaker at Preston No. 3, the water was removed from that section, but because of some disagreement of the men during a strike the place was abandoned,

and the breaker removed, so that the mine is now in a worse condition than ever.

*Smith Coal Company*—This company has decided to erect a washery at the Evans colliery, Beaver Meadow, prior to building a breaker there.

#### NORTHUMBERLAND COUNTY

Graphite has been found in paying quantities on the mountain side north of Trevorton, on land owned by John Burget. Two hundred tons of graphite has been mined and after this was inspected by a company from Philadelphia, a contract was closed for the sale of the entire output.

### South Dakota

#### LAWRENCE COUNTY

*Echo*—Manager Simmons has started to drive the present 300-ft. tunnel to 2000 ft. New drills have been installed.

*Rochford - Wyoming Oil Company*—Both oil and gas have been encountered, but the company is going deeper to increase the supply.

#### PENNINGTON COUNTY

*Black Eagle*—A body of graphite with a 25-ft. breast is being developed and the first shipment will be made in a few days.

*Jo Bear*—This property, adjoining the Belt and Lena groups at Keystone, has been purchased by the Henry Wagner interests of Yankton, S. D., who will start work on all the claims within the month.

*Eldorado*—A three-compartment shaft has been sunk 206 ft., uncovering a wide vertical vein of ore. Mill runs justify continued exploitation.

*Dewing*—Col. Clark will develop this property near Keystone in conjunction with the Eagle Mountain and King Oscar groups.

*Forest Bell*—Twenty-five miners are at work on this group on Squaw creek. The claims have been heavily timbered and a new ledge of quartz is being opened.

### Tennessee

#### MAURY COUNTY

*Phosphate Mines*—Many phosphate mines in the Mount Pleasant district have suspended work. From 3000 to 5000 men are thrown out of employment, but arrangements are under way to resume work; the demand for phosphate rock is large.

### Utah

#### BOX ELDER COUNTY

*Century Mining Company*—Work has been suspended in this property.

#### IRON COUNTY

*Jennie Gold Mining Company*—Equipment for the new addition to the mill has arrived on the ground. It is expected that

the enlarged plant will be running by Dec. 15. Eight stamps are being added.

#### GARFIELD COUNTY

*Utah Antimony Company*—This concern has placed its concentrating mill in commission. The plant is built to treat 60 tons of ore a day.

#### JUAB COUNTY

*Colorado*—Upon the request of the smelting company to which it has been shipping its ore for treatment, this company has limited its production to 30 cars monthly. It is expected that a still further reduction will be made later.

*May Day Mill*—This plant is being operated one shift a day. Ore is brought out of the mine on the 200 level and conveyed direct to the mill, avoiding hoisting to the surface.

*Opecr*—The shaft at this property is down 1170 ft. It is to be continued to the 1300 level. The property is controlled by F. Augustus Heinze.

*Sioux Consolidated*—Development work continues at this property. The shaft is down 250 ft.

#### SALT LAKE COUNTY

*South Columbus*—This mine at Alta has been the scene of some important developments during the past two weeks.

*Yampa*—It is expected that this company will resume the operation of its smelter in Bingham cañon about the beginning of next year. The plant is being put in fine condition, and the mine is being equipped with an electric haulage system. The aerial tramway between the mine and smelter is almost completed.

#### SUMMIT COUNTY

*Ore Shipments*—Shipments from Park City mines last week amounted to 2,267,000 lb., the contributing mines and amounts being: Silver King Coalition, 1,472,320; Daly Judge, 795,000 pounds.

*Uintah Treasure Hill*—This company is pushing development work steadily through the Creole shaft.

### Vermont

#### ORANGE COUNTY

*Copper Mines*—The low price of copper has forced the Pike Hill, the Smith and the Higley mines near Corinth to shut down. If the present low prices of copper continue, operations will also be suspended in the remaining mines of the State.

*Vermont Copper Company*—This company proposes to undertake mining and smelting copper ore from the Elizabeth mine near South Strafford. A cement dam is under construction for hydro-electric power and a 300-ton smelter will be installed.

### Wisconsin

#### ZINC—LEAD

*Best*—This new producer, in the Cuba City camp, is turning out 15 to 25 tons of concentrates per shift with a 60-ton mill equipment. A rich strike made by the Veribest company to the southwest, and a big ore find made to the northeast on the McNet land, prove a continuous length of three-fourths of a mile for the Best.

*Frontier*—The frame superstructure has been started for the new 3-jig concentrator. Two 16-in. crosshead pumps will be installed at the mine which will enable the company to unwater the mine from Saturday night to Monday morning of each week.

*Henrietta*—This company is erecting a 60-ton, 8-cell concentrator, equipped with two Wilfley tables. One 14x40-in. Corliss engine will furnish motive power.

*Luckey Twelve*—This company, operating near New Diggings, is erecting a power and sinking plant. Two 15-in. drill holes are said to have yielded close to 1000 lb. of jack clippings.

*Midway*—The 100-ton mill will be operating before the end of November. One 14x36-in. Corliss will generate mine and mill power and one 40-h.p. slide valve engine will run the two 10-in. crosshead pumps.

*Pittsburg Lead and Zinc Company*—A new shaft is being sunk 500 ft. north from the main pump shaft. This company has opened up a zinc deposit of an interesting character. A clay opening filled with a brown to bluish clay, richly disseminated with pebble jack, has been proven 18 to 30 ft. high, 30 ft. wide and 200 ft. long.

*Pittsburg-Benton*—Two new shafts were started recently by this company. One is ahead of the Corr lead run and the other just ahead of the Etna.

*Vanacenter*—The superstructure of the single-jig concentrator is partially reared. The initial shipment from this mine, a carload of hand-cobbed jack brought \$41 per ton; though roughly cleaned it carried only a small fraction of lead and scarcely a trace of iron.

### Canada

#### COBALT DISTRICT

*Ore Shipments*—Shipments of ore for the week ending Nov. 9 were as follows: Buffalo, 40,000 lb.; Kerr Lake, 62,040; La Rose, 455,040; Nipissing, 135,040; O'Brien, 260,000; total, 952,120 lb.

*Beaver*—Forty men are engaged on development work. No. 1 shaft is down 85 ft., and when the 100-ft. level is reached a crosscut will be run to intersect a large vein, showing in the surface, believed to be a continuation in the Temiskaming vein.

*Cobalt Lake*—A vein, reported as nicolite struck in drifting, has been proved

to be mostly smaltite with a small percentage of nicolite. It shows a width of from 26 to 28 in.

*Green-Meehan*—At the annual meeting, held Nov. 9, it was decided to reduce the capital from \$2,500,000 to \$1,500,000 by cancelling 1,000,000 shares of unissued treasury stock. The balance sheet showed \$5292 cash in hand. It appeared that the amount paid for the property was \$325,000 of which \$250,000 was cash and the balance stock; and that only 33 acres, instead of 40 as usual, was secured. Considerable dissatisfaction was expressed by shareholders.

*Red Rock*—No. 3 shaft is down 110 ft. and is being timbered. A station is being cut at the 100-ft. level where extensive drifting and crosscutting will be done during the winter to connect with shafts Nos. 1 and 2.

### Africa

#### RHODESIA

Gold production in October is reported at 53,823 oz. bullion. This makes a total for the 10 months ended Oct. 31 of 455,063 oz. bullion in 1906, and 508,448 oz. in 1907; an increase of 53,385 oz. The bullion reported this year was equal to 452,519 oz. fine gold, or \$9,353,568 in value.

### Asia

#### INDIA

*Kolar Goldfield*—The output of gold in October is reported at 48,808 oz. bullion, being 996 oz. more than in September, but 1293 oz. less than in October, 1907. For the 10 months ended Oct. 31 the total was 479,819 oz. bullion in 1906, and 451,738 oz. in 1907; a decrease of 28,081 oz. The bullion reported this year was equal to 406,564 oz. fine gold, or \$8,403,678 in value.

### Australia

#### NEW SOUTH WALES

Gold production in October was 24,075 oz.; for the 10 months ended Oct. 31 the total was 275,721 oz. in 1906, and 239,382 oz., or \$4,948,026, in 1907; a decrease of 36,339 oz. this year.

#### QUEENSLAND

Gold production in October is reported at 38,300 oz., or \$791,661. The largest district output was 14,800 oz. from Charters Towers.

#### WESTERN AUSTRALIA

The gold production in October is reported at 150,117 oz., an increase of 8914 oz. over September. For the 10 months ended Oct. 31 the total was 1,502,191 oz. in 1906, and 1,397,272 oz., or \$28,881,612 in 1907; a decrease of 104,919 oz. this year.



# Metal, Mineral, Coal and Stock Markets

Current Prices, Market Conditions and Commercial Statistics of the Metals, Minerals and Mining Stocks

## QUOTATIONS FROM IMPORTANT CENTERS

### Coal Trade Review

New York, Nov. 20—The trade in the West is generally steady, with little falling off in demand. There has been a surprising decrease in complaints of car shortage, and the troubles in this direction have diminished, except on certain roads.

In the East the bituminous trade is hesitating a little, being more affected by the financial disturbances than in the West. Nevertheless, demand is still fair.

The anthracite trade shows the usual improvement as colder weather approaches. Both domestic and steam sizes are stronger than they have been.

In the bituminous fields there seems to be a rather unsettled condition with regard to labor. The miners are approaching the subject of schedules, etc., for 1908 with considerable hesitancy on account of the present financial troubles and with the example of the shutting down or curtailing production of the metal mines before them. On the other hand, the operators are taking a firm stand in the matter and it is not believed that they will give in to any demands made by the men. At present there are only undercurrents of dissatisfaction and no actual demonstration. The question of making adjustments between the miners and the companies comes up considerably earlier this year than in former years.

### COAL TRAFFIC NOTES

Shipments of coal and coke originating on the Pennsylvania Railroad Company's lines east of Pittsburg for the year to Nov. 9 were as follows, in short tons:

	1906.	1907.	Changes
Anthracite.....	3,824,311	4,834,797	I. 1,010,486
Bituminous.....	27,599,951	33,749,305	I. 6,149,354
Coke.....	10,890,799	12,016,697	I. 1,125,898
<b>Total.....</b>	<b>42,315,061</b>	<b>50,600,799</b>	<b>I. 8,285,738</b>

The total increase this year was 19.6 per cent.

Coal receipts at St. Louis for the nine months ended Oct. 31 are reported by the short tons in 1906, and 5,695,971 tons in 1907; an increase of 374,981 tons.

Coal receipts at Boston for the 10 months ended Oct. 31 are reported by the Chamber of Commerce as follows:

	1906.	1907.	Changes.
Anthracite.....	1,324,717	1,705,535	I. 380,818
Bituminous.....	2,475,043	2,585,289	I. 110,246
<b>Total domestic....</b>	<b>3,799,760</b>	<b>4,290,824</b>	<b>I. 491,064</b>
Foreign coal....	551,840	448,137	D. 103,703
<b>Total.....</b>	<b>4,351,600</b>	<b>4,738,961</b>	<b>I. 387,361</b>

The foreign coal is chiefly from Nova

Scotia, but a little comes from Great Britain.

### New York

#### ANTHRACITE

Nov. 20—The market shows considerably more activity and certain large producers report a strong demand and large shipments of all sizes of anthracite with the exception of egg, which for several months has been dull. Small steam sizes have picked up and are in good demand. It is reported from certain quarters that stocks of hard coal are much lower at this time than they have been for some years past. Prices are quoted as follows: Broken, \$4.50@4.75; egg, stove and chestnut, \$5; pea, \$3.25@3.50; buckwheat No. 1, \$2.75@3; buckwheat No. 2 or rice, \$2.15@2.25; barley, \$1.75, all f.o.b. New York harbor.

#### BITUMINOUS

Trade in New York harbor is inclined to be less active than last week. This is due to the fact that the bulk of the shoalwater port orders are now closed up, and the coal formerly going to these points is now available for other territory. Prices are a little lower than recently, good grades of steam coal bringing \$2.75@2.85 f.o.b. New York harbor. There seems to be enough coal to go around, but there does not seem to be much surplus. In the harbor ports freighters are receiving 25c. per ton to points in the harbor and 50c. per ton to the Sound, which is considerably higher than formerly.

In the far East the demand is wholesome and strong. A few cargoes are still going to shoalwater ports; most of the contracts are now completed, but certain shippers always endeavor to send a "last" cargo only to follow this by a still later one if possible. Freights to these ports are in consequence very high. Along the Sound trade is good and the demand is strong.

Transportation from mines to tide is fair and car supply is variable. In some sections cars are fairly plentiful, while elsewhere there is a decided dearth. Vessel freight rates are as follows: From Philadelphia to Boston, Salem and Portland, \$1; to Newburyport and Lynn, \$1.25; to Portsmouth, \$1.05@1.10; to the Sound, 85@90c. per ton.

### Birmingham

Nov. 18—There has been but little interruption so far in the coal business in

Alabama. A number of coke ovens belonging to the larger iron companies have been shut down and this has affected the coal production in some quarters, but the general conditions are still satisfactory.

The Alabama-Gulf Coal Company has been organized to build part of a line from the Warrior coalfields to the Gulf. Lewis Minor is vice-president and acting president; J. R. Dewberry, treasurer; R. D. Johnston, Jr., secretary.

### Chicago

Nov. 18—The coal trade continues unsettled and probably will not recover its former larger proportions soon, whatever the outcome of financial troubles. It is realized that in several lines of steam-coal consumption there will be curtailment in the future.

Illinois and Indiana coals remain at \$2.15@3 for lump, \$1.75@2.25 for run-of-mine, and \$1.15@1.50 for screenings.

Eastern coals have been weak and in too great supply. Smokeless is especially weak, and has been cut 10 to 15c. below \$3 for run-of-mine listed at \$3.40. Lump and egg of smokeless hold up more nearly to the list price, \$4.30, but have also been cut on many sales. Hocking has been over-abundant and has sold at \$3.50@3.65. Gas coals are fairly firm. Youghiogheny brings \$3.25 for 3/4-in. and Pittsburg No. 8 \$3 for 1 1/4 in.

Anthracite is selling well, with none too great supply and chestnut still scarce.

### Pittsburg

Nov. 19—Conditions remain practically the same as a week ago. Prices are somewhat stronger, although quotations remain \$1.40@1.50 for mine-run coal f.o.b. mine. Many sales were made during the week at the maximum rate. Slack is weak and it is doubtful if more than 70c. can be obtained. Several transactions are reported at a much lower rate. There are not enough railroad cars to operate the mines to capacity and production is limited to about 60 per cent. The river mines continue to operate fully and have an ample supply of empty coal boats and barges.

*Connellsville Coke*—Prices continue to decline and standard Connellsville furnace coke is quoted this week at \$2.40@2.50; foundry coke, \$2.90@3, at ovens. The H. C. Frick Coke Company continues to restrict production and is said to have about 3000 idle ovens and has put a number of additional works on five days a week running time. The *Courier* in its summary

for the week gives the production in both regions at 322,340 tons. The shipments amounted to 11,913 cars, distributed as follows: To Pittsburg, 4411 cars; to points west of Connellsville, 6714 cars; to points east of Connellsville, 788 cars.

### Foreign Coal Trade

The coal bunkered or sold for consumption on steamships in foreign trade at United States ports for the nine months ended Sept. 30 was 4,523,534 tons. Adding this to the exports, previously reported, makes a total of 14,342,677 tons of coal sold for consumption beyond the limits of the United States.

Fuel exports from Great Britain, with coal sent abroad for the use of steamships engaged in foreign trade, for the 10 months ended Oct. 31 was, in long tons:

	1906.	1907.	Changes.
Coal.....	46,371,460	52,814,549	I. 6,443,089
Coke.....	658,321	768,415	I. 110,094
Briquets.....	1,152,632	1,233,226	I. 80,594
Total.....	48,182,413	54,816,190	I. 6,633,777
Steamer coal.....	15,576,014	15,539,691	D. 36,323
Total.....	63,758,427	70,355,881	I. 6,597,454

Exports to the United States, included above, were:

	1906.	1907.	Changes.
Atlantic ports.....	22,112	14,339	D. 7,773
Pacific ports.....	30,741	31,682	I. 941
Total.....	52,853	46,021	D. 6,832

The larger exports were 8,770,524 tons to France; 8,329,296 to Germany; 6,928,742 to Italy; 3,331,719 to Holland.

### Iron Trade Review

*New York, Nov. 20*—The iron and steel markets continue to feel the effect of financial conditions. New business appears only in very small volume, and such orders as are placed are for immediate needs. No one is prepared just now to enter into any extensive commitments for the future. A number of furnaces have already gone out of blast, and mills are closing down, in whole or in part. By the end of the month, apparently, production will be seriously reduced.

It is understood that the leading interest will maintain prices so far as possible. Under present conditions prices do not seriously affect the business coming forward. A little later, however, when the money market is more settled, the question of prices will come up for careful consideration.

*Pig-Iron Production*—The reports of the blast furnaces on Nov. 1 show that the actual weekly capacity of the coke and anthracite stocks in blast was 491,500 tons, a reduction of 20,000 tons from Oct. 1. Since Nov. 1, however, a number of furnaces have blown out, reducing the weekly capacity to about 462,000 tons; while more are preparing to stop. Tak-

ing the American Association report for the first half of the year, the estimate of the *Iron Age* for the coke and anthracite furnaces in recent months, and making allowance for the charcoal furnaces, we find that the production of pig iron in October was, approximately, 2,372,000 tons; for the 10 months ended Oct. 31 it was 22,669,544 tons.

*Lake Superior Iron Ore*—Shipments of iron ore by ports from the Lake Superior region for the season to Nov. 1 are reported by the *Marine Review*, of Cleveland, as follows, in long tons:

	1906.	1907.	Changes.
Escanaba.....	4,967,360	5,253,043	I. 285,683
Marquette.....	2,509,286	2,701,812	I. 192,526
Ashland.....	3,049,054	3,103,838	I. 54,784
Superior.....	5,352,745	6,747,945	I. 1,395,200
Duluth.....	9,955,216	11,908,539	I. 1,953,323
Two Harbors... ..	7,405,174	7,326,684	D. 78,490
Total.....	33,238,835	37,041,861	I. 3,803,026

The chief increase this year came from the Mesabi range. The three Minnesota ports shipped this year 70.1 per cent. of the total, against 68.3 last season.

*Steel Production in Great Britain*—The British Iron Trade Association reports the production of steel ingots in Great Britain for the first half of the year as follows, in long tons:

	1906.		1907	
	Tons.	Per Ct.	Tons.	Per Ct.
Open-hearth....	2,196,853	70.5	2,337,794	68.6
Bessemer.....	919,620	29.5	1,068,972	31.4
Total.....	3,116,473	100.0	3,406,766	100.0

The increase in open-hearth ingots was 140,941 tons, and in bessemer 149,352; the total gain being 290,293 tons, or 9.3 per cent. The increase in bessemer steel was greater in proportion than that in open-hearth. The proportion of steel to pig-iron output was 63.5 in 1906, and 65.6 in 1907. The make of bessemer steel rails this year was 452,774 tons, a decrease of 34,410 tons.

### Baltimore

*Nov. 19*—Imports for the week included 6280 tons chrome ore from New Caledonia and 2900 tons manganese ore from Cuba. Arrivals of iron ore were 12,000 tons from Cuba and 6100 tons from Greece; 18,100 tons in all.

### Birmingham

*Nov. 18*—A general curtailment in the pig-iron production in the Southern territory is on. Little is being said in this section in regard to the pig-iron quotations. There is no corroboration of statements that iron has been selling at low prices. What little is being sold now is for immediate delivery and a fairly good price is being obtained, though nothing like what has been in vogue for more than a year.

The new president of the Tennessee company, Gordon Crawford, former manager of the McKeesport division of the United States Steel Corporation, is now

getting a view of the properties of the company and getting ready for the actual management of its affairs.

### Chicago

*Nov. 18*—Hardly any market exists for pig iron, the few orders received by furnace agents being for small lots, mostly of carload size. This condition has existed for several months and is not to be ascribed wholly to financial conditions.

Quotations are hard to give, sales being made under such different conditions and prices. Southern may be had at \$15.50 Birmingham (\$19.85 Chicago) or it may be worth \$1.50 or \$2 more, depending on who has it and how much it is needed. Northern is in the same condition, low quotations being \$20@20.50. Northern charcoal iron has occasional sales at about \$25.

Coke shares the depression of business and the best Connellsville brings \$5.65@ \$5.90 Chicago.

### Philadelphia

*Nov. 20*—The action of the Government will probably have an excellent effect upon the steel industry in this territory. Much of the inactivity has been due to the lack of confidence. The establishment of better conditions will react on the market and result in increased business. This in effect is the conclusion as expressed by a few of the larger pig-iron producers. In point of fact, very little business has been done during the past week. No one is offering any iron; everyone is anxious to sell, but the makers are determined to do business at certain prices.

*Steel Billets*—Steel billets continue at about the same prices as last week with sales of small lots mainly from customers who have been for some time buying material just as needed.

*Bars*—Bar iron is strong in a retail way.

*Sheets*—Our sheet-iron trade is in about the same shape. Card rates unchanged.

*Merchant Steel*—Agents report a moderate but steady distribution in this territory.

*Pipes and Tubes*—The industries using pipe work and tubes are all busy, but our people are buying in a small way only.

*Structural Material*—The structural-steel business has dropped off decidedly. There are no more heavy orders coming in. The mills have a good deal of business, but some cancellations have taken the life out of the business.

*Scrap*—The scrap dealers have less to say than usual and have no important sales to report. They are rather cautious about buying scrap at current quotations. The only kind that they are willing to take chances on is heavy steel and railroad scrap. Other kinds are inclined to weakness, but there is not enough business to judge.



**Pittsburg**

Nov. 19—Conditions in the iron and steel markets do not show any improvement and it is not likely there will be much new business placed this year, outside of steel rails. Nothing definite has developed so far toward the placing of orders by the railroads for 1908 requirements, but it is confidently believed that they will come into the market shortly.

There not only is no new business but many old orders have been cancelled and specifications have fallen off considerably. The Steel Corporation positively refuses to accept cancellations and is postponing the orders, expecting the buyers to take the material later. Production is being greatly restricted and when buying begins there will not be any accumulation of stocks in any of the various finished lines. In this way it is proposed to prevent a serious slump in prices. It is understood the current quotations on finished products will continue until the end of the year when there will be a complete readjustment. The American Sheet and Tin-Plate Company is not making any tin-plate beyond the actual demand. In carrying out this plan it is operating less than 50 of its 242 tin-plate mills. The leading independent producer, the Pope Tin-Plate Company, has suspended operations, and it is estimated that not more than 50 independent tin mills are running.

**Pig Iron**—There has been absolutely no transaction of importance in pig iron for several weeks. Quotations on all grades are lower, but are purely nominal. Bessemer may be had at \$19, Valley furnaces, but the leading independent producer refuses to quote less than \$20. No. 2 foundry iron is down to \$18.50 and gray forge may be had at \$18, Valley furnaces. On basic there is not even a nominal quotation and it would not be surprising to see sales as low as \$17. Production has been greatly curtailed. According to authentic information received late today the United States Steel Corporation is operating but 50 of its 95 blast furnaces. The Carnegie Steel Company has 24 out and 4 banked; the Illinois Steel Company has 9 idle, the National Tube Company, 5 and the American Steel and Wire Company, 3, a total of 45 furnaces inactive. The Republic Iron and Steel Company is operating but two of its six furnaces in the North.

**Steel**—The market is quiet. Both bessemer and open-hearth billets are quoted at \$28. Sheet-bars remain at \$31, but no sales are being made at that price. Plates remain strong at 1.70c. and steel bars at 1.60c.

**Sheets**—The regular prices are being shaded \$2 and more. Quotations remain at 2.60c. for black sheets and 3.75c. for galvanized for No. 28 gage.

**Ferro-Manganese**—One sale of prompt ferro was made today at \$52.50, which represents a cut of 50c. a ton.

**Sault Ste. Marie**

The freight passing through the Sault canals for the season up to Nov. 1 is reported as below, in net tons:

	1906.	1907.	Changes.
East-bound .....	35,917,954	39,552,112	I. 3,634,158
West-bound.....	8,487,561	10,923,579	I. 2,436,018
<b>Total.....</b>	<b>44,405,515</b>	<b>50,475,691</b>	<b>I. 6,070,176</b>

The number of vessels passed through was 17,983, showing an average cargo of 2807 tons. The mineral freights included in the totals were as follows, in net tons, except salt, which is in barrels:

	1906.	1907.	Changes.
Anthracite.....	823,800	1,249,844	I. 426,044
Bituminous.....	6,495,054	8,626,500	I. 2,131,446
<b>Total coal.....</b>	<b>7,318,854</b>	<b>9,876,344</b>	<b>I. 2,557,490</b>
Iron ore.....	31,307,915	35,036,614	I. 3,728,699
Pig & manu. iron	308,141	259,291	D. 48,850
Copper.....	88,651	63,767	D. 24,884
Building stone...	6,222	898	D. 5,324
Salt, bbl.....	404,688	417,960	I. 13,272

This year iron ore formed 69.4, and coal 19.6 per cent. of the total freight reported.

**London**

Oct. 21—Exports of iron and steel from Great Britain for the nine months ended Sept. 30 are valued by the Board of Trade returns as follows:

	1906.	1907.	Changes.
Iron and Steel..	£28,755,634	£35,623,319	I. £6,867,685
Machinery.....	19,497,196	23,113,859	I. 3,616,663
New Ships.....	7,381,681	8,229,390	I. 847,709
<b>Total.....</b>	<b>£55,634,511</b>	<b>£66,966,568</b>	<b>I. £11,332,057</b>

The total quantities of iron and steel were 3,359,430 tons in 1906, and 4,002,919 tons in 1907; an increase of 643,489 tons, or 19.2 per cent. The exports of pig iron to the United States this year were 410,371 tons, an increase of 235,237 tons; of tin-plates 46,723 tons, an increase of 4886 tons.

Imports of iron and steel into Great Britain for the nine months were valued as follows:

	1906.	1907.	Changes.
Iron and steel..	£6,565,980	£5,035,812	D. £1,530,168
Machinery.....	3,939,644	4,081,009	I. 141,365
<b>Total.....</b>	<b>£10,505,624</b>	<b>£9,116,821</b>	<b>D. £1,388,803</b>

The total quantities of iron and steel were 974,984 tons in 1906, and 643,187 in 1907; a decrease of 331,797 tons, or 34 per cent.

Imports of iron ore for the eight months were, in long tons:

	1906.	1907.	Changes.
Manganiferous ores.	242,929	239,171	D. 3,758
Iron ores.....	5,804,384	5,728,638	D. 75,746
<b>Total.....</b>	<b>6,047,313</b>	<b>5,967,809</b>	<b>D. 79,504</b>

Of the ores imported this year, 186,183 tons manganiferous and 4,345,790 tons iron came from Spain.

**Dusseldorf, Germany**

Nov. 8—The German Iron and Steel Union reports the output of the blast furnaces in Germany in September at 1,091,020 metric tons of pig iron, or 26,525 tons less than in August. This apparent decrease was really less than was due to the shorter month; the daily aver-

age showing a gain, from 36,050 tons in August to 36,367 in September. For the nine months ended Sept. 30 the production was as follows, in metric tons:

	1906.		1907.	
	Tons.	Per Ct.	Tons.	Per Ct.
Foundry iron....	1,583,193	17.1	1,668,083	17.2
Forge iron.....	638,731	6.9	583,494	6.0
Steel pig.....	695,613	7.5	758,732	7.8
Bessemer pig....	354,880	3.8	357,461	3.7
Thomas pig.....	6,000,566	64.7	6,320,714	65.3
<b>Total.....</b>	<b>9,272,983</b>	<b>100.0</b>	<b>9,688,484</b>	<b>100.0</b>

There were increases of 84,890 tons in foundry iron; 63,119 in steel pig, which includes spiegeleisen, ferromanganese, ferrosilicon and all similar alloys; 2581 in bessemer pig; 320,148 in Thomas or basic iron; and a decrease of 55,237 tons in forge iron. The total gain was 415,501 tons, or 4.5 per cent.

Exports and imports of iron and steel in Germany for the nine months ended Sept. 30 were as follows, in metric tons:

	1906.	1907.	Changes.
<b>Exports:</b>			
Iron and steel.....	2,728,729	2,569,880	D. 158,849
Machinery.....	211,913	242,849	I. 30,936
<b>Total.....</b>	<b>2,940,642</b>	<b>2,812,729</b>	<b>D. 127,913</b>
<b>Imports:</b>			
Iron and steel.....	443,795	600,063	I. 156,268
Machinery.....	65,075	72,713	I. 7,638
<b>Total.....</b>	<b>508,870</b>	<b>672,776</b>	<b>I. 163,906</b>

Imports of iron ore for the nine months were 6,441,919 tons; exports were 2,962,026 tons. Imports of manganese ore were 287,187 tons; exports were only 2648 tons.

**Metal Market**

**Gold and Silver Exports and Imports**

NEW YORK, Nov. 20.  
At all United States Ports in Oct. and year.

Metal.	Exports.	Imports.	Excess.
<b>Gold:</b>			
Oct. 1907..	\$ 3,112,539	\$ 4,480,910	Imp. \$ 1,368,371
" 1906..	7,074,544	27,250,852	" 20,176,308
Year 1907..	52,992,352	35,343,130	Exp. 17,649,222
" 1906..	42,864,506	139,026,869	Imp. 96,162,363
<b>Silver:</b>			
Oct. 1907..	5,053,997	3,566,634	Exp. 1,487,363
" 1906..	3,549,017	3,882,522	Imp. 333,505
Year 1907..	53,024,790	38,054,858	Exp. 14,969,932
" 1906..	48,990,356	36,876,591	" 12,113,765

These statements cover the total movement of gold and silver to and from the United States. These figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

**Gold and Silver Movement, New York**

For week ending Nov. 16 and years from Jan. 1

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week.....	\$ .....	21,110,672	\$ 1,199,218	\$ 76,659
1907.....	34,818,544	37,168,550	46,354,230	2,709,747
1906.....	6,040,153	92,792,058	45,891,143	1,984,431
1905.....	34,510,503	10,514,083	30,640,660	3,930,765

No exports of gold for the week; the silver went chiefly to London. Imports of gold for the week were from Great Britain and France; of silver from the West Indies and South America.

The foreign trade of the United States for the 10 months ended Oct. 31 is reported as below by the Bureau of Statistics of the Department of Commerce and Labor:

	1906.	1907.
Exports, merch'dise..	\$1,425,187,772	\$1,512,148,160
Imports, ..	1,066,395,469	1,219,994,354
Excess, exports.....	\$358,792,303	\$292,153,806
Add excess of exports, silver.....	14,969,932	
Add excess of exports, gold.....	17,649,222	
Total export balance.....	\$324,772,960	

The gold and silver movement in detail will be found in the table at the head of this column.

Specie holdings of the leading banks of the world, Nov. 16 are reported as below, in dollars:

	Gold.	Silver.	Total.
Ass'd New York			\$170,347,900
England.....	\$159,481,455		159,481,455
France.....	541,033,070	\$186,834,455	727,867,525
Germany.....	142,985,000	39,625,000	182,610,000
Spain.....	78,005,000	127,245,000	205,250,000
Netherlands.....	38,124,500	24,922,000	63,046,500
Belgium.....	15,480,000	7,740,000	23,220,000
Italy.....	183,430,000	24,116,000	207,546,000
Russia.....	625,735,000	24,940,000	650,675,000
Aust.-Hungary.....	227,580,000	57,720,000	285,300,000
Sweden.....	21,125,000		21,125,000

The banks of England and Sweden report gold only. The New York banks do not separate gold and silver in their reports. The European statements are from the cables to the *Commercial and Financial Chronicle* of New York.

Gold and silver movement in Great Britain for the 10 months ended Oct. 31 is reported as follows:

	1906.	1907.
Gold :		
Imports.....	£36,350,603	£37,980,302
Exports.....	37,209,592	30,789,670
Excess.....	Exp. £858,989	I. £7,190,632
Silver:		
Imports.....	£15,172,860	£13,810,699
Exports.....	16,577,681	14,779,880
Excess, exports.....	£ 1,404,821	£ 969,181

Of the silver imported this year £10,175,638, or 73.7 per cent. of the total, came from the United States.

Silver Market

SILVER AND STERLING EXCHANGE.							
Nov.	Sterling Exchange.	Silver.		Nov.	Sterling Exchange.	Silver.	
		New York, Cents.	London, Pence.			New York, Cents.	London, Pence.
14	4.8600	58 3/4	26 1/2	18	4.8650	58 7/8	27 3/4
15	4.8650	58 3/4	26 1/2	19	4.8560	59 1/2	27 3/4
16	4.8700	58 3/4	27 1/4	20	4.8600	59 1/4	27 3/4

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver, 0.925 fine.

Shipments of silver from London to the East as reported by Messrs. Pixley & Abell as follows, for the year to Nov. 7:

	1906.	1907.	Changes.
India.....	£ 13,585,396	£10,131,554	D. £ 3,453,842
China.....	430,700	99,850	D. 330,850
Straits.....	1,750	625,950	I. 624,200

Total..... £ 14,017,846 £10,857,354 D. £ 3,160,492

Receipts for the week were £194,000 from New York, £2000 from the West Indies and £3000 from Australia; £199,000 in all. Exports were £231,600, all to India.

Indian exchange is again easier, the Council bills offered in London having been taken at an average of 15.91d. per

rupee. Buying of silver for India has been light.

The director of the Mint this week bought 100,000 oz. of silver for delivery at Denver, and 100,000 oz. delivered at New Orleans. The price paid was 58.812c. per fine ounce.

Prices of Foreign Coins

	Bid.	Asked.
Mexican dollars.....	\$0.47	\$0.49
Peruvian soles and Chilean.....	0.41	0.46
Victoria sovereigns.....	4.83	4.86
Twenty francs.....	3.87	3.92
Spanish 25 pesetas.....	4.78	4.80

Other Metals

Nov.	Copper.		Tin.	Lead.	Spelter.	
	Lake, Cts. per lb.	Electrolytic, Cts. per lb.			Cts. per lb.	Cts. per lb.
13 1/2	13 1/2			4.40	4.95	4.80
14	@13 3/4	@13 3/4	59	30 1/2 @4.45	@5.00	@4.85
15	13 3/4	13		4.35	4.90	4.75
15	@13 3/4	@13 3/4	58 1/2	30 1/2 @4.40	@5.00	@4.85
16	13 3/4	12 3/4		4.35	4.90	4.75
16	@13 3/4	@13 3/4	.....	30 1/2 @4.40	@4.95	@4.80
18	13 3/4	12 3/4		4.30	4.85	4.70
18	@13 3/4	@13	58 3/4	29 1/2 @4.35	@4.95	@4.80
19	13	12 3/4		4.25	4.85	4.70
19	@13 3/4	@13	58 3/4	31 @4.30	@4.95	@4.80
20	13	12 3/4		4.25	4.85	4.70
20	@13 3/4	@13	58	31 @4.30	@4.95	@4.80

London quotations are per long ton (2240 lb.) standard copper, which is now the equivalent of the former g.m.b.'s. The New York quotations for electrolytic copper are for cakes, ingots or wirebars, and represent the bulk of the transactions made with consumers, basis, New York, cash. The price of cathodes is 0.125c. below that of electrolytic. The quotations for lead represent wholesale transactions in the open market. The quotations on spelter are for ordinary western brands; special brands command a premium.

**Copper**—The financial position continues to dominate, and buyers are unwilling to enter into commitments for the future. Sellers are equally unwilling to take orders for the future at current prices. Neither party is disposed to do anything except under the pressure of necessity, consequently the market retains all the features which characterized it in the previous week. Business is of small proportions and consumers both here and abroad are showing little interest. There are, however, some speculative operations which keep up a semblance of activity. Offerings have been somewhat more pressing and prices are giving way gradually, so that the market closes easy with Lake at 13@13 3/4c., electrolytic in ingots, wirebars and cakes at 12 3/4@13c., while business in casting copper has been done during the week on an average of 12 1/2@12 3/4c.

The London standard market has also been rather depressed during the greater part of the week, but continues to fluctuate within narrow limits. The close is cabled at £58 for spot, £57 15s. for three months.

Statistics for the first half of the current month show an increase in the visible supplies of 3000 tons.

Refined and manufactured sorts we

quote: English tough, £55; best selected, £62; strong sheets, £66.

Exports of copper from New York and Philadelphia for the week were 6570 long tons. Our special correspondent gives the exports from Baltimore for the week at 495 tons.

**Copper Sheets and Wire**—The base price for copper sheets is 20c. per lb.; of wire, 16 1/2@16 3/4c. per pound.

**Tin**—The London market during the past week has been steady. A firmer tone developed the beginning of the week on account of larger transactions which had taken place in this market, where buyers showed some interest in November and December deliveries. The domestic spot market is still at a premium over import prices, and closes at 31c. per lb. From London the closing quotations are cabled as £135 for spot, £136 10s. for three months.

**Lead**—Last week we stated that, for reasons then given, our quotations for lead would hereafter be those of the open market—that is, the prices of large quantities on actual sales—and not the contract prices of the chief producer, as heretofore. That producer has accepted the situation. The American Smelting and Refining Company announced last Monday that it withdraws its official quotations and in future will compete in the open market. By this action the artificial situation which has existed hitherto is at an end, and more normal conditions can be expected to prevail henceforth, since prices are again to be regulated by the law of supply and demand. At the present time the tendency is downward. Consumers are well supplied, while sellers have large stocks on hand, with which they are ready to part at a sacrifice. Such business as has taken place has been of small proportions and was transacted at declining prices. The market closes weak at 4.25@4.30c. New York. In St. Louis lead is freely offered at 4.20@4.25c.

The London lead market is gradually giving way and the close is cabled as £16 17s. 6d. for Spanish lead, £17 for English lead.

**St. Louis Lead Market**—The John Wahl Commission Company reports as follows: Lead is dull and lower. The metal can be bought on basis of 4.30c., and will not sell at present market. The financial conditions are no better than they have been for some little time, and until there is improvement in this direction we cannot look for any movement in lead.

**Spelter**—The market is very weak. Stocks which have accumulated in the hands of smelters are being pressed for sale without finding a ready outlet, since galvanizers are well supplied and in the present condition of the money market are not inclined to take in near-by spelter even at figures which in a different financial position would be very attractive.



The close is quoted at 4.85@4.95c. New York, 4.70@4.80c. St. Louis.

The reports about the European spelter market are still discouraging. The market there again closes lower at £21 for good ordinaries, £21 5s. for specials.

**Zinc Sheets**—The base price is \$7.50 per 100 lb.—less discount of 8 per cent.—f.o.b. cars at Lasalle and Peru. The freight rate to New York is 27.50c. per 100 lb.

**Antimony**—The market remains inactive and prices are unchanged. Quotations are as follows: Cookson's, 11c.; Hallett's, 10c.; ordinary brands, 8 3/4@9 1/8c.

**Nickel**—For large lots, New York, the chief producer quotes 45@50c. per lb. according to size and terms of order. For small quantities, 50@65c., same delivery.

**Quicksilver**—New York quotations are \$45 per flask for lots of 100 flasks or over, and \$46 for smaller orders. Retail sales are made at 62@63c. per lb. The London price is £8 5s. per flask, with £8 3s. 9d. quoted from second hands.

Receipts of quicksilver at San Francisco for the nine months ended Sept. 30 were 11,416 flasks in 1906, and 9852 flasks in 1907; a decrease of 1564 flasks.

**Platinum**—No charge is noted in the market during the week. Prices are: Hard metal, \$29; ordinary, \$26@26.50; scrap, not more than \$19 per troy ounce.

**Wisconsin Ore Market**

**Platteville, Wis., Nov. 16**—The prevailing price paid for 60 per cent. zinc ore during the week was \$38.50 per ton; lead ore, 80 per cent., sold at \$21 per thousand; two choice cars testing above 82 per cent., bought for the purpose of reducing western mixed ores, brought the top price to \$24 per thousand.

Shipments for the week ending Nov. 16 were, in pounds:

Camps.	Zinc ore, lb.	Lead ore, lb.	Sulphur ore, lb.
Platteville	312,820	66,000	
Livingston	200,000		
Galena	170,000		
Harker	166,980		
Cuba City	138,000		
Highland	132,000		
Linden	120,000		
Benton	115,790		
Rewey	110,000		
Dodgeville	95,000		
Hazel Green	65,000		
Mineral Point	51,400		
Total for week	1,676,990	66,000	
Year to Nov. 16	91,432,817	4,488,030	462,360

Unable to sell sufficient ore to pay operating expenses, several mines have already been forced to close down and unless the situation changes and buyers get back into the market again, a general shutdown will likely occur within the next two weeks.

**Missouri Ore Market**

**Joplin, Mo., Nov. 16**—The highest prices reported paid for zinc was \$41.50 per ton, on an assay base price ranging from \$35 to \$40 per ton of 60 per cent.

zinc. One sale of 800 tons was made on a \$40 base, aside from which a \$39 base was the highest reported, and some 63 per cent. ore sold as low as a \$38 base. Offerings as low as a \$35 base were made, but not accepted. The average price was over \$1 higher, on account of higher grades selling. It was \$36.78. The highest price paid for lead was \$48, medium grades ranging from \$44 to \$46 per ton and the average at \$45.12, very little low-grade ore being included. The market was steadier, and this gave the effect of firmness, and it is generally believed by the buyer and the seller that the low level has been reached. The shipment was the smallest of the year.

Following are the shipments of zinc and lead from the various camps of the district for the week ending Nov. 16:

	Zinc, lb.	Lead, lb.	Value.
Webb City—Carterville	2,631,740	498,310	\$ 60,148
Joplin	1,748,050	173,830	37,037
Oronogo	728,450		14,225
Duenweg	527,830	87,080	11,764
Galena	579,130	53,450	11,573
Prosperity	350,880	194,200	10,957
Badger	323,470		6,469
Spurgeon	289,400	55,830	6,108
Granby	450,000	10,000	5,230
Alba-Neck City	225,610		4,512
Aurora	183,510	22,800	4,080
Zincite	160,480		3,129
Sarcozie	82,210		1,520
Carthage	63,790		1,275
Stott City	50,070		926
Wentworth	46,930		868
Totals	8,421,550	1,105,500	\$179,821

46 weeks..... 521,477,230 77,716,990 \$14,464,751  
Zinc value, the week, \$154,872; 46 weeks, \$11,692,729  
Lead value, the week, 24,949; 46 weeks, \$2,772,022

Average prices for ore in the district, by months, are shown in the following table:

ZINC ORE AT JOPLIN.			LEAD ORE AT JOPLIN.		
Month.	1906.	1907.	Month.	1906.	1907.
January	47.38	45.84	January	75.20	83.53
February	47.37	47.11	February	72.83	84.58
March	42.68	48.66	March	73.73	82.75
April	44.63	48.24	April	75.13	79.76
May	40.51	45.98	May	78.40	79.56
June	43.83	44.82	June	80.96	73.66
July	43.25	45.79	July	74.31	58.18
August	43.56	43.22	August	75.36	59.54
September	42.58	40.11	September	79.64	53.52
October	41.55	39.83	October	79.84	51.40
November	44.13		November	81.98	
December	43.68		December	81.89	
Year	43.24		Year	77.40	

**Chemicals**

**New York, Nov. 20**—Little new business has developed during the past few weeks and while prices have held fairly steady, the tone of the market is unsettled, owing to lack of confidence and the inability of small dealers to obtain credit. Arsenic and antimony products have continued stagnant and show weakness.

**Copper Sulphate**—The demand is easy and prices remain unchanged at \$5.50 per 100 lb. for carload lots and \$5.75 for smaller quantities.

**Nitrate of Soda**—There has been but little business the past week either for

spot or future delivery. Quotations remain as follows: For spot delivery and also for the balance of 1907, 2.37 1/2@2.40c. for 95 per cent.; for 1908, 2.42 1/2c.; for 1909, 2.40c. The price for the 96 per cent. grades, these deliveries, is 5c. per 100 lb. higher.

**Phosphates**—J. M. Lang & Co. report the exports of Florida phosphates through the port of Savannah in October as follows: Germany, 13,640 tons; Austria, 1056; Spain, 665; Great Britain, 333; total, 15,694 tons.

**Sulphur**—Emil Fog & Sons, of Messina, Sicily, report shipments of Sicilian sulphur for August at 27,881 tons against 23,952 tons in August, 1906. The total shipments in 1907 to the end of August were 239,162 tons as compared with 312,849 tons for the eight months of 1906. The total visible stocks in Sicily at the end of August were 547,979 tons, against 452,038 tons in 1906, an increase of 95,941 tons. In 1905 the visible stocks amounted to 383,087 tons and in 1904 to only 320,753 tons.

**Mining Stocks**

**New York, Nov. 20**—The general stock market shows this week a little more hopeful tone. The taking of some \$70,000,000 gold in Europe for import to this country and the action of the Government in issuing new bonds available as a basis for bank circulation, will tend to ease the money situation. Prices of stocks, however, continue low, with only transient improvement, and ordinary trading is dead for the present. Mining stocks in New York have followed the course of the general market, and have been dull and heavy, with small business and a tendency to lower prices.

An unusual transaction this week was a sale of 125 shares of New Jersey Zinc at \$316 per share. The last recorded transaction in this stock was a sale at auction some months ago at \$410.

The Standard Oil Company has declared a dividend of \$10 per share for the fourth quarter of the year. This makes \$40 for the year 1907, the same amount as last year.

**Boston**

**Nov. 19**—Not much encouragement is to be noted in the copper share market. After a day or two of rally, prices ran off again although in most cases tonight's close is above the lowest of the last seven days. Another mining company has passed its dividend, namely, North Butte. Quincy mining directors will meet shortly and they are expected to reduce the dividend again. Copper Range directors will not probably declare more than a \$1 dividend and the stock discounted this by breaking \$7.25 to \$46.50, although a \$3 recovery followed. North Butte broke \$6.25 to

\$32.75 on the passing of the dividend. Butte Coalition has been another soft spot, falling \$1.50 to \$12.50. Calumet & Arizona is also discounting a reduced rate, having fallen \$12 to \$92.

The percentage of decline of the leading mining issues this year varies from 70 to 40 per cent. Butte Coalition heads the list with 70 per cent. from the high of the year and Calumet & Hecla has the smallest with 40 per cent. Amalgamated Copper closed tonight at almost its lowest for the week at \$45.37½, against \$49 a week ago. Calumet & Hecla has lost \$25 to \$575. Osceola \$6 to \$74, Quincy \$7 to \$73, Tamarack \$4 to \$56 per share.

The curb has shown little animation and slight changes.

STOCK QUOTATIONS

NEW YORK Nov. 19		BOSTON Nov. 19	
Name of Comp.	Clg.	Name of Comp.	Clg.
Alaska Mine.....	.....	Adventure.....	.87½
Am. Nev. M. & P. Co.	.....	Allouez.....	.....
Amalgamated.....	45½	Am. Zinc.....	20
Anaconda.....	30½	Arcadian.....	3½
Balaklala.....	3½	Atlantic.....	8½
British Col. Cop.	3½	Bingham.....	5
Buffalo Cobalt.....	1½	Boston Con.....	9½
Butte & London.....	1	Calumet & Ariz.	93
Butte Coalition.....	13	Calumet & Hecla.	575
Butte Cop. & Zinc.	.....	Centennial.....	.....
Cobalt Contact.....	.....	Con. Mercur.....	28
Colonial Silver.....	1	Copper Range.....	48¾
Cum. Ely Mining.....	5	Daly-West.....	10½
Davis Daly.....	3½	Franklin.....	7½
Dominion Cop.....	1¾	Greene-Can.....	5½
El Rayo.....	2¼	Isle Royal.....	14¾
Foster Cobalt.....	.65	La Salle.....	9¾
Furnace Creek.....	.25	Mass.....	2¾
Groux Mine.....	3½	Michigan.....	8
Gold Hill.....	¾	Mohawk.....	44
Granby, New.....	.....	Mont. C. & C. (new)	1
Greene Gold.....	7½	Nevada.....	6¾
Greene G. & S.....	7½	North Butte.....	32¾
Greenw'r & D. Val.	.75	Old Colony.....	.50
Guanajuato.....	2¼	Old Dominion.....	20
Guggen. Exp.....	120	Osceola.....	75
Hanapah.....	35	Parrot.....	10
McKinley Dar.....	¼	Phoenix.....	.....
Micmac.....	3	Quincy.....	74
Mines Co. of Am.....	1¾	Rhode Island.....	2½
Mitchell Mining.....	¾	Santa Fe.....	1¾
Mont. Sho. C. (New)	.....	Shannon.....	10
Nev. Utah M. & S	2½	Tamarack.....	56
Newhouse M. & S	6¾	Trinity.....	10
Nipissing Mines.....	6	United Cop., com.	.....
Old Hundred.....	.....	U. S. Oil.....	8¾
Silver Queen.....	¾	U. S. Smg. & Ref.	31½
Stewart.....	¾	U. S. Sm. & Re. pd.	34¾
Tennessee Cop'r.	.....	Utah Copper.....	32¾
Union Copper.....	7½	Victoria.....	.....
Utah Apex.....	2¾	Washington.....	.....
West Columbus.....	.11	Winona.....	3 ¾
		Wolverine.....	107
		Wyandotte.....	.25

N. Y. INDUSTRIAL

Am. Agri. Chem.	12
Am. Smelt. & Ref.	61¾
Am. Sm. & Ref., pf.	85
Bethlehem Steel.	.....
Colo. Fuel & Iron.	15½
Federal M. & S., pf.	11
Inter. Salt.....	11
National Lead.....	34¾
National Lead, pf.	.....
Pittsburg Coal.....	.....
Republic I. & S.....	13¾
Republic I. & S., pf.	58
Sloss-Sheffield.....	.....
Standard Oil.....	406
Tenn. C. & I.....	99
U. S. Red. & Ref.....	.....
U. S. Steel.....	22¾
U. S. Steel, pf.....	80
Va. Car. Chem.....	.....
Va. I. Coal & Coke	32

ST. LOUIS Nov. 16

N. of Com.	High.	Low.
Adams.....	.35	.25
Am. Nettie.....	.04	.....
Center Cr'k.....	2.25	1.75
Cent. C. & C.....	65.00	64.00
C. C. & C. pd.....	76.00	75.00
Cent. Oil.....	105.00	100.00
Columbia.....	4.00	2.50
Con. Coal.....	26.00	25.00
Doe Run.....	130.00	120.00
Gra. Bimet.....	.25	.20
St. Joe.....	14.00	13.00

\*Ex. Div. †Ex. Rights.

BOSTON CURE

Ahmeek.....	50
Ariz. Com.....	.....
Black Mt.....	.....
East Butte.....	.....
Hancock Con.....	4¾
Keweenaw.....	5
Majestic.....	.80
Raven.....	.80
Shawmut.....	.42
Superior.....	.....
Superior & Pitts.	8¾
Troy Man.....	.60

LONDON Nov. 20

Name of Com.	Clg.
Dolores.....	£1 0s 0d
Stratton's Ind.....	0 2 9
Stamp Bird.....	0 16 0
Esperanza.....	1 11 0
Tomboy.....	1 7 6
El Oro.....	1 2 0
Oroville.....	.....
Somera.....	.....
Utah Apex.....	0 14 4½
Ariz. Cop., pd.....	.....
Ariz. Cop., def.....	.....

Cabled through Wm. P. Bonbright & Co., N.Y.

NEVADA STOCKS. Nov. 20. Furnished by Weir Bros. & Co., New York.

Name of Comp.	Clg.	Name of Comp.	Clg.
TONOPAH STOCKS			
Belmont.....	93½	Golden Sceptre.....	.....
Extension.....	1.00	Homestake King.....	.50
Golden Anchor.....	.06	Montgomery Mt.....	.05
Jim Butler.....	.44	Mont. Shoshone C.....	4.75
MacNamara.....	.18	Original Bullfrog.....	.03
Midway.....	.40	Tramp Cons.....	.20
Montana.....	1 30	MANHAT'N STOCKS	
North Star.....	.09	Manhattan Cons.....	.30
Tonopah & Cal.....	.....	Manhat'n Dexter.....	.09
Tono'h Mine of N.....	8.18½	Jumping Jack.....	.07
West End Con.....	.36	Stray Dog.....	.10
GOLDFIELD STOCKS			
Adams.....	.05	Indian Camp.....	.06
Atlanta.....	.23	GREENW'R STOCKS	
Blue Bell.....	.07	Furnace Creek.....	.25
Blue Bull.....	.17	Greenwater & D.V.	.06
Booth.....	.16	Green'r Cop. M. & S.	.05
Columbia Mt.....	.17	United Greenw'r.....	.04
Comb. Frac.....	.90	MISCELLANEOUS	
Cracker Jack.....	.08	Golden Boulder.....	.10
Dia'dfield B. B. C.	.17	Hayseed.....	.30
Goldfield Belmont	.14	Lee Gold Grotto.....	.13
Goldfield Con.....	4.18½	Nevada Hills.....	3 37½
Goldfield Daisy.....	.82	Nevada Smelting.....	1.00
Goldfield Mining.....	.....	Pittsburgh S. Pk.....	1 00
Great Bend.....	.27	Round Mt. Sphinx.....	.31
Jumbo Extension	.63	COLO. SPRINGS Nov. 16	
Katherine.....	.06	Name of Comp.	Clg.
Kendall.....	.11	Laguna.....	.....
Lone Star.....	.09	Lone Star.....	.06
Lou Dillon.....	.06	May Queen.....	.05
May Queen.....	.05	Mohawk.....	.....
Mohawk.....	.....	Oro.....	.10
Red Hill.....	.25	Red Hill.....	.25
Red Top.....	.08	Roanoke.....	.08
Sandstorm.....	.18	Silver Pick.....	.25
Silver Pick.....	.25	St. Ives.....	.36
St. Ives.....	.36	Triangle.....	.08
Triangle.....	.08	BULLFROG STOCKS	
BULLFROG STOCKS			
Amethyst.....	.....	Bullfrog Daisy.....	.....
Bullfrog Daisy.....	.....	Bullfrog Mining.....	.04
Bullfrog Mining.....	.04	Bullfrog Nat. B.....	.09
Bullfrog Nat. B.....	.09	Gibraltar.....	.12
Gibraltar.....	.12	Gold Bar.....	.38
Gold Bar.....	.38	New Dividends	

Company.	Pay-able.	Rate.	Amt.
Am. Smelters A.....	Dec. 2	\$1.50	\$255,000
Am. Smelters B.....	Dec. 2	1.25	375,000
Arizona, pfd.....	Nov. 1	0.08½	110,785
Batopilas.....	Dec. 31	0.12½	56,250
Butte Coalition.....	Dec. 15	0.15	150,000
Doe Run.....	Nov. 15	0.50	29,531
Dolores.....	Nov. 25	0.15	59,395
Goldfield Con.....	Nov. 15	0.10	500,000
Kendall.....	Nov. 23	0.02	10,000
Lehigh C. & Nav.....	Nov. 27	0.20	693,802
Mines Co. of Am.....	Nov. 25	0.02	40,000
Newhouse.....	Nov. 20	0.50	300,000
N. Y. & Hond. Rosario	Nov. 30	0.10	15,000
Rio Tinto, com.....	Nov. 1	0.60	375,000
Rio Tinto, pfd.....	Nov. 1	1.51	4,275,000
Standard Oil.....	Nov. 26	10.00	9,700,000
Tezuitlan.....	Nov. 12	2.00	20,000
U. S. C. I. Pipe & Fdy., com	Dec. 2	1.00	125,000
U. S. C. I. Pipe & Fdy., pfd	Dec. 2	1.75	218,750
U. S. Smg., Ref. & Mg., com	Nov. 1	0.87½	304,646
U. S. Smg., Ref. & Mg., pfd.	Nov. 1	0.87½	656,250
U. S. Steel Corp., com.....	Dec. 30	0.50	2,451,513
U. S. Steel Corp., pfd.....	Nov. 30	1.75	6,305,497
Warwick I. & S.....	Nov. 15	0.30	43,674

Assessments

Company.	Delinq.	Sale.	Amt.
Alpha, Nev.....	Nov. 25	Dec. 17	\$0.05
Cent. Eureka, Cal.....	Nov. 1	Nov. 29	0.01
Con. Imperial, Nev.....	Nov. 7	Nov. 27	0.01
Crown Point, Nev.....	Nov. 26	Dec. 19	0.10
Del Monte, Cal.....	Nov. 20	Dec. 11	10.00
Emerald, Utah.....	Dec. 14	Jan. 11	0.01
Eschequer, Nev.....	Oct. 28	Nov. 19	0.05
Imlay.....	Nov. 23	Dec. 17	0.01
Julia.....	Nov. 5	Nov. 27	0.03
Little Chief, Utah.....	Oct. 30	Nov. 30	0.01
Mt. Dell, Utah.....	Nov. 19	Dec. 7	0.01
Penn. Con., Cal.....	Nov. 16	Dec. 3	0.10
Provident Oil Mg., Ca.	Dec. 7	Dec. 27	0.01½
Seg. Belc. & Midas, C.	Nov. 6	Nov. 27	0.05
Scorpion, Nev.....	Nov. 4	Nov. 25	0.02
Sleeping Beauty, Cal.	Oct. 12	Nov. 15	0.05
Stansbury, Utah.....	Nov. 18	Dec. 16	0.01
Ultimo, Cal.....	Dec. 2	Dec. 23	0.05
Union Con.....	Nov. 15	Dec. 6	0.10
Wabash, Utah.....	Nov. 30	Dec. 23	0.03
Wolverine & Ariz., A.	Nov. 18	.....	0.25

Monthly Average Prices of Metals AVERAGE PRICE OF SILVER

Month.	New York.		London.	
	1906.	1907.	1906.	1907.
January.....	65.288	68.673	30.113	31.769
February.....	66.108	68.835	30.464	31.852
March.....	64.597	67.519	29.854	31.325
April.....	64.765	65.462	29.984	30.253
May.....	66.976	65.981	30.968	30.471
June.....	65.394	67.090	30.185	30.893
July.....	65.105	68.144	30.113	31.366
August.....	65.949	68.745	30.529	31.637
September.....	67.927	67.792	31.483	31.313
October.....	69.523	62.435	32.148	28.863
November.....	70.813	.....	32.671	.....
December.....	69.050	.....	32.003	.....
Year.....	66.791	.....	30.868	.....

New York, cents per fine ounce; London, pence per standard ounce.

AVERAGE PRICES OF COPPER

Month.	NEW YORK.		LONDON.	
	Electrolytic	Lake.	1906.	1907.
January.....	18.310	24.404	18.419	24.825
February.....	17.869	24.869	18.116	25.236
March.....	18.361	25.065	18.641	25.560
April.....	18.375	24.224	18.688	25.260
May.....	18.475	24.048	18.724	25.072
June.....	18.442	22.665	18.719	24.140
July.....	18.190	21.130	18.585	21.923
August.....	18.380	18.356	18.708	19.255
September.....	19.033	15.565	19.326	16.047
October.....	21.203	13.169	21.722	13.551
November.....	21.833	.....	22.398	.....
December.....	22.885	.....	23.350	.....
Year.....	19.278	.....	19.616	.....

New York, cents per pound. Electrolytic is for cakes, ingots or wirebars. London, pounds sterling per long ton, standard copper.

AVERAGE PRICE OF TIN AT NEW YORK

Month.	1906.	1907.	Month.	1906.	1907.
January.....	36.390	41.548	July.....	37.275	41.091
February.....	36.403	42.102	August.....	40.606	37.667
March.....	36.662	41.313	September.....	40.516	36.689
April.....	38.900	40.938	October.....	42.852	32.620
May.....	43.313	43.149	November.....	42.906	.....
June.....	39.260	42.120	December.....	42.750	.....
			Average year.....	39.819	.....

Prices are in cents per pound.

AVERAGE PRICE OF LEAD

Month.	New York.		London.	
	1906.	1907.	1906.	1907.
January.....	5.600	6.000	16.850	19.828
February.....	5.464	6.000	16.031	19.531
March.....	5.360	6.000	15.922	19.703
April.....	5.			