

THE ENGINEERING AND MINING JOURNAL AND



(Published Every Saturday at 253 Broadway, New York.) Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

VOL. LXIV. AUGUST 21. No. 8.

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Main Office: 253 Broadway (P. O. Box 1833), NEW YORK.

Telephone Number, 3,095 Cortlandt.

New York Cable Address—"ROTHWELL." (Use McNeill's or A B C 4th Edition Code.) London Cable Address—"WELLOTH."

Branch Offices: Chicago, Ill., Monadnock Building, Room 737. Denver, Colo., Boston Building, Room 206. Salt Lake City, Utah, 230 Atlas Building. San Francisco, Cal., 207 Montgomery Street. Birmingham, Ala., Chalifoux Building. London Eng., Office, 20 Bucklersbury, 366 & 367. E. Walker, Manager.

English subscriptions to the JOURNAL may be paid at the London office at the rate of \$7 = £1 8s. 9d.; the publications of the Scientific Publishing Company may be bought at the rate of 4s. 2d. to the dollar, net.

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The production of quicksilver in the United States during the first six months of the current year was 11,970 flasks (915,705 pounds), which was, as heretofore, entirely the output of the California mines. These figures show a large decrease from the corresponding period of 1896, and the total for the present year is likely to be below the average of the last four years.

Although gold mining has been carried on in Nova Scotia for many years, no great depth has been reached in the workings. The deepest shaft at present is 600 feet, and there are very few down more than 400 feet. It has been a question considerably discussed by the mining men of the province whether deeper mining would pay, and this has been argued from several different points of view. The question is now to be settled in at least one case by a practical test, the Guffey-Jennings Company, in the Caribou District, having let a contract to sink its main shaft to a depth of 1,000 feet. The result will have much local interest.

The production of coal in the Indian Territory for the year ending June 30th, 1897, was 1,302,378 tons against 1,235,333 tons in the previous year. There were 23 producers, of which the most important were as heretofore, the Choctaw, Oklahoma & Gulf Railroad Company, the Southwestern Coal and Improvement Company, the Osage Coal and Mining Company and the Atoka Coal and Mining Company. The total number of men employed in the mines was 3,470, which is 225 less than in the previous year, and in comparison with the increased output indicates greater economy in mining. We are indebted for these figures to Mr. L. W. Bryan, the United States Mine Inspector for the Territory.

It is not generally known that James Watt proposed in 1783 a decimal system of weights and measures, but W. H. Preece, the eminent electrician, called attention to this in a lecture delivered at Greenock, Scotland, several months ago. Watt's unit length was based on the seconds pendulum; his unit weight was to be the unit cube filled with water. Watt visited Paris in 1786, and met La Place, Monge and other members of the committee of the Academy, who were then considering the question, and it is not unlikely that his ideas were used in the formulation of the existing metric system, which was adopted in 1801. The length of a seconds pendulum in the latitude of London does not vary much from a meter.

London promoters have taken up the Klondike boom with enthusiasm, and there are already numerous companies organized to take part in operations in that region. In the latest issue of the London Statist at hand we find notice of the incorporation of six companies, whose total authorized capital stock is £1,000,000—some of them having also power to increase the amount when necessary. The London investor is apparently to have quite as many chances of putting his money into a Klondike adventure as the New Yorker; and he needs to exercise the same caution. Few or none of these companies can have any defined property in the new fields yet, and no one ought to invest without very careful investigation of the representations which are made by the promoters.

There have been no new arrivals from the Klondike region, though a steamer from St. Michael is expected to arrive at San Francisco very soon. There is, consequently, no fresh news of the new goldfields, and no further developments can be reported. The excitement continues, but has been somewhat checked for the present by the evident impossibility of reaching the country this year. This is more clearly shown than ever by the accounts from Alaska, which report several shiploads of adventurers stopped at Dyea and other points on the road by the impossibility of finding transportation. The number of men starting for the North this fall will probably be small; but there are prospects of a great rush in the early spring, if the reports of the Argonauts returning on the steamships now on the way confirm those which we have already.

Copper production in July, according to the statement of Mr. John Stanton, who acts as statistician for the companies, showed a sharp and unexpected decrease in activity. The total output reported from the mines in the United States for the month was 15,344 long tons, which was less than that for July, 1896, by 1,251 tons, or 7.5 per cent.; it was also less by 1,931 tons, or 11.2 per cent., than the monthly average for the first six months of the year. Notwithstanding this reduction in July, the output of copper in the United States for the seven months ending with July still shows a large increase over that of any previous year; the gain was 16,020 tons, or 14.8 per cent., as compared with the corresponding period in 1896, and 30,659 tons, or 32.9 per cent., over 1895.

The United States exports still continue to be on a large scale, and Europe took from us during the seven months no less than 78,239 tons of copper, or 63.1 per cent. of our entire production. The exports show the considerable increase of 9,036 tons over last year, but this was less than the gain in production by 6,984 tons; that is, our home supplies were greater by that quantity, nearly all of which seems to have gone into

consumption, as we hear of very little increase in stocks. At the present time there is reported an increase in manufacturing which must cause a larger demand for copper here.

Our advices from Salt Lake report that the fall in silver and the shut-down of the Ontario and the Daly mines have caused a general feeling of depression in the mining industry of the State. It is not to be denied that the situation is serious, but the depression is probably greater than is warranted by the facts. The mining industry is the most important single interest in the State and at the present time its chief products are silver and lead. The gold production is growing rapidly, but is still far from equaling that of silver in importance, however it may promise for the future. In the gold resources of the State, however, and in the fact that many of the silver producers are lead producers also, will be found the ameliorating features of the situation.

At Park City the shutting down of the Ontario and Daly mines and mills has thrown about 800 men out of employment, causing a serious business upset. In other silver camps the lead product in nearly every instance makes good the silver loss, as compared with last year. Most of the Utah silver-lead ores are medium to low grade, averaging perhaps 30 ounces silver and 30 per cent. lead; and though silver has fallen about 15 cents an ounce, lead has already advanced about 20 cents a unit. Where the lead percentage equals the number of ounces of silver per ton, the present metal quotations mean better returns for the mines than a year ago, with the same freight and treatment charges, and at Bingham and at most of the Tintic mines production would now be increasing were it not for the advances in freight, treatment charges and powder prices, which occurred last May.

The strike of a number of miners employed by the Lehigh & Wilkes-Barre Coal Company in the anthracite region seems to be in no way directly connected with the movement among the Western coal miners. It was caused by local circumstances and is at present confined to one group of collieries, though about 2,500 men are engaged in it. Probably the general spirit of unrest and the excitement due to the Western strike had some influence—as such things will—in making the miners ready to go out; but apparently there is no further relation.

The strike is being watched very closely by the other anthracite companies, with some apprehension of its spreading to other collieries. There is no sign of this as yet, but there is little doubt that a general feeling of uneasiness exists, since the time is approaching when increased demand may be expected. The stocks on hand have been diminished since the first of the year, and a general stoppage of work would very soon affect the trade.

The condition of the miners in the anthracite region has been very little better than that of the men in the bituminous mines. The nominal wages have not been quite as low, perhaps; but the frequent stoppages which have been necessary to keep down the output have practically put the mines upon half-time or less, and their earnings for the last two years have been very small. With the present equipment and force the production can easily be run up to 5,000,000 tons a month, and 6,000,000 tons would not require a great effort. For four out of the seven months of this year, however, the output has been set at 2,500,000 tons monthly, or really about half-time, and there is little probability that it will go above 4,000,000 tons in any month of the present year. The trade is now so closely controlled that the allotted production is not exceeded.

The Coal Miners' Strike.

The strike among the soft-coal miners, which originated in Western Pennsylvania and Ohio, has been gradually spreading into West Virginia, where every possible effort has been made to induce a sympathetic movement. These efforts have been partially successful in the Northern or Fairmont Section, where the miners and coals are closely identified with the Pittsburg District; and last week practically all the Kanawha mines were idle as far East as Mount Carbon, through sympathetic or hypnotic influence, which might be called "the enthusiasm of crowds." They have since then, however, generally resumed work. The New River and Pocahontas Flat Top districts have not yet been converted, and are working full time, with little disposition to join in the strike.

Ask for the cause of this movement, and the same answer is given by all, the intelligent or thinking class, as well as the ignorant, "The miner is not receiving fair wages for his labor," though they admit that he is receiving a fair proportion of the market price. The miner, knowing that the depression is due to over-production, realizes the fact that the operator is powerless to help him; consequently no bitterness between the two has yet been developed, and they are moving in parallel lines to accomplish the same purpose, to increase prices by restricting production. All agree that the miners should receive better wages, and all agree that this is possible only by raising the market prices through restrictions; consequently the fight is between the producer and consumer,

and it behooves the laborer to consider well what this means, more especially since enforced idleness has been such a large factor in his reductions and sufferings. As the cost of such a war must be borne by labor in any event, it may find victory to be more expensive than defeat. Capital may gain in such a fight (by throwing the cost upon labor), but labor never can make good its losses in any case.

The annual consumption of coal in this country has never quite reached 190,000,000 tons, and according to the reports made to the authorities of the several States the mines have a capacity to produce this quantity in a little more than 90 days. It is possible therefore to supply this demand upon a little more than one-fourth working time; or a little more than one-fourth of the labor and capital employed may furnish what the market requires. Any suspension of production which would operate to increase prices of coal must necessarily reduce the demand by the shutting down of factories consuming coal, unless their products can be advanced in like proportion; and the annual consumption would therefore be lessened. The first effects of such increased price would be to draw more labor and capital into the mining business and thus increase the capacity for production. With an increased output and decreased consumption wages must necessarily be lowered, unless the universal law of supply and demand can be reversed. The only way to accomplish the miners' object is either through the general prosperity of the country, which would increase the consumption and consequently the demand for coal, or by a permanent withdrawal of a portion of the labor and capital from the mining business, which would have the same effect upon the survivors. Spasmodic exertions will get him no nearer the goal financially than they would physically in a long race.

As the Pittsburg and Hocking Valley districts have overstocked their markets, the present strike, if it can be made general, will be especially beneficial to both miners and operators there; but it will be death to the West Virginia and other miners competing for a portion of that trade. The inauguration of the strike saved the operators a probable loss on their stocks, and puts them in position to make new contracts at better prices, while the miners, who had to lose time in any event, will lessen their period of idleness very materially by shutting out West Virginia and other competing coals. It seems rather curious that in the two districts of West Virginia in which the strike has made progress, the operators divided a share of the advance with the miners, while the two not affected so far have continued at the old rates, and show no disposition to quit work.

Mr. Ratchford and other labor leaders are doing well to preach peace and compliance with law, and as long as this advice is followed, the sympathy of the public can be depended upon; but they make a grave error when they teach the miners that they have the power to alter the laws of trade, or that any lasting benefit can be gained by the present movement. The best that can be hoped for under present conditions is to benefit one section at the expense of another; or if every point is gained, to increase the wages of the miner at the expense of labor engaged in coal consumption. The balance between these is equalized by the law of supply and demand, since any laborer in this country can always choose his occupation, or seek the most lucrative employment in the labor market. Western Pennsylvania and Ohio have nothing to lose and much to gain by this strike; but West Virginia has nothing to gain, and all to lose; and a large majority of its miners understand that, while participation may result in a temporary increase of wages, the final result will be loss of work and all its attendant evils, with an ultimate lower level in their earnings. A raise of wages and loss of job is little gain to any man.

NEW PUBLICATIONS.

HYDRAULIC CEMENT: ITS PROPERTIES, TESTING AND USE. By Frederick J. Spaulding. New York; John Wiley & Sons, and London; Chapman & Hall. Pages, 266; illustrated. Price, \$2.

A great deal has been written about cement, and a great variety of experiments and tests have been made and recorded, with the result in some cases of confusing rather than clearing the subject. It is not as simple, perhaps, as it may seem to be, and the consequence has been a variety of opinions among engineers, which are not reassuring to the student. Mr. Spaulding has endeavored to state his own views, based upon study and experiment and a careful comparison of the work of others. The book includes chapters on Hydraulic Lime; on the Classification and Constitution of Cement; the Setting and Hardening of Cement; Soundness of Cement; Methods of Testing; Tests for the Strength of Mortar; Tests for Soundness; Special Tests, and on Cement Mortar and Concrete. An appendix gives, as examples of the present practice of engineers, the specifications for cement prepared by the Pennsylvania Railroad, the Canadian Pacific Railway and by municipal engineers in Brooklyn, Philadelphia and St. Louis.

The composition and manufacture of cements are generally explained and some space is given to their composition and the effects of the different ingredients. The chapter on Methods of Testing is carefully written and gives a very fair account of the methods adopted in different countries and by different authorities, which vary greatly. The standard in this country, which is gradually being adopted everywhere, is that pre-

scribed by the American Society of Civil Engineers, which combines more of the French and English than of the German methods.

The importance of the subject in all that relates to buildings, bridge piers and many other engineering structures is very great. Abroad it has been considered by several government commissions, the most careful and elaborate work having been done by the French commission, which was charged with consid ring methods of testing materials of construction. In this country the American Society of Civil Engineers has given much time to it, and has appointed committees for its special consideration at different times. Mr. Spaulding's book has the advantage of being compact and carefully written, and the student is quite safe in accepting it as a guide.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

Barytes Deposits Wanted.

Sir: Probably you or some of your numerous subscribers can give me information as to deposits of barytes in this country whose owners are in a position to furnish a steady supply of the raw ore; or would be willing to sell the property to parties who are prepared to work it on their own account. In either case a market could probably be found.

NEW YORK, Aug. 18, 1897.

BARIUM.

THE INFLUENCE OF SUDDEN COOLING ON NEARLY PURE IRON.

By J. O. Arnold.

In this paper, originally sent to *Engineering*, in London, Professor Arnold says that Mr. H. M. Howe, the distinguished American metallurgist, in enunciating his carbo-allotropic theory, by which he claims to have explained most of the phenomena attending the hardening of steel, has always regarded as the central support of his platform the alleged fact that nearly pure carbonless iron assumes on heating to about 750° C. an allotropic form possessing a tenacity far greater than that of ordinary iron; also that if such allotropic iron be suddenly cooled from a full red heat it retains more or less completely its tenacious molecular configuration, and hence when cold registers a maximum stress far higher than that given by slowly cooled iron which has had time to resume its normal molecular structure.

Mr. Howe's original statement was that the tensile strength of nearly pure iron could be tripled by very sudden cooling. In other words, the stress could be raised from about 20 to 60 tons per square inch, or 200%. The accuracy of this statement was denied by Mr. R. A. Hadfield and the writer, who asserted that their practical experience led them to the conclusion that the tenacity of quenched iron was, with test bars of 0.25 sq. in. area, not 200, but only about 25% greater than that of the normal metal; that is to say, the stress rose from about 21 to 26 tons per square inch. Mr. Howe published some experiments in the *Engineering and Mining Journal* for December 12th, 1896, page 557, and for January 30th,

a number of small bars of very impure mild steel at varying temperatures, and noted the relation of the observed tenacities to the critical points. The data obtained by this admirably conceived plan will always be of great value with reference to researches on the properties of the particular class of steel employed. But in connection with the properties of nearly pure iron they are inapplicable except as inaugurating the sound experimental lines upon which such investigations should be conducted. Hence the writer does not quite see why in examining the physical properties of nearly pure iron, Mr. Howe has abandoned his own excellent original method. He now seems to conclude that because such iron quenched from 900° C. in a freezing mixture rises 6 tons in mean tenacity, therefore the allotropy of iron above Ar 2 at 750° C. (or at what Mr. Howe now somewhat vaguely terms "the upper retardations") has been mechanically indicated.

What Mr. Howe really required to prove was that associated with the break in the recalcence curve at Ar 2 there was a corresponding break of nearly 6 tons in a curve of which the co-ordinates were tenacities and quenching temperatures. It should be remembered that the range of Ar 2 is about 30° C. In the absence of evidence from Mr. Howe on this vital point, upon which to a great extent his theory must stand or fall, the writer has carried out the following experiments:

Swedish bar iron was melted in a crucible and cast into a 50-lb. 3-in. ingot. The ingot was hammered, rolled and reeled into a bar 3/4 in. in diameter. From this test-pieces were prepared. The carbon in the ingot was 0.04%, but during the reheating operations it appears to have absorbed a little carbon. The impurities in the finished bar (being the mean of analyses made by Mr. F. W. Harbord and the writer) were as follows: Carbon, 0.07; silicon, 0.02; manganese, 0.02; arsenic, 0.04; phosphorus, 0.02; sulphur, 0.02; copper, 0.01; aluminum, 0.02.

The test-pieces 2 in. parallel and 0.1 sq. in. in area were turned to an accuracy of 0.001 in. in diameter. One of the screwed ends was recessed for the reception of the thermo-couple and its clay insulator. The other end had a hole into which was forced the iron rod by means of which the bars were withdrawn from the furnace. The test-bars were heated in an iron tube furnace with two rows of gas and air-blast jets of small diameter, and so distributed as to evenly heat the tube well beyond the ends of the test-piece. The bars were heated up to an initial temperature of about 990° C., were allowed to cool to the desired temperature, and were then instantaneously quenched in a tank of saturated brine and ice. The average temperature of the brine was 5° C. The heatings and coolings were throughout conducted in an atmosphere of pure dry nitrogen, thus preventing the formation of the slightest traces of scale on the test-bars, which, after quenching, retained their polish, and in the most extreme cases showed on their surfaces only an attenuated blue-gray film of oxide, under which a light scratch with a pin revealed white metal. The initial and quenching temperatures were measured by means of a delicate installation of Le Chatelier's pyrometer, on the scale of which 1 mm. is equivalent to 2.8° C. in the proportional range. The mechanical tests were made with every care on a 10-ton Wicksted single lever machine registering in 12 inch-ton moments to the third decimal of a ton. It is, however, difficult to avoid experimental errors or variations to the extent of about 0.5 ton per square inch (equal to 0.05 ton on section).

The details of the experiments are set forth in Table I. They are plotted with tons per square inch and quenching temperatures in degrees Centigrade as co-ordinates in Fig. 1, as is also the recalcence curve of one of the test-pieces registered by M. Osmond's admirable method. The co-ordinates of the curve last named are the number of seconds occupied by the cross-wire in falling 2 mm., and millimeters corresponding to 2.8° C. of temperature. The latter co-ordinate corresponds with the temperature co-ordinate of the tenacity curve.

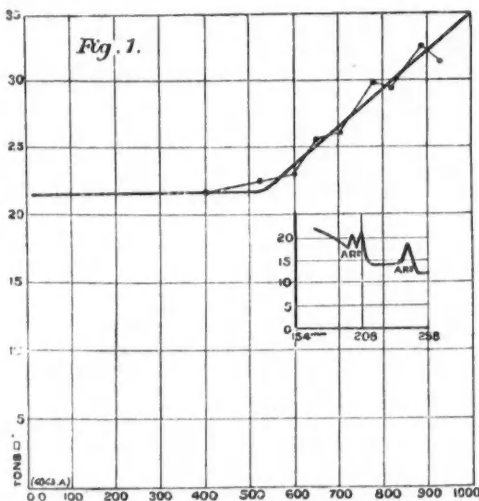


TABLE I.

Bar number.	Quenching temperature, Deg. C.	Maximum stress,	Elongation,	Reduction of area,
		Tons per sq. in.	Per cent. in 2 in.	Per cent.
Normal.....	15	21.42	44.0	80.0
3	400	21.58	43.0	76.8
6	525	22.46	41.0	78.8
8	660	23.02	34.0	76.2
2	650	25.56	31.5	76.8
5	705	26.24	27.5	73.8
11	780	29.79	29.5	70.8
4	820	29.46	27.5	75.4
9	887	32.63	21.5	75.9
1	928	31.35	30.0	76.2

On inspecting the table and curves, it will be seen that quenching below a red heat has little or no effect on the mechanical properties of the metal, but that at an incipient red heat about 500° C. there is a well-marked critical point, and the curve turns somewhat sharply upward. It will also be seen that the critical thermal points Ar 2 and Ar 3 are as such without influence on the mechanical properties. In fact, between 500° and 900° C. the increase of tenacity is proportional to the quenching temperature. The following table shows the experimental errors in measuring the stress required to bring the observed results into absolute agreement with the above law:

Test-bar No. 1 = 0.167 ton - error.	Test-bar No. 5 = 0.050 ton - error.
" " 9 = 0.067 " + "	" " 2 = 0.050 " + "
" " 4 = 0.033 " - "	" " 8 = 0.060 " - "
" " 11 = 0.100 " + "	" " 6 = 0.060 " + "

A very remarkable feature of the results is the fact that the reduction of area is practically constant and unaltered, averaging 76% in the quenched bars as against 80% in the normal metal.

The results obtained in this investigation point, in the writer's opinion, to the conclusion that the increasing tenacity as the temperature of quenching rises is the measure of crystalline stresses internal and external. When these stresses are overwhelmed by the flow of the metal preceding rupture, the mass resumes its normal ductility as measured by reduction of area. The elongation will obviously be largely governed by the rapidity of the localized rupture which will determine the comparative percentages of elongation adjacent to and distant from the point of fracture.

1897, page 111, on nearly pure iron (containing about 0.02% of carbon and 0.1% of copper), and has found that his deductions, based on tests obtained with impure materials, were erroneous. In seven tests on sections averaging 0.034 sq. in. in area, quenched from a temperature of 900° C. in saturated brine at a temperature of -6° C. he obtained an average increase of 27% in tenacity, 6 tons, or from 22 to 28 tons per square inch. His results, however, were very erratic. To take extreme cases, one bar registered an increase of only 1 ton, while in another the stress had risen 8 tons per square inch. The above variations suggest serious experimental errors. Mr. Howe does not appear to consider that his claim to have presented strong mechanical evidence of the allotropy of iron is in any way weakened by the circumstance that the increase in tenacity which he supposed to be 40 tons per square inch appears as a matter of experimental fact verified by himself to be only 6 tons. The actual data upon which Mr. Howe based his carbo-allotropic theory were the results of a series of observations in which he quenched

THE ACHESON ELECTRIC FURNACE PATENT.

The decision of the United States Circuit Court for Western Pennsylvania in the suit of the Cowles Electric Smelting and Aluminum Company against the Carborundum Company, which has already been briefly referred to in our columns, goes very fully into the question of the infringement of patent claimed by the plaintiff. The decision of the court is long, examining carefully into the claims of the patents, and from this examination concludes that the two substantial points in the Cowles patents were the diffusion of the electric current and a mixture of the carbon resistance material with the subject of reduction as the method of securing the diffusion and utilization of heat and current. Nothing else than what is consonant with these two dominant disclosures is stated in the patent. This construction accords with that reached by the Circuit Court for the Northern District of Ohio in the case of Lowrey vs. The Cowles Electric Company, where the patent was considered by that court. The gist of the Cowles invention is the use of the granular carbon distributed through the mass of granulated ore to carry the current from one electrode to another, and by its low conductivity and resistance to produce intense heat, not at a single point, or in a single line, but throughout the ore, and to maintain it constant. This same view was emphasized on final hearing of the same case, where the court said: "The gist of the Cowles invention is the use of granular carbon or other equivalent resistance material distributed through the mass of granulated ore to carry the current from one electrode to another, and by its low conductivity or resistance to produce intense heat, not at a single point or in a single line, but throughout the ore, and by the heat thus generated to fuse the ore, and to separate the metal element by the chemical action of the carbon upon the non-metallic element of the ore, just as iron and other like ores are smelted in a furnace." An analysis of the several claims shows that these two fundamental disclosures characterize the claims.

With regard to the Acheson patent, the court says that from the proofs it would seem that some years after the Cowles patent in suit was issued Mr. Acheson discovered the possibility of uniting a single atom each of carbon and silicon, and producing a new chemical product. It is chemically known as carbide of silicon, and commercially as carborundum. While extremely cheap to manufacture, it has proved to be an abrasive harder than emery, and indeed than any abrasive material except the diamond. The ingredients, their mode of treatment and the results obtained are substantially these: The apparatus used consists of the ordinary engine, dynamo, transformers and other appurtenances belonging to the generating and regulating of an electric current, and what might be termed an electrically heated furnace. Upon an ordinary pedestal of brick is constructed a box of firebrick, 9 ft. 8 in. in length, 1 ft. 11 in. wide, and 1 ft. 9 in. deep. No cement or mortar is used in the construction of the side walls of the furnace, nor in its ends. In the construction of the pedestal or base on which the furnace proper is built, cement is grouted into the brick work for the purpose of excluding the gases, but in the walls the joints are quite open to prevent escape of the gases. Through the center of the box, extending lengthwise is a core or conductor for the conveying of electric current. This conductor is formed of granular coke, and has relatively a large cross-section. Its terminals are connected to nine solid carbon rods. These carbon rods extend through the ends of the furnace and connect with two metallic plates through which electrical connection is made to an alternating current dynamo. The materials used in forming the mixture of the charge, and from which the carborundum is produced, are coke and anthracite coal in the form of fine powder, salt, sand and sawdust. These materials are taken in the proportions by weight of 31 parts sand, 29 parts coke, or coal, two parts salt and four parts sawdust. They are all thoroughly mixed together, and then form what is called the charge mixture. A sufficient quantity of the prepared mixture is placed in the furnace to fill it half full. A trough or trench is then dug along the center line of the furnace in the mixture, this trough forming a bed for the conductor of coke. Being thus prepared, 100 lbs. of granular coke is placed uniformly throughout the length of the trough, and rounded up to form as nearly as practicable a cylinder. When complete, the core measures from 8 to 9 in. in diameter and extends through the length of the furnace for a distance of about 8 ft., leaving a small space between its ends and the carbon rods. A good connection is made between the granular core and the carbon rods by introducing finely powdered carbon, thus completing the electrical conductor through the furnace chamber and the walls. The remainder of the furnace is filled with another portion of the prepared mixture, reserving at the ends a small space that is filled with the fine carbon, and on top of this bricks are placed to improve the contact by pressing the fine carbon against the terminal rods.

When the current is first turned on it usually has a volume of 150 amperes. As a result of the passage of the current through the core its resistance is reduced, and the current is proportionately increased until eventually the resistance of the carbon core has become sufficiently low to permit of the passage of 1,000 amperes. The volume of the current is maintained at 1,000 amperes until the operation of the furnace is completed. During the period of the increasing volume of the current, the temperature of the core has been raised, by reason of its resistance to the passage of the current, to a very intense heat sufficient to effect a direct conversion of the amorphous form of carbon as represented in coke into the graphitic form. The temperature required for this transformation is approximately 7,000° Fahr.

The court holds that in this case the practice and result are on wholly different lines from and at variance with the suggestions and disclosures of the Cowles patent, and that the method is one based on localization of the current, heat generation along a localized central line and that the heat reaches the substances to be effected only by radiation. The respondents have designedly followed a course the reverse of that advised and disclosed by Cowles.

The court further says: "The process, preparation of ingredients and means employed in the two methods now under consideration are diverse and the desired objects unlike. The like thermo-electric agent is employed in both, but with it the substantial likeness ends. Cowles' object was reduction, while Acheson's was composition. One reduced a substance already in existence, the other by composition produced a new product. With Acheson the new product, consumed the carbon con-

stituents of the charge; with Cowles an excess of the carbon constituents remained at the close of the process. In Cowles the charge for functional purposes occupied the central space between the electrodes; in Acheson for functional purposes it was removed from such central space and from electrode contact. In Cowles an excess of carbon was required in the charge mixture as a current conductor; in Acheson no such excess was required or used, but the carbon for that purpose was isolated in the central core. Their methods are so radically unlike and are carried out on such diverse lines that we are firmly convinced that the charge of infringement has not been sustained."

The court therefore ordered a decree entered dismissing the complaint and the charge of infringement.

NOTES ON THE DETERMINATION OF INSOLUBLE PHOSPHORUS IN IRON ORES

By Charles T. Mixer and Howard W. DuBois.

In this paper, read before the Franklin Institute in Philadelphia, the authors referred to the greater necessity than formerly of determining the insoluble phosphorus in Bessemer iron ores, owing to the increasing demands for a lowering of the phosphorus content in what are considered standard Bessemer ores. The usual method of fusing the insoluble residue with sodium carbonate has been found impracticable where a large number of determinations are to be made daily. Experiments were instituted to devise a shorter method that would give accurate results. The use of hydrofluoric acid to dissolve the siliceous residue from the acid treatment of the ore was found to be of no advantage as regards economy of time. A mixture of ore and sodium carbonate subjected to a red heat (without producing a fusion) gave fair results with low silica ores, but was not adapted to high silica ores on account of the fusion of the mass. Calcined magnesia mixed with the ore and ignited to a red heat (without fusion) extracted all the phosphorus, even with high siliceous ores. Calcining the ore (without the admixture of any base) gave perfectly accurate results. The calcination of the insoluble residue was just as satisfactory, so this treatment was adopted.

The details of the method are as follows: About 1½ g. of ore are dissolved in a No. 3 beaker with 25 c. c. of hydrochloric acid, 1.1 specific gravity. When the ore is dissolved the excess of acid is evaporated until the solution begins to assume a syrupy consistency. It is then diluted with water and filtered into an Erlenmeyer flask, and the filter-paper and residue are placed in a platinum crucible and ignited. When the paper is burned off the residue is broken up with a platinum rod and ignited at a red heat for several minutes, after which it is removed and placed in a beaker for solution. Water is added, together with a few drops of hydrochloric or nitric acid, and the solution is brought to a gentle boiling for about five minutes. It is then filtered into the flask containing the soluble phosphorus (or into another flask, in case it is to be determined separately) neutralized with ammonia and precipitated as ammonium phospho-molybdate. The latter precipitate is titrated according to Handy's modification of the sodium hydroxide method. It has been found that it is better to determine separately the soluble and insoluble phosphorus. Otherwise a too dilute solution is obtained for the precipitation.

The conversion of the insoluble phosphorus into the soluble form, by simple ignition, is a matter of some theoretical interest. Possibly the method proposed by Berzelius for the decomposition of phosphates by means of silica may involve a reaction somewhat similar to that.

Steel Ore Cars.—The new ore cars for the Pittsburgh, Bessemer & Lake Erie—the Carnegie road from Pittsburgh to Conneaut—are built entirely of steel and have a capacity of 50 tons of ore each. The weight of a car empty is 17 tons. The car has four main sills 10 in. deep at the end and gradually increasing to 17 in. at the mid-length where the greater swaying burden is supported. The single formation of the side sheet with flanges at top and bottom and its through riveting with the top flange on the side sill practically makes the entire side of the car a single girder. To the center sill are riveted two longitudinal hoods and one transverse hood. The body bolster is placed on top of the sills, and is made of a rectangular piece of steel. At each end are gusset plates, which are riveted to the flanges of the side sill and side sheeting. A flange is also turned up on the ends of the bolster and riveted to the side sheeting, which is re-enforced by a rectangular plate on the outside ½ in. thick. In addition to this the bolster is braced and tied to the sill by triangular brackets. The end sill of the car is pressed out of one sheet of steel and is re-enforced by gusset plates which are riveted to it and the main sills of the car. The car is tied together by a transverse hood and hopper. The Westinghouse friction draft and buffing device is used upon these cars, and also the automatic air-brake. The brake cylinders are located under the hopper, near the end of the car.

Glass Coloring by Penetration.—M. Léon Léal proposes to color glass not throughout the mass, nor in enamel fashion, but by what he calls penetration. A little silver salt is put on the surface of the glass, which is then heated to 500° or 550° C. (930° or 1,000° Fahr.). The excess of salt having been removed, the surface appears yellow, the color penetrating to a depth of 0.17 mm. when the baking has lasted for about five minutes. After an hour a layer of double that thickness would be colored; after 18 hours the color would have penetrated through a glass plate 1.6 mm. in thickness. In reflected light this yellow displays a beautiful greenish or bluish fluorescence. The intensity of the coloration depends, of course, upon the quantity of salt applied. But very minute quantities suffice. To transfer a lace pattern on glass, it is only necessary to dip the lace in a 0.001 solution of silver nitrate and then into potassium sulphide. According to *La Nature*, of July 17, colored monograms can easily be obtained in this way, and what is still more interesting, ordinary collodion negatives can be printed on glass in various colors. Silver and copper give a red; gold and iron salts have also been used. When the baking is continued for a long period, the coloring matter is renewed from time to time, say every six hours. The observation has a scientific interest as well. The rate of penetration would probably depend upon the nature of the glass, and upon the atomic volume of the metal.

MICROSCOPICAL EXAMINATION OF IRON AND STEEL.—III.*

Written for the Engineering and Mining Journal by Albert Sauveur.

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GRINDING AND POLISHING.

The purpose of the grinding and polishing is to produce a surface free from any scratches or from any markings which do not belong to the structure of the metal. If this has been successfully accomplished the metallic surface should appear highly specular; to that effect the sample which has previously been filed with a smooth file, as stated elsewhere, must be ground very gradually by means of abrasive material of increasing fineness; the minute markings left by the last grinding being finally removed by a polishing powder.

Emery is the substance which naturally suggests itself for the preliminary work. Starting with a grade sufficiently coarse to remove promptly the file marks, the specimens should then be rubbed successively over two or three finer grades. At all events, the markings left by the last grinding should be sufficiently light to permit their speedy removal by the polishing powder. The emery may be used in the shape of emery wheels of various grades, or as emery papers, or emery cloths, or else the powder itself may be spread loose on a suitable foundation. As a polishing agent jewelers' rouge is universally employed and has probably no equal.

The markings left, even by the finest grade of emery, however, are sometimes effaced only with great difficulty and through much labor, by the polishing rouge. This is especially true in the case of wrought iron and soft steel. To facilitate the work various powders have been used between the last emery grinding and the final polishing, such as crocus, water of Ayrstone, crushed oil stone, etc. The writer, however, finds tripoli powder more effective for the purpose than any of the above.

The grinding and polishing operations may be conducted entirely by hand, or some simple mechanical device may be used when it is desired to turn out quickly a great many specimens. By hand polishing, however, samples can be prepared in a reasonably short time, and this method will be found satisfactory in many instances.

Grinding and Polishing by Hand.—After numerous trials of all the grinding and polishing agents which have been suggested, as well as of the various methods recommended, the writer adopted, long ago, the following process as yielding the best and quickest results. The specimen is ground and polished by being rubbed over the following substances, in the order given:

1. Emery paper No. 2 tacked on a smooth wooden block.
2. Emery paper No. 1, similarly mounted.
3. Flour emery spread wet over a cotton cloth, stretched over a block of wood with a perfectly plain surface.
4. Tripoli powder, wet, on cloth in like manner.
5. Jewelers' rouge, used wet on a piece of chamois skin, stretched tightly over a block of marble.

When the specimen has been filed with a very fine file the treatment upon the first emery paper may often be omitted. The tripoli powder removes readily the markings of the flour-emery and leaves the surface in a much better condition for the final polishing, which may then be accomplished in a shorter time and with much less labor.

Quality of the Grinding and Polishing Material.—Some metallurgists state that it is necessary for them to prepare their own grades of emery, because suitable qualities cannot be bought. This is accomplished by mixing with water the emery powder of the dealers and dividing it into several grades of fineness according to the time required by the different particles to settle at the bottom of pear-shaped vessels. The operation is a tedious one and the writer has never experienced any difficulty in securing emery papers, emery powders and tripoli which gives very good satisfaction. It is probable, however, that when the samples are to be polished on rouge, immediately after the emery treatment, the quality of the last grade used is of much greater importance. A greater uniformity in the size of the grains is then required than is generally met with in the powders prepared for industrial purposes.

It is more difficult to procure the right quality of jewelers' rouge and it is of great importance that the best-washed grade only be used, as an inferior quality gives very unsatisfactory results. The very best retails at \$1.25 per pound and may be bought from Bullock & Crenshaw, of Philadelphia, and is probably kept also by other dealers. Other qualities cost from 40 to 70c. per pound. Some of these give good satisfaction while others are worthless.

The cotton cloth upon which the grinding with flour-emery and tripoli is carried on should be of a fine texture, free from coarse and hard knots.

Supports.—It is convenient to have a few blocks of wood, say 12 in. square and 1 in. thick. The different grades of emery paper are fastened on these boards with thumb tacks. The cotton cloth upon which the flour-emery and tripoli are spread is tightly stretched over some pieces of hard wood and tacked around the vertical sides. These boards may conveniently be 12 in. long by 6 in. wide and 1 in. thick.

As a support for the final polishing with rouge a similar board may be used, but a piece of marble about 6 in. square, and with the upper side polished gives better satisfaction. The marble is first placed on a wooden block, say 12 in. square; a piece of fine chamois leather 10 in. square or thereabout is stretched tightly over it and tacked all around to the board.

Instead of rectangular supports Professor Arnold recommends circular ones, slightly conical. They may be made either of wood or preferably of machined cast iron. The cloth is stretched over them and held tightly in place by taper metallic rings. The advantage of this form of supports lies chiefly in the facility with which the cloth can be removed and fastened on again. They are to be recommended—Fig. 1 shows the proper size and shape. A polished piece of marble of this shape would make an excellent bed for the polishing with rouge.

Other substances have been used as supports, such as glass and metal plates. Mr. Stead recommends ordinary schoolboys' slates; Professor

Martens favors pitch plates made "from pure soft pitch, with a little resin added, by pouring the mixture out upon glass plates" or slates. These plates being very hard, the specimens prepared upon them have a very flat surface, hard and soft constituents being ground to exactly the same level. More will be said presently upon this subject.

Covers.—In order to protect the polishing surfaces from dust and foreign particles of all kind, they should always be kept covered when not in use with suitable wooden or cardboard covers or bell jars. This is especially important in the case of the softest powders. A few hard particles of dust or grit mixed with the rouge are liable to scratch the specimen so deeply as to necessitate its being taken back on the emery papers.

Modus Operandi.—The various powders are spread over their respective cloths, sprinkled with water (conveniently by means of a wash bottle), and worked down a little with a spatula, so as to break all the lumps. The specimen, previously filed, as stated elsewhere, and being held by both hands, if its size will permit it, is rubbed back and forth over the first emery paper, at right angles to the markings left by the filing. The rubbing is kept on until the latter have completely disappeared and are replaced by new and finer ones running in the direction of the rubbing. The specimen is then rubbed over the second emery paper, precisely as before, at right angles to the markings produced by the coarse emery, until they have been effaced. Another turn of 90° and the sample is rubbed over the next grinder, flour-emery, and so on, always crossing the markings when passing from one block to the next. By proceeding in this way it is much easier to ascertain when the marks of the previous operation have been completely removed than if the rubbing was carried on always in the same direction.

Water is added from time to time as needed. Before passing from one powder to the next, the specimen should be carefully washed in running water, as well as the finger tips of the operator, in order to make it sure that they do not to carry over some particles of the coarser powder, and thus avoid disastrous results.

The final polishing on rouge should remove the fine lines left by the previous treatment, and the metal should then be free from even microscopical scratches. The sample is washed and thoroughly dried with a soft cloth. If it is not to be etched immediately it should be placed in a dessicator containing calcium chloride or some other hygrometric substance. In following these instructions and after a necessary apprenticeship, it will be found that when they do not measure more than one-half of a square inch (a very convenient size), samples of pig irons, spiegeleisen

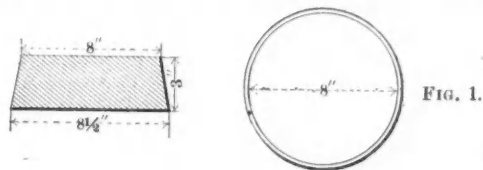


FIG. 1.

and very hard steels can be prepared in about 15 minutes, while medium hard steels require from 15 to 25 minutes, and wrought irons and the softest grades of steel from 20 to 30 minutes.

Hard vs. Soft Supports for the Final Polishing.—When the final polishing is conducted on a piece of soft chamois leather, covered with rouge and soaked with water, as described above, the various constituents, if they vary much in hardness, are not worn to exactly the same level. The softer components are depressed more than the hard ones, which therefore stand somewhat in relief. While such slightly engraved appearance is seldom objectionable, being on the contrary often sought for, and the relief effect purposely intensified, still in some instances it may be preferable to have all the constituents ground down to precisely the same level.

A hard, unyielding foundation must then be used for the final polishing. For this purpose a piece of parchment laid over a plate of glass and covered with rouge is very good. The rouge must then be used dry. Or the polishing powder may be spread, dry, upon a glass plate or a block of pitch, as recommended by Professor Martens. By this means the sample is finished with a very flat surface, highly specular.

Dr. Sorby states that some of his very best preparations were polished dry on parchment with rouge and never acted on by acid. "Some of the specimens thus prepared were splendid, and while some of the constituents were bright and metallic others were deep blue. For some sorts of specimens this method is most excellent and it is easy to leave off polishing when the structure is brought out to perfection. Cast irons and some steels come out splendidly."

Polishing in Relief.—By intensifying the relief effect produced by polishing upon a soft, yielding support the structure of those samples whose components differ much in hardness may be revealed by the microscope without further treatment. This method affords, moreover, an excellent means of judging the relative hardness of some constituents. By carrying on the polishing upon a thick, soft chamois skin and using plenty of water good results will be obtained, but probably the best foundation for polishing in relief consists of a block of soft wood upon which is stretched a piece of parchment, thoroughly soaked and covered with a very little of the finest jewelers' rouge. Mr. Osmond finds it beneficial in some instances to finish the polishing with some sulphate of calcium spread in like manner upon parchment.

It is especially when the sample contains much free cementite that the structure is revealed in this way without requiring any further development. Cementite, which, as will be seen, is a mineralogical name for the carbide Fe_3C , is the hardest constituent of iron and carbon alloys. It abounds in very high carbon steel, in white cast iron and in spiegeleisen. When such specimens are polished upon a soft support, the cementite stands in sharp relief, as is well shown in Fig. 2, which exhibits the structure of spiegeleisen containing $1\frac{1}{2}\%$ manganese and magnified 56 diameters. The bright constituent is cementite, the darker back ground pearlyte.

Graphite, Slag and Mechanical Defects.—The presence of graphite, slag or mechanical defects such as imperfectly welded blow holes, flaws,

* No. 1 of this series appeared in the *Engineering and Mining Journal* for June 26th, 1897, page 602; No. 11., July 17th, 1897, page 69.

* Private communication to Mr. J. E. Stead.

pping, etc., is also made apparent by the polishing operation, but these do not properly belong to the microstructure of the metal.

Fig. 3 shows the structure of a piece of gray cast iron containing about 4% of silicon as it appears after polishing and magnified 56 diameters. The mode of occurrence and distribution of the graphite, even of the minutest plates, is clearly and beautifully brought out by the polishing. It must be noticed, however, that the structure of the iron background is not revealed—a further treatment is required to enable the microscope to resolve it.

Limitation of the Polishing Operation as a Means of Revealing the Structure.—To sum up, polishing in relief reveals the structure of certain classes of ferrous alloys in their broader outlines. In order, however, to bring out the finest details—those that can be seen only by means of very high power—a further treatment of the sample is generally required.

Prolonged polishing on a hard support, as advocated by Dr. Sorby, also reveals the structure of certain grades of iron and steel. Finally, the presence of graphite, slag and mechanical imperfection is made apparent by the polishing operation. In the great majority of instances, however, for the exceptions are few, a proper development of the specimen is absolutely necessary. Wrought iron and all classes of soft and medium hard steel, which have such important and numerous industrial applications, fail to exhibit their microstructure in the polished condition. Again, the appearance of a polished surface, under the microscope, will always be improved, I think, by a well-conducted development.

Grinding and Polishing by Machine.—Emery wheels of increasing fineness and driven by shaft power may be used instead of emery papers and emery powders for the grinding of the samples, and such arrangement shortens materially the time required for their preparation. The flat sides of the wheels are used, and it is more convenient to have them revolved in a horizontal plane.

As already stated, however, the marks left, even by the purest grade of emery, are not easily effaced by the rouge, much labor being often required in the case of soft specimens. Here again it is beneficial to remove the emery markings by rubbing the sample over some tripoli powder, which may be spread over a cloth tacked to a revolving wooden disk, if it is desired to eliminate hand work. The polishing on rouge may be effected in a similar manner upon a revolving support either soft or hard.

When the various wheels and disks (two or three emery wheels, one disk

cutting faces were obtained, and by varying the fineness of the emery, and using rouge or petty powder on the last disk, any desired polish might be obtained." The circumference of the disk has a velocity of some 10,000 ft. per minute. Mr. Tucker states that he has obtained by this method perfect surface in two or three minutes. This is certainly very rapid work, and the result must doubtless be satisfactory in the case of hard samples. For the softest grades of steel, however, the treatment appears somewhat rough, and likely to produce what Mr. Osmond calls *arrachements* or "digging up" of the metal in places. The minute cavities pro-

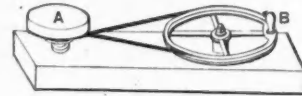


FIG. 4.

duced in this way are very difficult to remove by the subsequent treatment, and if left in the specimens greatly impair the appearance of its structure, besides being easily mistaken for microscopical blow holes.

At any rate, it is seen, that when circumstances demand it, and with the proper equipment, samples of iron and steel can be prepared for microscopical examination very rapidly and in great numbers. While it is probable that by machine grinding and polishing surfaces cannot be obtained as perfect as those prepared by hand labor, they will, nevertheless, be satisfactory in the great majority of cases for all industrial purposes.

Coal in Java.—A recent report on the mineral resources of the Island of Java shows that although deposits of coal have been discovered, the seams are in some cases too thin to be profitably worked, while others are too far away from any proper means of transport. At Bantam there is a seam fully 1 m. thick, but there are numerous faults in it.

Properties of Metals Extracted from Amalgams.—According to Antoine Guntz in the *Chemical Record*, when metals are compounded with or dissolved in mercury, they are in, what he calls "atomic states," by which he apparently means not so lightly polymerized as when isolated. He infers this from the fact that when the mercury has been retorted off, they are sometimes left in a pyrophoric condition. He refers to Ramsay

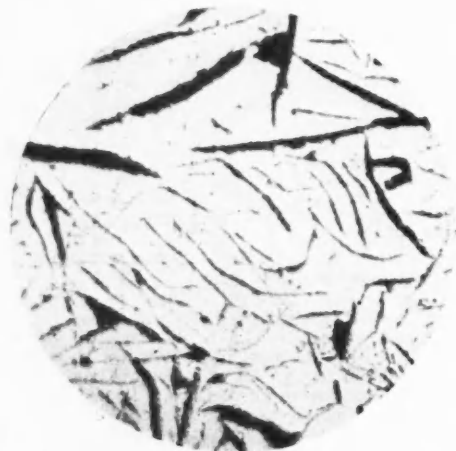


FIG. 3.—GRAY CAST IRON AFTER POLISHING AND BEFORE DEVELOPMENT. (Magnified 56 diameters.)

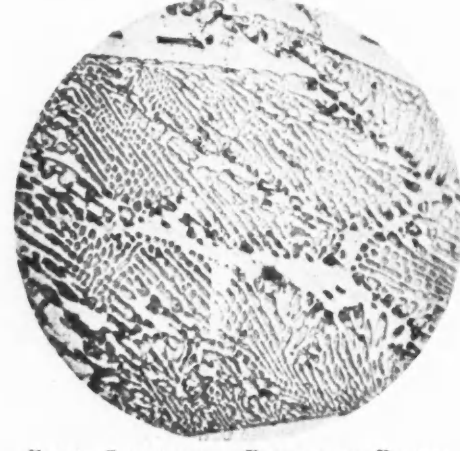


FIG. 2.—SPIEGELEISEN POLISHED IN RELIEF. (Magnified 56 diameters.)

for the tripoli and one for the rouge) are so arranged that they can be revolved simultaneously and when proper clamps are provided (one or more at each wheel) to press the specimens against the abrasive or polishing surfaces, many samples can be polished simultaneously and a great number prepared in a relatively short time.

The writer does not know of any grinding outfit of this kind being manufactured, but since its mechanism is very simple its design and construction should not present any difficulty.

Mr. Stead* describes a small power machine similar to those used for grinding lenses, and also a small hand machine. In both instances the sample, which should be very thin, must be cemented with Canada balsam to a metallic crown at the extremity of a carrier which is then clamped to the machine. This cementing operation seems to lengthen needlessly the manipulations. By using thick pieces ($\frac{1}{4}$ in. or more) suitable clamps can be devised which will take hold of the specimens and press them against the revolving disks without necessitating any previous mounting.

Fig. 4 shows a very simple little hand machine manufactured by Fuess, of Steglitz, Germany, and which may be used with good advantage for the final polishing, and also for the tripoli treatment. The cloth or chamois skin is stretched over the disk A, which is made to revolve by means of the handle B at the rate of some 200 revolutions per minute, imparting to the circumference a velocity of about 8 ft. per second, while the specimens are pressed upon the polishing surface by the left hand.

Mr. A. E. Tucker† advises the use of disks similar to those employed in the Birmingham (England) district for the grinding of jewelry. They are made of equal parts of lead and tin. If a harder surface is needed bismuth or antimony may be added. The disks are 1 ft. in diameter, and are prepared by "first cutting a face on them and then working emery powder of any suitable fineness into them. . . . In this way excellent

(*Journal of Chemical Society*, 1889, p. 521), for support of this; also to a previous paper of his own (in the *Comptes Rendus* 114, 115, 1892), where he showed that manganese obtained from its amalgam is highly active, burning in CO, CO₂, SO₂, and BCl₃. He finds that the heat of combustion of such manganese is higher. He suggests that metals, as ordinarily known, are highly polymerized. Chromium is another metal which is ordinarily permanent in air, but when obtained from its amalgam is highly active. Molybdenum is another example.

Alloys of Iron and Antimony.—Mon. J. Laborde, in the *Chemical Record*, says that these alloys were obtained by melting together in a Perrot furnace pure crystallized antimony and iron wire. The fused antimony dissolved the iron readily and the alloy was cooled rapidly by pouring into an ingot mold. The properties were as follows:

	Iron, per cent.	Density at 0°.	Specific heat.		Iron, per cent.	Density at 0°.	Specific heat.
1	18.45	7.211	0.0639	5	43.12	8.298	0.0797
2	25.69	7.912	0.0688	6	55.02	8.159	0.0869
3	35.42	8.300	0.0753	7	61.20	8.120	0.0913
4	39.20	8.071	0.0779	8	81.20	7.800	0.1028

The author points out that most of these alloys are heavier than iron although that metal is the heavier of the two components; thus indicating a condensation during their formation. The specific heats figured are all larger than the calculated means of the metals combined.

These alloys of iron and antimony, which were experimented upon by Prof. Henry Wurtz more than 30 years ago, are very curious and interesting. They are very easily made. Some use should be found for them in the arts, as they could be quite cheaply furnished. Their great brittleness debars them for most uses, but there are applications where it would prove an advantage; and there can be no rational doubt that triple alloys could be found having valuable properties. One of Professor Wurtz's results was the formation of such triple alloys with metals for which iron has no direct affinity. One object of his experiments was to discover new solders for iron and steel, but they were too soon interrupted.

* *Journal of the Iron and Steel Institute*, I., 1894, page 292.

† *Journal of the Iron and Steel Institute*, I., 1894, page 317.

OHIO MINING IN 1896.

The twenty-second annual report of Mr. R. M. Haseltine, Chief Inspector of Mines of Ohio, for the year 1896 has just been filed with the Governor. From this it appears that the year's coal production of Ohio was 12,912,608 tons, a loss as compared with 1895 of 771,271 tons. The four leading counties in point of production are: Perry, 1,703,816 tons; Jackson, 1,651,109 tons; Athens, 1,383,709 tons; Hocking, 1,351,511 tons. Perry County, which has been second in point of production during the two preceding years, has again assumed the head of the list. Jackson County, which has led during the past two years, dropped back to the second position. Athens and Hocking remained third and fourth, respectively, the positions they have occupied for the past three years. Belmont County advanced from sixth to fifth, and Stark from eighth to seventh. Guernsey receded from fifth to sixth, and Jefferson from seventh to eighth. Columbiana and Tuscarawas remained as during the two preceding years. The counties of Athens, Hocking and Perry, which compose the Hocking Valley coal field, produced 4,430,036 tons, an amount which equals 34.2% of the entire production of the State as compared with 34% during the preceding year, 36.7% during 1894, 38.4% in 1893, and 37.7% during 1892.

From a carefully prepared table designed to show the amount of coal delivered at the several lake ports, it is found that it amounted in the aggregate to 8,941,327 tons in 1896. Of this 3,175,722 tons was anthracite and 5,765,605 was bituminous. By a comparison with the preceding year the latter is found to be an increase of 1,543,692 tons. The footings also indicate a gain in the total shipments of 162,093 tons over 1895, and an increase of 2,072,070 tons when compared with 1894. Of the bituminous coal sent to the lake ports during the year, 4,337,815 tons came from mines in Pennsylvania, 1,267,035 from Ohio, 159,117 from West Virginia and 1,638 from Maryland. These shipments from Pennsylvania represent a gain of 1,755,828 tons, and were equal to 75.2% of the entire year's shipment, as against 61.1% during 1895, 65.9% during 1894, and 49.9% during 1893. The Ohio fields furnished 1,267,035 tons, which is a loss of 99,679 tons as compared with the preceding year, and a loss of 801,877 tons as compared with 1894, and a loss of 861,330 tons when compared with 1893. Ohio coal during the past year formed 21.9% of the entire lake shipments of bituminous coal, as against 32.3% in 1895, 28.8% in 1894, 46% in 1893 and 25% during 1892, which indicates that during the past three years the percentage of Ohio coal in the lake shipments has decreased 24%, while the quantity from Pennsylvania has increased 25.3%.

Of the year's production of coal in Ohio, 3,368,349 tons were mined by machinery. While the year's production shows a decrease of 771,271 tons as compared with the preceding year, that produced by machinery shows an increase of 247,893. Mining machines have been operated in 11 of the 30 coal-producing counties of the State, as compared with nine during 1895. The largest production by machine was in the counties of Hocking, Athens, Perry and Guernsey. In the three former, which are known in the coal trade as the Hocking Valley, 96% of the entire amount of machine mined originated, an increase of 3% as compared with 1895. There were 13 new installations made during the past year. The new mines added to the list are: Phoenix No. 2, Courtright Kistler & Company, or No. 16, Maple Hill, Springfield and Daleton, in Athens County; Sherrods-ville No. 5, in Carroll County; New Shaft at Salineville, in Columbiana County; Central, Hartford and Trail Run, in Guernsey County; Cawthorn mine, in Hocking County; Glendale, in Perry County; Hutson No. 4, in Portage County, and the Woodland mine in Stark County. There were 45 mines in the State equipped with mining machines. In these 209 machines were operated, an increase of 45 as compared with 1895. Of this number 130, or 62.5%, were of the electric type as compared with 82 during 1895, 59 in 1894, 42 in 1893 and 27 in 1892. There were 79 machines designed to use compressed air, compared with 82 during 1895, 112 in 1894 and 107 in 1893.

There were 110 new mines opened during the year; 119 remained suspended and 114 were exhausted or abandoned. At the close of the year there were 1,203 mines in the State. Of these 1,094 were in operation a greater or less portion of the year. Of this number, 360 employed more than 10 men each and 724 employed a less number. There are 824 drift openings, 149 shafts and 66 slopes; while in 167 the mode of reclaiming the coal is not given. Of the whole number 134 are ventilated by fans, 281 by furnaces, 38 by fire-baskets and 52 by steam jets or exhaust from the pumps; 528 rely upon the laws of nature, and the mode of ventilating 179 is not given.

The number of inspections made by the members of the department was 1,835, which, when the loss of time and the adverse surroundings are considered, compares favorably with the preceding year. The number of permanent improvements is given at 280, a number which has been exceeded but twice during the history of the department. In all 93 sets of scales were tested during the year, of which 30% weighed incorrectly, as compared with 32% in 1895 and 42% in 1894. Of those found incorrect during the year five are reported as being against the miners and one against the operator. The beneficiary of the 22 remaining sets is not given.

A total of 28,417 persons found employment in and about the mines during the year. Of this number 22,145 were miners, a loss of 271 as compared with 1895, and 6,301 were day hands, of whom 3,764 were employed on the inside and 2,537 on the outside. The total number of day hands indicates a loss of 281. The statistics of labor, wages and average time of employment are very fully given in the report; a summary of its statements was given in the *Engineering and Mining Journal* for August 7th, page 154.

IRON ORE, FIRE-CLAY AND LIMESTONE.

The iron-ore production was confined to the counties of Jackson, Lawrence and Scioto, where 70,765 tons of hematite iron ore were mined, a decrease of 22,286 tons as compared with 1895. The 17 counties which show a production of fire-clay return a total of 827,540 tons as against 844,832 tons during 1895. The average number of weeks worked is given as 32, the same as during the preceding year; 602 men were employed in mining it, which is a decrease of 227 as compared with the preceding year. In the preparation and manufacture of brick, etc., from this clay 3,139 persons were employed, as against 4,156 during 1895. In the pro-

duction of limestone the returns show losses in eight of the nine classifications into which the product is subdivided for the market. The average time worked is given as 24 weeks, a gain of one week over 1895. The number of men employed was found to be 3,186, a decrease of 643 from last year, but an increase over 1893 and 1894.

MINE ACCIDENTS.

In all 303 accidents occurred in and around the mines of Ohio during the year. Of this number 41 were fatal, a decrease of 11 as compared with the previous year; 159 were serious, a decrease of seven, and 103 were of a minor character, an increase of 36 over last year. Of the year's accidents 44% were attributable to falls of roof, 11% to falls of coal, and 25% to injuries by mine cars. There were 314,942 tons of coal mined to each life lost; 81,211 tons for each serious injury received, and 64,563 tons produced for each person injured.

THE COPALQUIN AND LEMON MINERAL ZONE, DURANGO, MEXICO.

Written for the Engineering and Mining Journal by Ramon Felix y Buelna.

During an expedition lasting from July to November, 1895, through the northern part of the State of Durango, with the object in view of determining the geological formation of that region, I had an opportunity to examine closely a number of mineral zones and to fix my attention upon those which I considered of the greatest importance and future value. Of these, outside of Guanacevi, which is already well known and being rapidly developed, I will make special mention of Copalquin and Lemon, considering them, by reason of their proximity and similarity of formation, as constituting the same mineral zone. There are no extensive workings in the metal-producing zones of this district, and my conclusions are deduced from the general and comparative geology of the zone, and from its morphological characters, using the few data furnished by the workings in the veins, although they are small and have been superficial. At the close of the cretaceous period, which formation, with more or less interruptions of continuity, constitutes the skeleton of the northern portion of the State of Durango, appeared the tertiary age, characterized by colossal eruptions partly of acid rocks and principally of neutral rocks, both belonging generally to the cryptocrystalline series of these groups.

The mineral zone of Copalquin and Lemon is situated on the western slope of the Sierra Madre, between the parallels of 25° 40' and 25° 32' north latitude, being symmetrical with that of the mineral districts of Guanacevi on the eastern slope. Copalquin, which we may consider the centre of this zone, is 885 m. (2,903 ft.) above the level of the sea. Five km. (3.1 miles) to the southwest, is Lemon, at an elevation of 580 m. (1,902 ft.) and 5 km. to the northeast is found the summit of the mountain range at an elevation of 2,300 m. (7,546 ft.). In consequence the ends of the transverse axis, or line from northeast to southwest through the center of the zone, presents a difference in level of 1,720 m. (5,644 ft.).

On the barren summits of the mountains, on their slopes and in the bottoms of the ravines, we observe a large number of lodes lying in two directions, principally northwest and southeast, parallel to the general direction of the mountain range; there are also east and west lodes and dikes of green rocks crossing the general formation.

The three special cases of exploitation, moderately extensive, that have been carried on in this locality are the Refugio, San Manuel and Soledad lodes; of these the first produced a great bonanza of gold and silver, the second an extensive lode of rich silver ore, containing gold, and the last is producing abundant gold and silver ore of high-paying grades, and it has in sight a large pocket of ore rich in gold and silver, the exact dimensions of which are as yet undetermined. The topography of the zone is favorable for exploitation, exploration or investigation. In working the mines in 90% of the cases that will occur it will be a long time before it will be necessary to use hoisting or pumping machinery.

The distance to Culiacan, the capital of the State of Sinaloa on the west, is about 200 km. by the road and it is easily traveled in winter, spring and autumn, but with some slight difficulty in summer, by reason of the rains that cause freshets in the streams. In transporting ores to Culiacan to be treated it is probable that the rivers Humaya and Tamazula can be advantageously used. Culiacan is connected with the Gulf port of Altata by a railroad and at Altata various lines of steamers provide communication, either directly or with but one change, with San Francisco or Guaymas, Sonora. Communication with the interior of the Republic may be had by way of Durango, the southwestern terminus of the International Railroad, or by Guanacevi, the latter being usually preferable. By either of these routes it is necessary to traverse the Sierra Madre. The distance from Copalquin to Guanacevi is, approximately, 300 km. (126 miles). It is hoped, in view of the great development, and the importance that attaches to Guanacevi, that it will soon have a railroad; with this, and the completion of a wagon road across the Sierra Madre, the communication between Copalquin and the interior of the Republic will not be difficult.

Platinum and Iridium in Russia.—According to the *Bulletin de la Société de Géographie Commerciale*, xix., 5, the production of platinum in Russia in the year 1895 was nearly 270 pounds (9,735 lbs.), more than 1,750 lbs. less than during the year 1894. The output of this metal is from the Oural, in the districts of Perm and the mountain regions of Verkhoutorski. Eleven pounds of iridium were found in the district of Orenburg, according to a recent consular report.

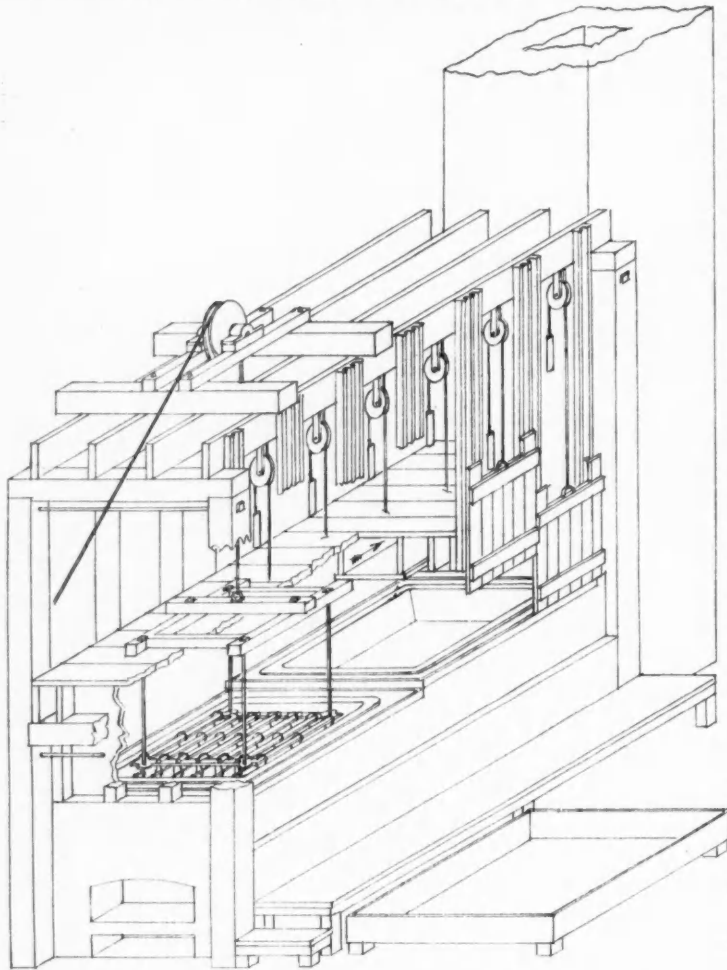
Boiling Point and Critical Temperature of Liquefied Hydrogen.—Olszewski, in the *Philosophical Magazine*, says that the constants of liquefied gases are likely in the near future to become matters of great practical import. Olszewski determined the temperatures with a platinum resistance thermometer down to -208.5°. The critical temperature (above which hydrogen is no longer liquefiable by pressure alone) was found to be -234.5° and the boiling point, at 1 atmosphere of pressure, -243.5°. Oxygen by the same resistance thermometer gave -118° to -119.2° for critical and -181.2° to -182.5° for boiling point as against -118.8° and -181.4° by the hydrogen thermometer.

A PLANT FOR PARTING LOW-GRADE BULLION

Written for the Engineering and Mining Journal by F. Gutzkow.

The article on "Refining of Copper Bullion," published in the *Engineering and Mining Journal* April 17th, 1897, appears to have interested those engaged in the production of such bullion, to judge from the inquiries I have received. I hope, therefore, that a representation of the plant which I use will also be appreciated. The description in my former article referred more to bullion of middling fineness, but the present is on the treatment of very low-grade bullion, containing 25% of silver and 75% of copper. For the sake of comparison I shortly state, how, according to Dr. Percy (*Silver and Gold*, page 490), such bullion is manipulated in Europe. The bullion is made red hot, becoming then brittle and is pounded in a mortar while still red hot. The sifted powder is stirred into a bath of boiling sulphuric acid until the evolution of gas stops. The mass of sulphates is thrown into water and worked for bluestone. The acid which has served as a bath is probably utilized for dissolving high-grade silver dore, as it would not pay to dilute it with water in order to recover the comparatively small amount of dissolved silver, which makes the process fit only for large custom refineries.

The first step, that is, pounding red-hot copper and stirring the pow-



THE GUTZKOW PLANT FOR PARTING LOW-GRADE BULLION.

der in acid, is an old operation, and does not invite imitation in this country. The second step, that is, the making of bluestone out of anhydrous copper sulphate, was invented by Bucholz in 1803 (Percy, *Silver and Gold*, page 433). I mention this here because a rediscoverer succeeded in obtaining a United States patent on that process as late as June 9th, 1896, part of which, that is the invention of Bucholz, has been practised, regularly or occasionally, in all the refineries of the world for almost a century.

The accompanying sketch of my apparatus shows a cast-iron flat-bottomed pan or kettle, 4 ft. square and 2 ft. deep, which is mounted over a fireplace, and a second pan of equal area, but only 15 in. depth, which is heated by the waste heat from the first. Each pan is covered by separate wooden chambers provided with doors sliding up and down. The chamber over the first pan is lead lined and connected by a leaden conduit with the chimney. The draft must be powerful enough to prevent the escape of fumes into the working-room, even when one of the sliding doors is partly lifted. The pans are made square for the sake of economy of space and flat-bottomed for the easier manipulation of a hoe; otherwise, there is no objection to having them round, with a rounded bottom.

The bullion is cast into slabs about 1 in. thick and 12 in. square. Each slab has a hole of 2 in. diameter, made by placing an iron cylinder in the mold during casting, wherever wanted. These slabs, 20 or more, are suspended by S-shaped iron hooks from horizontal iron rods covered with lead pipe. The rods rest on a lead-covered iron frame about 3 ft. square, to which are fastened four vertical iron rods, also covered by lead pipes. The vertical rods pass through four holes in the roof of the lead-lined

chamber, and are secured by screws to a wooden frame which rests on the roof. The whole contrivance, the wooden frame on the outside, the iron lead-covered frame on the inside, together with the suspended slabs of bullion, can be lifted by a windlass placed on the general floor of the room. It can be lifted entirely out of the chamber by removing the roof, which consists merely of loose planks covered on one side with sheet lead. The lead-covered iron frame is kept out of reach of the hot acid. The iron hooks do not outlast many operations, but are very cheap, as they can be bent out of any old material.

In this apparatus there can be worked at a moderate heat in 24 hours about 800 lbs. of the bullion described, which is divided in about 20 slabs of from 40 to 50 lbs. each. To convert that amount of metal into sulphates, about 2,000 lbs. of concentrated sulphuric acid are required in round numbers. It is assumed that each of the two pans contains 2,000 lbs., although, in fact, some of it is better introduced from the reservoir at a later period. A third 2,000 lbs. is stored in a sheet-iron pan which stands conveniently near to the described plant and serves for crystallizing the silver sulphate, as will be told hereafter. This third 2,000 lbs. is diluted to the strength of 60° Beaumé, and represents the mother-liquor from the crystallizing of silver sulphate by a previous operation.

The cast-iron pan which is mounted over the fireplace being heated, the bullion commences to dissolve. The principle of the process is now to replace what acid is consumed in the formation of the sulphates of silver and copper by the diluted acid. This addition keeps the copper sulphate much longer in solution than would otherwise be the case. When the addition of the weak acid is stopped, the acid in the pan becomes concentrated and the copper sulphate separates rapidly and almost completely as a crystalline powder.

In order to secure regularity the 24 hours' run is divided into, say, eight periods of three hours each. In each period, consequently, one-eighth of the bullion, or 100 lbs., is to be dissolved, and one-eighth part of the diluted acid on hand has to be spent. At the end of each period the frame with the suspended slabs of bullion is raised high enough to allow the scraping of the bottom by a suitably shaped iron hoe. The separated powder of copper sulphate, about 1 cu. ft. in measure, is raked to the two corners nearest to the second pan. A slide, which forms a part of the partition between the two pans, is removed and the powder is laded into the second pan. This partition is not shown in the sketch. The frame with the bullion is lowered again into the original position, diluted acid is added, and another period begins with the redissolving of what copper sulphate the tools have failed to reach. The bulk of the copper sulphate, now in thesecond pan, is stirred in the warm concentrated acid to free it from the adhering silver sulphate, and is finally fished out and removed for further treatment. The workman is not incommoded by fumes during this operation, because the acid in the second pan is not allowed to become hot enough to generate fumes. This point may be settled once for all after the first trials of the apparatus by changes in the construction of the flue underneath. After thus removing the copper sulphate in eight periods of three hours each, the silver has been concentrated in the hot solution which measures just as much as at the beginning, because all the spent acid has been replaced by the diluted acid from the crystallizing pan. The latter is empty, the fire is banked, and the hot solution is siphoned into the crystallizing pan, which has been covered so that by an outlet and a lead-lined wooden chimney the fumes from the hot acid can be led through the roof of the building into the open air. When the first pan has become practically empty the acid in the second pan is siphoned into the first. This acid, which, as said before, is not very hot, reduces the temperature. When the fuming in the first pan has ceased all the six sliding doors are opened, some pieces of sheet iron are shoved over the pan, the remnants of the bullion are removed, and the frame is charged with a new batch of bullion. The frame is lowered, the fire revived, and the process starts afresh in a second run. The second pan is refilled from a reservoir as before. It is obvious that another charge of diluted acid is required. Therefore, for continuous working there must be two crystallizing pans, the second furnishing the mother-liquor which in the first run came from the crystallizing pan. The remnants of bullion are washed in water. Scraps go to the melting furnace; pieces that can be suspended are utilized later on.

The hot solution in the first crystallizing pan corresponds in volume and strength to the original weight of 2,000 lbs. It holds in solution the 200 lbs. of silver which the 800 lbs. of 25% fine bullion contained; furthermore, about 80 lbs. of silver which the mother-liquor in the first crystallizing pan had been retaining. It is allowed to cool until the fuming stops. Then a steam-jet is blown in until the solution has become sufficiently diluted to allow the introduction of a small stream of water to finish the dilution to about 60° B. About 500 lbs. of water is required for this purpose, including what the steam has been furnishing. No powder of silver sulphate will separate during this dilution, because the steam has raised the temperature of the acid once more to a high degree. The cover is now raised and the hot, clear liquor is allowed to cool and to separate crystals of silver sulphate. It need not cool to a very low temperature. This part of the process is essentially identical with my older process, patented in 1889, and in use for parting silver dore.

The simple operation of converting the silver sulphate crystals into metallic fine silver by melting with charcoal has already been described in the *Engineering and Mining Journal*. It can be best achieved in an ordinary tilting retort furnace, so arranged that the sulphurous gas which is evolved escapes into the chimney or in an air furnace constructed accordingly.

The cost of the process is chiefly in the expense for sulphuric acid; but as each pound of the 2,000 lbs. of sulphuric acid furnishes fully 1 lb. of bluestone from the 600 lbs. of copper in the bullion, the parting may be said to cost nothing, and the present expense for expressing and refining is entirely saved.

Kieselguhr for Boiler Coverings.—At a recent meeting of the Society of Mine Managers, at Witten-on-the-Ruhr, Germany, Mr. Buse advocated the use of infusorial earth (kieselguhr) as the most efficacious covering for boilers and steam pipes. Its use, he claimed, effects a saving of 28% in condensation water. At a colliery at Neunkirchen, he said, the annual saving effected has amounted to \$3,000 or \$3,500 since it was adopted.

THE WITWATERSRAND GOLD-FIELD AND ITS WORKING—IX.*

THE TRANSVAAL COAL INDUSTRY.

WRITTEN FOR THE ENGINEERING AND MINING JOURNAL BY W. Y. CAMPBELL.

The success of the gold industry of the Witwatersrand is largely based on the existence of immense areas of coal, in parts overlying unconformably the tilted gold matrices, but in chief part lying on the eastern edge of the gold area. The coal area covers hundreds of square miles. The seams are from 3 to 75 ft. thick. The quality, taking best Welsh steam coal as the unit of 100, varies from 55, the coal nearest the gold mines, to 70 or 80 for coal found about 90 miles east of the gold mines. The seams worked lie from 100 ft. to 200 ft. below the surface, with sandstone roofs.

The main current supply comes from a group of coal mines situated five miles from the most easterly of the Main Reef gold mines, and, therefore, at distances varying from 5 to 40 miles from the remaining gold mines as they stretch away westward. The chief coal pits are connected with the Netherlands Railway which runs along the northern border of the Main Reef Series.

The output from the pits varies from 5,000 to 25,000 tons per pit per month of 26 working shifts of nine hours. The aggregate output of all the pits is at present about 1,250,000 tons per annum.

Nominally the ton charged for and freighted is that of 2,000 lbs., but as the bulk of the traffic is, by an arbitrary rule—not direct, but indirect—of the Netherlands Railway, bagged coal, 10 bags are called a ton, and they average 210 lbs. per bag. This bagging costs the mines from 25c. to 50c. a ton extra on their coal.

The main coal pits are working in large seams 30 ft. to 70 ft. thick, but only carrying a working face of from 12 ft. to 30 ft. Machine cutters are unknown, though much talked about, and washing is barely dreamt of. The surface equipments are good for rapid hoisting, screening, sorting and handling.

Given a good coal area with 40 ft. seam, lying 150 ft. from grass roots, the local experience is that it takes \$500,000 to put the mine into a position to produce 30,000 tons a month; and this is without washing apparatus or machine cutters. Some coal men say \$750,000.

The working force of a typical colliery handling 1,000 tons per day of nine hours will be 35 whites and 750 blacks. About 30 tons per man per month working shifts of nine hours, and 26 shifts to the month, is considered good work. About 55% of labor is underground, the rest on the surface; a large part is taken up in bagging and sewing bags.

Coal is blasted out with dynamite, black powder not being allowed by the government. There is a large percentage of culm or waste. Of coal sent to surface for market 70% is round coal and 30% nut; the latter, though the better fuel fetches a lower price.

As to working costs, they are of great variety, owing to causes such as management, nature of equipment, steadiness or irregularity of output, etc., but the variation is from 72c. to \$2.16 per ton.

The average for the main pits supplying the gold mines is \$1.50, and itemized shows as follows, in comparison with what the charges should be at a reasonable rate of working, the latter being estimated:

	Present, cents.	Estimated, cents.
White labor.....	29.0	36.0
Black ".....	75.4	24.0
Subs.....	19.4	12.0
Explosives.....	14.4	8.0
General.....	8.8	6.0
	150.0	86.0

One large pit, favored with exceptionally good and expert management, is running to-day at \$1 per ton, and I am satisfied my estimates are well within the mark.

Bagging coal for the mines should be stopped and loading in bulk made the rule. The opposition of the railroad management to sidings from main lines to the respective gold mines should be withdrawn; coal could then go in bulk without wasteful handling from colliery to mill bunkers. With these simple changes the coal bill of the gold mines would drop 50%, and would form only 5% of the costs instead of 10%, as at present.

One trouble ahead for the colliery owners is their own number and power of production, already in excess of local consumption. Combinations and pools are inevitable for a time, but the area of known coal is too great and too conveniently situated to permit arbitrary restrictions to succeed long. The profits will be made by high-class outfits, working a good quality of coal, run by shrewd management, and by opening the Indian Ocean trade at Delagoa Bay.

RAILROAD CHARGES.

The Witwatersrand is connected by railroad with five ports: Delagoa Bay, distant 413 miles; Durban, 440 miles; East London, 665 miles; Port Elizabeth, 714 miles, and Cape Town, 1,014 miles. The line to Cape Town carries mails, passengers and light freights, its terminus being the first port of call from Europe.

There is no competition, though there are so many lines to different ports, since the Transvaal railroad concessionaires control the line in the Republic and make all freight rates. The men who run the State railroads are Hollanders. The rates are generally extremely high. Thus, that for carrying coal to the gold mines is 7c. per ton-mile, though the railroads in Natal and the Orange Free State, when carrying coal for themselves do it at 1c. per ton mile. Machinery, timber and general freight rates are kept high in the same way as the coal rates by the concessionaires. In many cases the railroad freight charges are equal to the full cost of the consignment. The Transvaal railroads carrying for the goldfields can show net earnings up to 15 and 16%, whereas other South African railroads carrying for corn, wool or sugar fields show only 1½ to 3%.

Under the concession the Pretoria government has the right to buy out the concessionaires at any time on giving 12 months' notice of intention to do so. In that case the State must pay off all obligations or bonds or shares on the basis of a sum calculated on 20 times the average

dividend of the last three years plus 1% for every year unexpired of the concession. The concession will expire in January, 1915. To buy the roads at the present time would require \$41,250,000.

The bonds and shares are in part held in Germany and Holland, and in part by the Transvaal government; thus of the 3,000 total 4½% bonds the Transvaal government holds 920, and of the 11,000 issued 6% bonds or shares the government holds 4,793.

THE STRUCTURE AND CONSTITUTION OF ALLOYS OF COPPER AND ZINC.

In this paper, in the *Chemical Record*, M. Charpy, refers to a previous paper of his presented to the Academy of Sciences in 1893, showing that microscopical examination of the structure of brass leads to an intelligent following up of the results of mechanical and thermal treatment of these alloys. He gives the following conclusions: 1. Alloys containing up to 35% of zinc all present the same microstructure; the cast metal being formed of an agglomeration of long dendritic needles, often rectangularly ramified. The dimensions of these crystallites depend altogether on the rapidity of solidification. When the temperature is kept high, but below fusion, crystals are developed, become more distinct and finally invade the whole mass. He further says that this crystallization by annealing has been already pointed out and utilized by Messrs. Fouqué and Levy, in their studies on the metamorphism of eruptive rocks. These crystals are then octahedra of dimensions increasing with the heat that has been applied. Their angles have not yet been measured, but they appear to have identically the same form and to make up the whole mass in red copper, as well as in the alloy of 34 to 100 of zinc, and all the intermediate alloys, which leads us to consider all these metals as formed of isomorphous mixtures.

For this group of metals there are then two structures very well defined, one of dendritic crystallites corresponding to cast metals; the other formed of well defined octahedral crystals corresponding to the completely annealed condition. All hardening is marked by the existence of deformed crystals, and all incomplete annealing by the appearance of small and badly developed crystals.

When the zinc passes 34 parts in 100, the structure changes; the cast metal being formed of crystallites with rounded outlines and without the dendritic ramifications. This structure is not developed sensibly by annealing, and whatever may be the treatment undergone by the metal, there are always two materials present, crystals imbedded in a magma. When the zinc increases further, the crystals diminish, and above 45% the mass is composed of large plates of a polygonal contour, which seems to develop around a certain number of centers of solidification, and in the interior of which small crystals are distinguished. When the zinc attains 67% we have an alloy of a conchoidal fracture, but appearing sensibly homogeneous; but with still more zinc the potash dissolves certain portions and develops ill-formed crystals which seem imbedded in the zinc.

2. The microscopic structure leads to the interpretation of certain facts relating to the mechanical properties. In the well-crystallized (34% of zinc) alloys the impurities localize themselves between the crystals. In industrial brasses these impurities are usually weak metals. Lead and tin form a solder very resistant to cold. It is a fact proved that the flaws and fractures occur in the interior of crystals, which explains why these alloys, formed of large crystals, show a finely granular structure. But if the temperature is raised, the resistance of this solder rapidly diminishes, and above 200° (392° Fahr.) the metal becomes very fragile, ruptures occurring between the faces of the crystals. When the proportion of zinc is but 40% this effect is not produced. The crystals never occupy the whole mass, and the impurities are distributed throughout a magma which does not so easily lose its cohesion. It is known, in fact, that brasses of 36% to 45% zinc can be forged cold.

3. The properties of brasses indicate clearly the existence of the definite compound CuZn₂ (67.3% Zn), which M. Chatelier has isolated. Riche's researches into densities also show a perturbation about the alloy Cu₂Zn (34.5% Zn). These facts, with the above microscopic results, furnish us the following hypotheses regarding the alloys of copper and zinc: 1. The 34.5% alloys are made up of mixed isomorphs of Cu and Cu₂Zn. 2. The 34.5 to 67.3% alloys are variable mixtures of Cu₂Zn (a malleable compound) and CuZn₂ (hard and breakable). 3. Those of 67.3% Zn are mixtures of Zn with CuZn₂. These hypotheses are believed to be warranted by the experiments made.

Lignite Mining in Bohemia.—The production of lignite in Bohemia during 1896 as compared with 1895, was 15,226,850 metric tons, an increase of 574,700, or 3.9%. Of the production of 1896, the Teplitz-Komotau District furnished 13,262,355 tons.

Pumping Engines for Japan.—A large pumping engine for underground working has been lately constructed by Messrs. Joseph Evans & Sons, of Wolverhampton, England, for use in the Miike coal mines in Japan. The engine is of the direct-acting type, and consists of two complete compound engines, arranged side by side on bed plates, their steam-distribution gear being so arranged that under ordinary conditions the two engines work together on the duplex principle, so as to keep up a continuous flow of water; but when desired the two sets of valve gear can be disconnected, and one of the engines can be kept at work while the other is at rest. The disconnection of the two sets of gear is effected entirely by the manipulation of certain stop-valves, and is the work of a very short space of time. The principal dimensions of the engine are as follows: High-pressure steam cylinders, 24 in. diameter; low pressure, 44 in. diameter; stroke, 36 in. The duty for which the engine was designed is to raise 2,000 gallons of water per minute a height of 600 ft. The water to be dealt with is gritty and impregnated with sulphur, and in consequence is of a strongly corrosive nature, and with a view to resisting this corrosive action, the rams, rods and other working portions of the pumps are made of a specially resistant bronze. The engine is provided with a surface condenser, having tubes and tube-plates of brass, the water raised by the pumps being employed as cooling water. The condenser is fitted with two independent air pumps of the direct acting type.

* No. 1. of this series appeared in the *Engineering and Mining Journal* for June 19th, page 631; No. II., June 26th, page 639; No. III., July 10th, page 36; No. IV., July 17th, page 67; No. V., July 24th, page 96; No. VI., July 31st, page 130; No. VII., August 7th, page 160; No. VIII., August 14th, page 190.

NOTES ON THE IMPROVEMENT OF RAIL STEEL.

Written for the Engineering and Mining Journal by G. Whitefield Chance.

In the rush of orders incident to the drop in rail steel and the extremely low prices at which contracts have been taken, there are elements of danger to the purchaser of rails which should not be overlooked. The tendency to cheapen the cost of production of late years has caused the use of larger ingots, faster running mills and higher heats in rolling. Partly to counteract the effect of these undesirable features of rail making, higher carbon has been introduced into rails. While high carbon, with low phosphorus and sulphur and medium silicon and manganese, will produce a good rail steel with proper heat and mechanical treatment, yet the methods used in some of our mills are not all they should be to produce good high carbon rails.

The rails of about 20 years ago, made of small ingots, with slow running mills, show much better results than the late higher carbon rails. That this fact is largely due to the small sections, I think the unprejudiced mind will admit, yet the other influences were no doubt factors in determining the good qualities. We may use manganese, phosphorus or silicon as hardeners, but carbon is the most reliable and produces the best results, the other hardeners producing brittleness, except perhaps silicon, which has been known to go to 0.3 without this effect.

The chemical, mechanical and heat requirements for a good rail are pretty well known, yet it may not be amiss to recapitulate here. The chemical composition should be: Carbon, 0.45 to 0.70; silicon, 0.10 to 0.15; manganese, 1.00 to 1.30; sulphur, not over 0.07; phosphorus, not over 0.07. These are close figures but vary some according to the weight of rail. The mechanical requirements are that the rail should have as much work as possible done on it by the rolls; to this end the billet should completely fill each pass, and with a quick running mill a large number of passes should be made to produce a good rail.

Heat treatment is most important. The chemical reaction should be completed in the converter, the charged material be of a uniform composition, molds should be warm, not stripped too soon, ingots reheated in a vertical position, and no cinder heats allowed.

Rails, after rolling, should be cooled, so as to admit of an even texture in the material. Especially is the last condition essential for a strong rail and a good wearing head. It has been found that the top of the head of an ordinary steel rail, just below the surface skin, is much softer than the web or base of the rail. This is exactly as it should not be, as the head should naturally be hardest for wear. The general opinion of experts on both sides of the water seems to be that flaws are generally produced in rail steel by segregations of injurious constituents or by pipes and blowholes, these being partly dependent on such segregations.

A good rail cannot be produced from an unsound ingot. As we cannot generally see ingot flaws, there seems but one way to effectually get rid of them and that is by a modified Whitworth hydraulic compression method of treating the fluid ingot steel.

This method has been applied so successfully in many ways in the production of sound steel, that its general introduction in rail making would not be altogether experimental.

My next suggestion is of the after treatment of the rails from the hot saws. With proper appliances, the cambering machine might be done away with, the rail held straight in a tempering oven or on a table and the heat abstracted more rapidly from the head than from the base and web, keeping all parts at nearly a uniform temperature, thereby producing a uniform texture or giving a head of equal hardness and elasticity with the web and base. It might be found desirable to temper the head harder than the base and web, but I doubt if this would result in as safe a rail, or one of as generally good quality.

It will be noted that these suggestions are on practically the Alpha and Omega of rail steel manipulation. That some gagging would be required after cooling is probable, but this would undoubtedly be small.

SMELTING CYANIDE SLIMES.

The following article is an abstract of a paper read by E. H. Johnson, before the Chemical and Metallurgical Society of South Africa, June 19th. It describes the process employed at the Princess Works, where the slimes are submitted to acid treatment before smelting, a variation from the general practice in South Africa. In this country acid is commonly used, and the process at the Primrose Works is essentially the same as that followed here. Mr. Johnson's paper will be, however, especially interesting to American readers for its figures of costs and metallurgical results, upon which comparatively little has been published.

At the Princess Works the slimes from the zinc boxes are separated from the solution drawn off with them by the aid of a vacuum filter. A water-wash is passed through until the slimes are free from cyanide. The gross weight of the slimes, including moisture, is then taken, by weighing the buckets of moist slime during transference to a large sheet-iron tray placed alongside the acid tank, to determine the amount of sulphuric acid necessary to destroy the zinc. Having found the approximate weight of slimes to be treated, sufficient water is run into the acid-vat to form, on the addition of the acid, a 10% solution. One pound of acid for every pound of moist slime gives good results. This would be equivalent to about 1½ lbs. of acid to the pound of slimes, dry. The acid is then added and the vat closed down tightly. The stirring apparatus is kept continually moving during the time of feeding in the slimes, which are fed in gradually in the same condition in which they were taken from the filter-vat. It is beneficial to keep up a continual stirring for at least half an hour after the action has apparently ceased. After all the slimes are in the acid, a jet of water is turned into the hopper to wash down any adherent slimes, and everything that has been used in the cleaning up of the boxes, etc., is well washed in the same jet. The stirring apparatus is then removed and well washed in the vat during removal. The vat is then filled with water and allowed to settle. Working with dilute acid, and not heating, a perfect settlement takes place within an hour. When heating with a steam jet, settlement was much more difficult. The washing is done by syphoning off the clear liquor, and filling the vat repeatedly with water, until the solution is

neutral to litmus paper—usually four or five washings. It is well stirred at each refilling by means of a long wooden paddle, a rotary motion being given to the water. This causes the slimes to collect in the middle of the vat and reduces the risk of loss during syphoning—the syphon being let down at the side. A sample of the washings taken continually during syphoning off showed, on careful assay of a large sample, to contain 13 g. of gold per ton of solution.

The drying of the resultant gold slime is conducted on an open drying hearth in large cast-iron enameled dishes. The cakes are subsequently broken up and transferred to small sheet-iron trays in thin layers and subjected to an increased heat. When cool the slimes are ground, fluxed and transferred to the crucible. It fuses quietly and with but little fume, and normally yields 50 to 60% of the weight of slime as bullion. The average fineness of last year's bullion was, according to the works' assays, 821.9 and 819.6 according to London returns. As a deduction of 2 millimetres is made on 800 bullion, this leaves an actual difference with London of 0.3 millimetres. The slag assays, after panning out the prills (of which there is very little), 23 oz. per ton, and one ton of slag has been accumulated in two years in producing 11,627 oz. of fine gold, which is equivalent to a little under 0.2% of the total gold locked up in slags. The cost of reduction, including acid, is 6.7d. per fine ounce, made up as follows, taking an actual "clean-up" as a basis: Dry weight of zinc-gold slimes, 504 lbs.; dry weight after acid treatment, 100 lbs.; 672 lbs. of acid at 4½d., £12 12s. 10d.; 66 lbs. of borax at 37s. 6d. per cwt., £1 2s. 1d.; 9 lbs. carbonate of soda at 2½d. per lb., 1s. 10d.; 9 lbs. fluorspar at 4d. per lb., 3s.; 5 bags coke at 8s. 6d. per bag, £2 2s. 6d.; 1 No. 60 crucible, £1 7s. 6d.; total, £17 9s. 9d.; yield, 620 oz. fine gold, or 6.7d. per fine ounce.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

PLACER PATENTS.—A known vein or lode, within the meaning of the laws of the United States (Ss. 2333), excepting from the operation of a placer patent veins or lodes known to exist at the time of the application for the patent, is one which has been clearly ascertained at the date of the patent, and is of such extent and value as to justify exploitation. Evidence that at the date of an application for such patent, made after the property had been worked as a placer mine for several years, there were some surface indications of veins of mineral-bearing rocks, but that they had not been examined with a definite view to working them, and that no assays had been made, and testimony of a witness who had sunk on some of them that they "played out," and of another witness that there were no veins with clearly defined walls, refutes a claim that there were "known" veins within the meaning of said law, excluding such veins from the operation of such patent. And where a quartz lode claim is located within a placer claim which lies in a town or city, or in a town-site, after an application for a patent to the placer claim has been made, there is a strong presumption in favor of the placer patent.—Casey vs. Thieviege (48 Pacific Reporter, 394); Supreme Court of Montana.

The Swedish Iron Trade.—Notwithstanding the great activity which is reported in the iron trade in Sweden, the exports from that country, as shown by the returns for the six months ending with June 30th, show not an increase but a decrease. The following are the figures for 1897: Pig and ballast iron, 24,290 tons; rough bars, 9,368 tons; scrap bars, 714 tons; bar iron, 65,810 tons; plates, 1,193 tons; wire rods, 2,293 tons; wire, 221 tons; heavy castings, 3,376 tons; nails, 999 tons. The changes, as compared with the first half of 1896, are not important, except in pig and bar iron. There was a decrease of 3,375 tons, or 11.8%, in exports of pig iron, and of 14,770 tons, or 18.2%, in those of bar iron.

The Supply of Iron to Japan.—It appears from British Consul Lowther's report on the trade of Yokohama in 1896, that in the supply to Japan of bar iron and rods Belgium takes the lead, while in the supply of other iron and steel Great Britain retains the first place. The report draws attention to the new and growing competition of the United States, which sends there wire nails at a lower price even than the European continent. While the quantity did not come near that sent by Germany, it was about equal to that of Great Britain and Belgium together. Pig iron and rails are also beginning to be imported from the United States. Orders for other railway material are shared between Germany, Belgium and England.

The Working of the British Explosives Act.—A Blue-Book just issued contains the report for the year 1896 of the British inspectors of explosives, giving details of the working of the explosives act of 1875. The inspectors state that the growth of the trade in explosives referred to in their last report was in no sense relaxed during the past year. Five new factories had been added since 1895, making a total of 139 under continuing certificate and license, to which 207 visits had been paid. The inspectors report that there has been no falling off in the high standard previously attained in the great majority of the factories, while some of the places which had formerly lagged behind have been brought more into line with the rest. While the actual number of factories has largely increased, and also, in many cases, the output of an individual factory, and consequently the number of hands employed and the resulting chances of accident, the number of deaths from accidents by fire or explosion in manufacture was only one. Out of 358 samples submitted for license and examined by Dr. Dupré only 32 were rejected. The amount of foreign nitroglycerine imported in 1896 was 1,259,200 lbs., as compared with 880,070 lbs. in 1895. The amount of dynamite imported in 1896 was 179,000 lbs., against 56,000 lbs. in 1895. The number of accidents by fire or explosion of which the department had cognizance during the year was 134, causing, so far as is known, 33 deaths and injuring 111 persons. But nearly four-fifths of these accidents occurred in the use of explosives and under miscellaneous conditions to which the controlling provisions of the act did not apply. The number of accidents in factories (46) is below the average (51.6) for the last 10 years, while out of the total a little more than one-half were unattended with personal injury.

POWER COAL DRILLS.

The use of power drills in coal mines where electricity and compressed-air plants are installed has not until recently received much consideration. The value of a drill of this kind is now appreciated, however, and their introduction is going on rapidly. The illustration given herewith shows the general design and construction of some drills of this kind made by the Jeffrey Manufacturing Company. As machinery of this kind is subjected to extremely rough usage, the design and construction of these drills are carried out with this point in view. A great many of each style of drill are being used in various localities under varying conditions, and the results obtained from them are encouraging for their adoption by operators having power at their mine.

The cut shows the electric drill with a double post. As will be observed, the general design of this drill insures its ability to withstand heavy strains and severe usage. The compactness allows it to be handled rapidly and with ease. The weight complete is about 150 lbs. The drill as shown is made up of three parts, the motor, the frame, and gears and feed. The motor is of the multipolar type with iron-clad armature. It is completely encased by the frame and is fully protected from injury by accident. The terminals are so arranged that they are readily accessible, and contact can be made or broken without delay. The armature and field coils are thoroughly insulated and protected from grounds

made up of two parts, which are connected on one side by a hinged joint and on the other side, when in position about the bar, by means of a thumb screw. The threaded part of the nut forms a liner for the clamps and can be removed when worn, without replacing the entire nut.

The nut is held in position by a collar about which passes a spring steel friction band, which can be adjusted to allow the nut to turn with the auger at any pressure desired. This insures a release of strain on the drill when the auger strikes any hard substance such as sulphur, hard slate or other foreign material. This automatic stoppage of the feed prolongs the life of the drill and allows the machine to work under a uniform strain. The auger is made of special steel and is of the usual type used for this class of work.

The general construction of the air-power drill is similar to that of the electric drill. The fundamental difference between the two drills is in the motor. On the air-drill the motor is of the rotary-engine type, being extremely simple and of few parts.

With either type of the above-described drills, from 300 to 600 lin. ft. per day of 10 hours can be drilled. The drill can be operated by one man and a boy.

Magnetic Variations in Mine Surveying.—Since 1895 the variation of the magnetic needle has been regularly registered by a photographic recorder

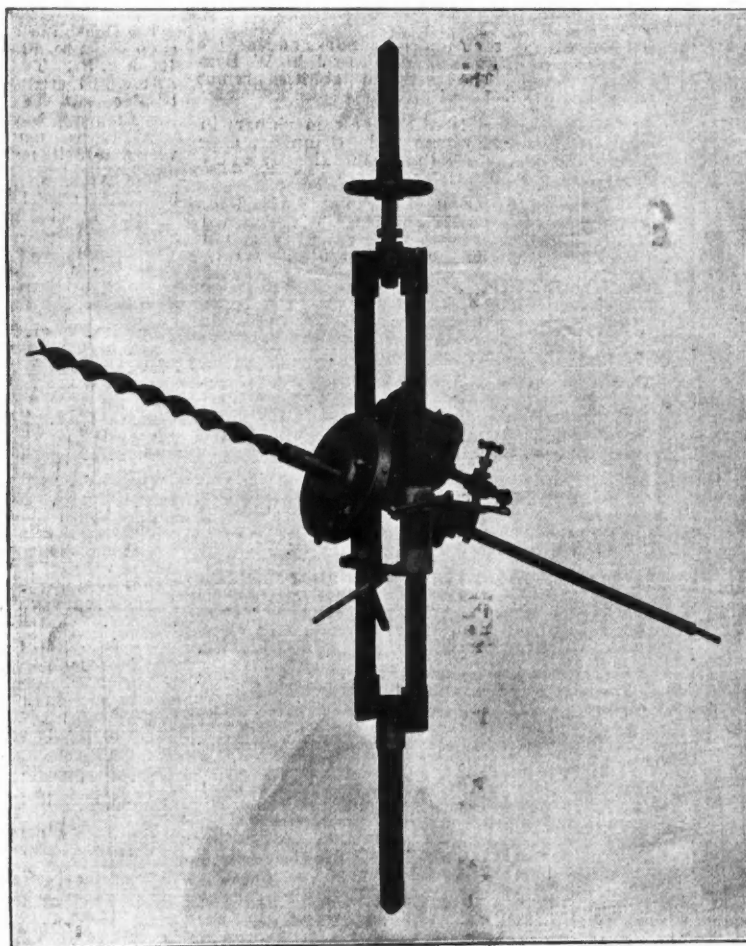


FIG. 1.—JEFFREY DOUBLE-POST ELECTRIC DRILL.

or short circuits. All parts are readily accessible and removable and can be reached without delay when necessary.

The frame is made of rolled-steel side bars firmly bolted to castings at top and bottom. The jack and jack-pipe are at the top and are built to be adjustable within certain limits, determined by the height of coal according to the special conditions existing in the mine where they are to be installed. These frames are built to suit any height of coal. The motor and feed-bar can be adjusted between the side bars in various positions according to the desired location of the hole to be drilled. The hole can be drilled at any height between the side bars and can be drilled at any angle in a vertical plane from 0° to 60° in either direction from the horizontal; it can also be drilled at any angle in a horizontal plane from 0° to 90° in either direction from the vertical plane passing through the center of the drill, and at right angles to the face of the coal. This arrangement allows the hole to be drilled in any position without resetting the drill.

The shaft carrying the gear or master wheel has its bearing on top of the field frame. The shaft is hollow and carries two keys diametrically opposite each other. The feed bar is 5½ in. in length, threaded its entire length with eight threads to 1 in. On one end of this is a socket to receive the auger. This bar passes through the hollow shaft of the master wheel and is splined in order to receive the two keys. The feed nut is arranged in front of the drill and is supported by a pin. It is

at Bochum, in Westphalia, and copies of the record are forwarded to all the mine surveyors in the district. Mr. Lenz has now published the detailed results of the magnetic observations during 1896. They show the great frequency of magnetic perturbations. The greatest amplitude was that of the perturbation on December 4th with 48.3 minutes.

Sparks from Metallic Uranium.—According to M. Chesnau, in the *Chemical Record*, M. Henri Moissan showed that ingots of uranium produced in the electric furnace give very brilliant and voluminous sparks when struck by hard bodies. The author desired to determine the temperature of these sparks, with a view to the utilization of this metal, now obtainable with ease by the Moissan furnace. He proved that these sparks at a single blow instantly set fire to explosive mixtures of air with methane and firedamp. This permits a calculation of the minimum temperature of the sparks. Mallard and Chatelier have shown that to inflame such explosive gaseous mixtures requires a heat of 650° continuing for 10 seconds, equivalent to 1,000° for one second. This is notably higher than the temperature of any sparks from flint and steel, as has been placed beyond doubt by the Fire Damp Commission. He finds that the uranium sparks also kindle cotton wicks wet with alcohol, naphtha, etc. He suggests practical applications in detail.

PERSONAL.

MR. GEORGE T. RIVES, a San Francisco mining engineer, has taken charge of the Golden Cache mine, Lillooet, British Columbia.

MR. JACOB CORBETT, late of Louisville, Ky., is now secretary and treasurer of the Riverside Mining Company, at Spokane Falls, Wash.

MR. J. H. CONRAD, well known in Montana circles, is at Mercur, Utah, arranging to push exploration on ground in which he is interested.

MR. THOMAS WEIR, manager of the Highland Boy, Bingham, Utah, paid a brief visit to New York last week. He has returned to Salt Lake.

MR. JOHN J. BROUGHALL, the Spokane agent of the Mine and Smelter Supply Company, of Denver, after devoting 10 days to Park City and Salt Lake, has returned north.

MR. T. E. SCHWARZ, Mining Engineer of Denver, Colo., has recently been engaged as consulting mining engineer by the Winrow Gold Mining and Milling Company of New York City.

MR. E. P. JENNINGS, of Salt Lake City, has completed an inspection of the Pie River and Long Lake region, Ontario, and is now looking over Thunder Bay about Port Arthur. His quest is a desirable gold mine.

MR. J. NAKAHARA, professor of mechanical engineering at the Tokyo Technical School in Japan, is now visiting in New York. He has been spending some time in this country, studying our methods of designing and shop practice.

PROF. C. J. NORWOOD, ex mine inspector of Kentucky, has been offered the position of assistant mine inspector, but has declined it owing to a previous contract with the owners of some Southern gold mines, who have secured his services.

MR. WM. PAINBRIDGE retires from the position of superintendent of the Elkton Mining and Milling Company, of Cripple Creek, on the last day of this month, and will be succeeded by WALTER B. WILSON, a mining man, who is well and favorably known throughout Colorado.

MR. JAMES E. BEVERIDGE, manager of the Pan-American Company at Torres, Sonora, Mexico, after visiting his family at Salt Lake, has returned to the mines. In the 23 years he has had charge of mining properties he has been connected with but four, in Utah three and his present office, a rather remarkable record.

MR. COURTNEY DEKALB has resigned the professorship of mining and metallurgy in the Missouri School of Mines, and will return to New York City, his future address being F. 26-27 Produce Exchange. He is at present engaged in the examination of coal properties in Western Pennsylvania and in Central West Virginia, for Pittsburg parties.

DR. WILLIAM B. PHILLIPS, recently chief chemist of the Tennessee Coal, Iron and Railroad Company, and MR. DAVID HANCOCK, have formed a partnership, and have established the Phillips Testing Laboratory at Birmingham, Ala. They will conduct all kinds of chemical work, especially in relation to iron and steel, coal and coke; also investigate technical processes, survey and report on mineral lands and mining properties.

OBITUARY.

MR. JOSEPH GREY died at his home, Sacramento, Cal., of heart disease, on August 6th. Deceased, who attained to the ripe age of 71 years, was extremely well known in the Grass Valley District, where he held at different times much valuable milling and lumber property.

SOCIETIES AND TECHNICAL SCHOOLS.

COLORADO STATE SCHOOL OF MINES.—The biennial report of the State School of Mines, Golden, Colo., contains a great deal of matter likely to interest those who follow closely modern methods of gold mining and milling. Prof. H. Van F. Furman discusses the treatment of low grade gold ores such as are met with in Colorado. He describes milling, chemical and smelting processes very clearly, seeing the limited space at his disposal. Prof. Louis C. Hill adds a chapter on electric power, its uses in factories and mills, which cannot fail to interest such as have any necessity for calling in the aid of electricity to run their machines.

Altogether the Colorado State School of Mines seems to be flourishing, and to have a very efficient staff.

MICHIGAN COLLEGE OF MINES.—The Michigan College of Mines, of Houghton, Mich., will begin its fall term on Friday, October 1st. On December 24th the term will close, thus giving 12 weeks' instruction to the students. The winter term begins on January 10th, the spring term on April 4th and the summer term on June 13th.

Tuition includes instruction in electricity, chemistry, assaying, metallurgy, drawing, surveying, mining, geology, mineralogy and kindred subjects.

SCHOOL OF MINING OF ONTARIO.—The calendar of the Kingston School of Mines for 1897-98 has been

sent us. Notice of intention to matriculate must be sent to the registrar of Queen's University, with which the school of mines is affiliated, by September 1st, together with a statement of the subjects in which the candidate desires to be examined. The school, in addition to its regular course, gives special instruction for mine foremen, assayers, prospectors and mining men generally in chemistry, mineralogy, geology, lithology, assaying, and such other studies as will assist them in the discharge of their work. Regular classes are formed at the college during the winter, and extramural classes held at distant points in the mining regions by professors sent to conduct them.

INDUSTRIAL NOTES.

The Bangor, Pa., slate factory was destroyed by lightning last week. The loss is \$12,000. One hundred and fifty men are thrown out of employment.

The plant of the Darragh Foundry and Machine Company, at Fallston, Pa., has been sold to a new electric power syndicate recently organized at New Brighton.

The Reading Iron Ore Company has started up its plant at Danville, Pa., the employees in all departments accepting the figures recently proposed by the company.

At Butler, Ind., the Auburn Foundry and Machine Works have made an assignment to John W. Baxter and I. Hanna. The assets and liabilities are not known, but will be large.

The preliminary trials of the new machinery in the plant of the Keystone Axle Company, near Beaver Falls, Pa., for rolling car axles by a new process have proven satisfactory.

It is proposed to start steel works at Springfield, O. A committee recently appointed by the Board of Trade of that city reported every facility existed for starting a small but probably profitable plant.

The Chattanooga, Tenn., Foundry and Pipe Works has just closed a contract with the Home Water Company, at Little Rock, Ark., for a 450-ton order of iron pipe. This is one of the largest orders received by the concern in some time.

A charter has been issued to the Valley Limestone Company, of New Castle, Pa., with a capital of \$6,000. The incorporators are Kennedy Andrews, of Warren, O., and John Reis, Garnet Reis, James W. Reis and W. E. Reis, of New Castle.

Articles of incorporation of the American Gas and Coke Company, of Phoenix, Ariz., have been filed. The incorporators are Mr. Lowe and his two sons, of California. This company will operate the new gas works now being constructed in that city.

Plans are being drawn by Superintendent J. K. Johnson, of the Charleroi Coal Company, for a river tippie at Charleroi, Pa. The tippie will have all the latest equipments and improvements, and when erected, will largely increase the shipping facilities.

Incorporation papers have been filed with the Secretary of State by the Arundell-Simmons Rock Drill Company, with a capital stock of \$500,000. The company will do business in Arapahoe County and the State of Colorado, with the main offices in Denver.

The Union Iron and Steel Company has started both its upper and lower plants at Youngstown, O., five trains in the lower and four in the upper mill. The puddling mills are on also, but coal is very scarce and not a great deal of puddling can be done just at this time.

The Lackawanna Iron and Steel Company, of Scranton, Pa., has ordered shipments of ore from Cornwall to be resumed to Scranton at the rate of 600 tons per day. Pig iron is also being shipped to Scranton from the Colebrook and North Lebanon furnaces at Lebanon.

Howard Morris, of Milwaukee, receiver for the West Superior Iron and Steel Company, has secured from Judge Vinjean an order permitting him to operate the works during the remainder of his term as receiver. It is expected that John D. Rockefeller will get control of the plant.

The Meehan Boiler and Construction Company, of Lowellville, O., is doing the boiler work at the Mary furnace, of the Ohio Iron and Steel Company, Lowellville. The Meehan company has lately increased its working force materially and has orders that will occupy it for weeks to come.

The new management of the Montana Coal & Coke Company, of Helena, Mont., has been installed, and the mines and ovens will now be operated to their fullest capacity. The ovens have nearly all been heated and are now burning coke to supply the smelter demand at Butte, Great Falls and East Helena.

The Lucknow Forge, of Harrisburg, Pa., which has been idle since 1893, began operations this week. This is one of the old forges, which manufacture blooms from scrap iron. The Chesapeake Nail Works will also resume next week. The manufacturers of iron and steel in that vicinity are much encouraged over the outlook.

The new iron works and machine shop of John

E. DuBois, at DuBois, Pa., were put into operation recently. The building is 500 x 80 ft. of iron and brick, with a foundry attached. When fully equipped it will have cost \$200,000 and will employ 300 hands. Dynamos and electrical machinery will be the principal articles manufactured.

The Pittsburg Pump Company, of Pittsburg, purchased the plant of the Columbiana, O., Pump and Machine Company at receiver's sale for a consideration of \$8,000. It is the intention of the new purchasers to enlarge the plant at once and to increase the output. New warehouses will be built, and Columbiana made the principal shipping point.

The Shiffer Bridge Company, of Pittsburg, has secured the contract for the new iron building for the Poughkeepsie, N. Y., Glass Works, consisting of a furnace building 120 x 200 ft., a shop building 183 x 39 ft., and a machine shop 39 x 42 ft. The company is also furnishing and erecting the steel work in the Henry McCadden Memorial Hall, Brooklyn, N. Y.

Articles of incorporation have been filed of the Cavanel Coal and Railway Company, the capital stock of which is placed at \$300,000. The incorporators are F. A. Dawes, Hugh McCaffrey, T. W. Blackburn and W. R. Dawes. The new company proposes coal mining and the construction of necessary railway and telegraph lines in the State of Nebraska.

The Consolidated Steel and Wire Company will soon begin to make improvements to its plant at Rankin, Pa. The roll mill will be overhauled and a new mill engine installed. New machinery will be placed for the direct rolling system. The heating furnaces have been arranged for this. New wire-drawing machines will be put in, and the galvanizing facilities increased.

The Alabama Rolling Mill Company has sold a bill of sheet steel to Walsh & Weidner, of Chattanooga. This is the first consignment of Southern sheet steel made in Birmingham. The purchasers will become large patrons of the Alabama steel. The transaction marks a new era in Southern industrial progress and gives Chattanooga further assurances of a rapid growth.

The De Lamar, Mercur, mill will be equipped with Gates high-grade crushing rolls and crushers. The Smuggler-Union Company of Colorado has also adopted Gates rolls. The Gates Iron Company is now very busy shipping large crusher orders to South Africa. This same concern has taken the contract to put up the new Silver Ledge 50-ton concentrating mill at Chattanooga, Colo.

The improvements in Citico furnace at Chattanooga, Tenn., have been completed. A new blower, engine and five new boilers have been added. The engine-room has been extended in length to accommodate the extra machinery. This will increase very materially the capacity of the furnace. The iron market, while not as active as in May and June, is still active, and there is a steady demand for iron.

A receiver has been asked for the Irondale Steel and Iron Company, of Middletown, Ind., it being in financial difficulties. This company has its headquarters in Indianapolis. George A. Laughlin is the president. The bill sets forth that the company is insolvent and that its total indebtedness is over \$100,000. The Irondale Company was incorporated in 1890 with a capital stock of \$150,000, for the purpose of making pig iron, steel billets, etc.

The Bethlehem (Pa.) Iron Company has cast the first 16-in. gun ever made in this country. Over 100 gross tons of metal were used. It was heated in two 40-ton and one 20-ton furnace, which were charged beyond their capacity. The casting was a great success. The casting is simply for the tube of the gun. It is octagonal in shape, 19 ft. 6 in. long, and 74 in. in diameter. The jacket for the gun will be cast later. It will be of the same size as the tube. The gun is for the United States Government.

The extensive nut and bolt works of Messrs. Plumb, Burdick & Barnard, situated at Tonawanda, N. Y., that has been closed since last May, will soon be running under new ownership. Mr. J. J. Albright, of Buffalo, has bought this plant and will keep it and its skilled workmen together. The works will have great power facilities, equipment and advantages of location as a shipping point. Mr. Albright's purchase includes the firm's real estate, the plant itself, the machinery, stock on hand and the good will and book accounts of the firm. Taking into consideration the encumbrances, the price paid was about \$225,000.

At the first of the month there were six furnaces in the Shenango valley in blast—Atlantic, Norway and Neshannock at New Castle, Sharon and Stewart at Sharon, and Mabel at Sharpsville. In the Mahoning Valley four furnaces were in blast, these being the Grace of the Brier Hill Iron and Coal Company; Hubbard, of the Andrews & Hitchcock Iron Company; Mattie, of the Girard Iron Company, and the Tod, of the Youngstown Steel Company. There are seven furnaces in the Mahoning Valley and 10 in the Shenango Valley still out of blast, but a greater portion of these will be started up during the present month.

An ordinance will be introduced authorizing the turning over of the old Baltimore & Ohio rolling

mill in Cumberland, Md., which has long been idle, from its present owner, the Baltimore & Ohio Railroad, to other parties, who will put it in operation. The property covers 33 acres, and the city in 1868 issued bonds for \$30,000 to purchase the site, which was to be the property of the railroad company as long as a rolling mill was operated, but to revert to the city when discontinued. It is believed the agreement will be amended to permit the railroad company to negotiate for industries. The site is said to be worth \$50,000.

Willis Shaw, contractor's machinery, 506 New York Life Building, Chicago, reports the following sales: A car of hoisting engines to Lantry Sons, at Pontotoc, Ill.; two narrow-gauge contractor's locomotives to Peppard & Johnson, of Minneapolis, Minn.; a 30 ton locomotive for the Ganahl Lumber Company, Arkansas; an equipment of "Shaw" dump cars to Carey Construction Company, at Fort Worth, Tex.; also pumps and boilers to Christie & Lowe for their contract at Sabine Pass, Tex. The Pacific Bridge Company, which has the contract for government fortifications at Marrowhead Point, has also placed its order for a 54-ton steam shovel with this concern.

Within a short time the long-talked-of pneumatic despatch system between the New York and Brooklyn post offices will be an accomplished fact. The tubes for conveying postal matter from one city to the other are now being laid. The line will extend from New York Post Office up Park Row, and over the Brooklyn Bridge to the Brooklyn Post Office. The Ingersoll-Sergeant Drill Company, of New York, is furnishing the air compressors to supply pneumatic power for the purpose, and already has orders for several compressors. The company will also supply compressors for the plant being installed in Philadelphia. The Batcheller despatch apparatus is the system employed, and it will probably be extended throughout all of the cities named.

Mr. Frank Smithson, of Paris, has brought to New York a model of the L. C. E. Meyer apparatus (U. S. patent No. 533,309) for immediately stopping the machinery of any plant from any part of the establishment by the simple pressure of an electric button. This device is in successful use in some of the largest works in France, and has been provisionally installed in New York. It consists of a throttling valve applied to the main steam pipe, near the boiler. By a very simple mechanism the valve can be instantly closed by an electro magnet, operated by a current of 10 to 12 volts. At the works where the experiment is in progress a Corliss engine, running 80 to 90 revolutions and delivering steam through a 3-in. pipe, is stopped by the device in a very few seconds. At the instant of making the electrical connection a whistle is automatically blown to attract the attention of the engineer in charge. In the larger works in France, in addition to the valve, there is an automatic brake, which is set in action simultaneously and applied to the fly wheel. The possibility of stopping machinery from any part of an establishment by simply pushing an electric button will save many lives and much damage to property.

TRADE CATALOGUES.

The Westinghouse gas engines, manufactured by the Westinghouse Machine Company, of Pittsburg, are well known to be of the same standard of excellence as the company's steam engines, of which so many are in use. Those, therefore, who are sufficiently interested in gas engines to wish to keep in touch with the latest advances made in them should not neglect to send for the new catalogue of the Westinghouse Company.

The gas engine has perhaps its widest application in Europe, and it has been the company's policy to send competent engineers across the Atlantic to study the latest practice; hence buyers may be sure that they will receive in return for their money all that skill, intelligence and experience can provide. The following extract from the catalogue seems to state the case for and against the gas engine very fairly: While fully appreciating the desirable features of the gas engine and acknowledging its superiority to the steam engine, in many locations and under peculiar conditions of service, we are not fanatical on the subject and do not predict that the day of steam engines is passing away. We are still building steam engines, and expect to build more and more of them each succeeding year. Being equally interested in both types of engines, intending purchasers can feel assured that our statements as to the relative advantages of steam and gas, for any given situation, will be more conservative and unbiased than if we were exploiting either one alone.

NEW PATENTS.

UNITED STATES.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Scientific Publishing Company upon receipt of 25 cents.

WEEK ENDING AUGUST 10TH, 1897.

587,686. APPARATUS FOR ELECTROLYSIS. Anthelme F. W. Boucher, Prilly, Switzerland. The apparatus consists of a positive plate or electrode, one portion

of which is non-oxidizable and adapted to be immersed in an electrolyte or liquid, and the other portion of oxidizable material constituting the positive terminal of the electrode, an insulating material surrounding the oxidizable portion of the positive plate and insulating the same from the electrolyte or liquid, a negative electrode consisting of two plates and together forming a box open at the top and bottom and adapted to be immersed in the electrolyte and to completely surround the non-oxidizable portion of the positive plate and suitably insulated therefrom, and a bar or bars adapted to support the negative electrode and constituting the negative terminal of the electrode.

587,718. PORTABLE MELTING FURNACE. Herman W. Falk, Milwaukee, Wis., assignor to the Falk Manufacturing Company, of Wisconsin. The combination of a truck, a melting furnace or cupola having a universally flexible suspension upon the truck, an air blast appliance and an extensible and universally flexible connection between the air blast appliance and the air passage of the furnace or cupola.

587,770. APPARATUS FOR CAUSING CHEMICAL CHANGES IN GASES. Nicolaas Van der See and August Schneller, Alfien-Oudshoorn, Netherlands, assignors to Henry Tindal, Amsterdam, Netherlands. Patented in Germany November 30th, 1894, No. 83,298; in England December 1st, 1891, No. 23,297; in Belgium December 29th, No. 113,388; in Italy December 29th, 1891, No. 42; in Switzerland December 29th, 1894, No. 9,745; in Luxembourg December 29th, 1894, No. 2,409; in Sweden December 29th, 1894, No. 6,629; in Norway December 29th, 1894, No. 4,183; in France December 29th, 1894, No. 243,980; in Spain March 30th, 1895, No. 16,792; and in Austria September 30th, 1895, No. 45,351. The combination with two or more electrical discharging apparatuses containing each a number of separated electrodes of the same polarity connected each to a separate specific resistance, and electrode of the other polarity, of coiling devices arranged so as to alternate with the electrical discharging apparatuses.

587,789. HYDRAULIC GOLD-SEPARATOR. John H. Barr and James F. Johnson, Kansas City, Kan., assignors of one-third to William E. Harvey, Rosedale, Kan. The combination of a jar comprising a body portion having a discharge opening near its upper end and an inlet opening, a removable bottom supporting one or more amalgam plates which project up into the body of the jar, and an inlet-pipe extending through the inlet-opening and surrounded by the amalgam plates.

587,829. PROCESS OF TREATING ALLOYS FOR MANUFACTURING ELECTRODES. Leon P. Hulin, Modane, France. Patented in France May 7th, 1894, No. 238,336; in Belgium May 7th, 1894, No. 109,807; and in Germany June 10th, 1896, No. 86,459. The process consists in alloying a heavy metal such as lead with barium, and thereupon treating the alloy with a liquid to eliminate the barium and thereby produce a spongy metal electrode.

587,830. PROCESS OF AND APPARATUS FOR MANUFACTURING METALLIC PEROXIDES AND CAUSTIC ALKALIES. Leon P. Hulin, Modane, France. Patented in France May 8th, 1894, No. 238,374, and in Belgium May 8th, 1894, No. 109,859. The process of forming the higher peroxides of heavy metals such as lead, antimony, bismuth, chromium and manganese, which are incapable of being separately peroxidized to the maximum by calcination in air, consists in alloying the metals with an alkali metal or alkali earth metal and subjecting the alloy thus constituted to the action of heat and of atmospheric air to form the peroxide desired in combination with the anhydrous alkaline oxide formed conjointly therewith, and decomposing the salt of the metallic acid thus formed in order to separate the peroxide.

587,867. CARBURETER. Frederick H. Shaver, Cedar Rapids, Ia. The combination of a float, a cup carried by the float and containing a sealing fluid, and having a portion between its ends enlarged to provide a closed expansion chamber, and having openings in its sides above the expansion chamber, and a nozzle of smaller diameter than the cup extending therein and closed by the sealing fluid and operating through an opening provided in the upper end of the cup.

587,901. CONVEYOR. William W. Wilson, Columbus, O., assignor to Joseph A. Jeffrey, same place. The combination of a sprocket link having a projection extending from one face, a flight formed in two sections, one of which is secured directly to the projection on the link, and means, independent of the connection between the flight-section and the link, for holding the other flight-section in position on the opposite side of the link and connecting the flight-sections securely together.

587,909. APPARATUS FOR SHARPENING AND DRESSING FRILL-KNIVES. Benjamin F. Anderson, Belmont, O. The apparatus consists of a crane provided with an elevating chain or cord, a buffer or stop-block, a clamping-head, provided with jaws, L-shaped levers pivoted to the jaws, an operating-lever connected intermediately to the L-shaped levers, and means for holding the jaws in fixed adjustment.

587,914. APPARATUS FOR PRODUCING ACETYLENE GAS. Charles F. J. B. Becherel, Paris, France, assignor to the Compagnie du Gaz Nouveau, same place. The combination of a gas-generator, an extensible gas receiver, a water-reservoir, a pipe leading from the reservoir to the generator, and a float contained in the reservoir and attached to the movable part of the gas-receiver in such manner that when the float descends with the movable part it will cause the rise of the level of the water in the reservoir to the orifice of the pipe.

587,942. FURNACE CHARGING MECHANISM. Joseph P. Eck, Muncie, Ind. The combination with a frame located in front of the furnace of a track for supporting one end of the charging mechanism arranged to have a vertical movement on the frame, a screw-threaded shaft supported on the frame above the track, levers pivoted to the frame and having their opposite ends pivoted to the shaft and track, and means engaging the threaded shaft for raising and lowering the shaft upon the frame.

588,012. PROCESS OF AND APPARATUS FOR MAKING METALLIC CARBIDES. Isiah L. Roberts, Brooklyn, N. Y. The process consists in moving beneath a horizontal electric arc the metallic compound and carbon to be converted, and in reflecting the heat of the arc downward.

588,035. ELECTROLYTIC APPARATUS. William Thum, Newark, N. J. The combination of a tank with a plane, inclined bottom; a cathode-sheet secured upon the inclined bottom and adapted to receive and guide the deposited metal; one or more horizontally adjustable anode-cells removably supported within the tank and provided with plane, inclined perforate bottoms

parallel to the inclined cathode-sheet and adapted to receive the pieces of metal to be treated; filtering material covering the bottom, and electric connections.

588,042. PROCESS OF AND APPARATUS FOR MANUFACTURING WHITE-LEAD PIGMENTS. Alfred B. Walker, Cincinnati, O., assignor to Ivan N. Walker, Indianapolis, Ind. The process consists in placing in the lower portion of a combustion chamber a layer of fuel, maintaining the fuel in an incandescent condition by introducing air beneath and causing it to pass up in a diffused condition through the layer, injecting air and finely divided galena above the fuel-bed, the amount of air introduced being in excess of that necessary to fully oxidize the volatilized products, conducting the resulting fumes through an extended oxidizing-zone, and finally condensing and screening them.

588,051. MINING MACHINE. Henry H. Bliss, Washington, D. C. Original application filed April 28th, 1894. The combination with a suitable carriage of devices arranged, upon the carriage, to cut a kerf into which the carriage may advance, means for forcing the carriage into the kerf so cut, and a wheel revolvably mounted upon the carriage and arranged to bite into one, only, of the kerf's broader walls as the carriage is forced forward.

588,070. INGOT TONGS. Henry B. A. Keiser, Braddock, Pa., assignor to the Carnegie Steel Company, Limited. The combination with suitable lifting mechanism of a vertical lifting and supporting bar attached at its upper end to tongs pivoted to the bar and having jaws provided with conical teeth arranged to engage the ingot outside its center of gravity and allow its swinging thereon; links pivoted to the jaws, and an operating rod for the links.

588,076. PROCESS OF TREATING SULPHIDE ORE. Bernard Mohr, London, England. The process for treating sulphide ore by acting on the pulverized ore with acid sodium or potassium sulphate, so as to obtain a solution of sulphate of zinc, depositing the zinc by electrolysis and thus recovering the acid alkali sulphate, and treating the insoluble residue obtained by the filtration for recovery of the other metals.

11,621. MINING MACHINE. Charles E. Davis, Chicago, Ill., assignor to the Independent Electric Company, same place. A feeding mechanism comprising a continuously rotating motor; a revoluble cam, a bar provided at one end with a roller which bears against the cam, the other end of the bar bearing against an arm carrying a pawl that engages a ratchet wheel; means for holding the arm and bar in engagement, and two shafts adapted to be alternately connected to the ratchet wheel and provided with sprocket wheels that engage a single stationary rack whereby the mining machine may be moved forward or backward.

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GENERAL MINING NEWS.

THE COAL MINERS' STRIKE.—The situation in the West continues far from clear, and there is apparently no more prospect of a settlement than there was a week ago. On the side of the operators it may be said that there is no scarcity of coal anywhere except at Wheeling, in West Virginia, where the iron works are temporarily tied up on account of the stoppage of the near-by mines in Ohio and West Virginia, from which they are usually supplied. There has been some disturbance in the Kanawha District in West Virginia; some mines have stopped and others have started, so that the situation on the whole shows little change. All the Pocahontas region is steadily at work and the mines are sending out coal in their usual quantities. The only change from the usual course of trade there is found in the large shipments westward, and the corresponding decrease in those to tidewater. The organizers in that district have had no success among the miners.

The closing of the mines in the Pittsburg District has had little effect on the local business and the river trades owing to the large stocks on hand at Pittsburg, and at all the principal cities on the Ohio and the Mississippi. These are being gradually worked off, but will last for some time to come. The shortage in production in this district and in Ohio is seen chiefly in the Lake trade. Coal for shipment to the Upper Lakes has been in very short supply, and ore-boats are going up light on account of the absence of coal for them.

Public attention has been generally called to the new system of carrying on the strike. As already noticed, the miners assemble at convenient points and endeavor to overawe the men who are still at work by parading near the mines in large numbers and holding meetings. Some of these parades have been made regular camps, as at the De Armitz mines. The operators have attempted to meet these tactics by securing injunctions from the courts. In most cases these have been granted provisionally and forbid interference with mine property and the holding of meetings. The miners complain that in some cases the authority of the courts has been stretched to its extreme limit, and that the right to hold public meetings has been unduly interfered with. However this may be, there

are some difficult legal questions involved in these injunctions, which will have to be settled later.

A conference of operators from the Pittsburg district was held in Cleveland on Wednesday, and it was given out that they had resolved to open their mines again, hiring new men, and protecting them by guards if necessary. The Union miners say that they consider this simply as a "bluff," which cannot be carried out, because it will be impossible to get the men needed.

The districts supplying the seaboard trade are still unaffected by the strike. The only extension reported this week is in the Reynoldsville district in Western Pennsylvania, which ships chiefly to Rochester, Buffalo and other cities in Western New York.

The strike continues remarkably free from violence. There has been no rioting of any importance and no destruction of property.

INTERNATIONAL MINING CONGRESS.—President L. Bradford Prince, of the International Mining Congress, which recently met in Denver, has appointed the committee on revision of State and National mining laws. The first meeting is called for September 7th, in Denver. The following gentlemen compose the committee: W. S. Keyes, California; F. J. Newlands, Nevada; W. S. Haskins, Idaho; W. A. Clark, Montana; G. B. Dennis, Washington; W. B. Potter, Missouri; J. E. Todd, South Dakota; G. J. Moore, Colorado; R. A. F. Penrose, Arizona; F. A. Reynolds, New Mexico; Lamar Cobb, Georgia.

ALABAMA.

WINSTON COUNTY.

It is stated that a 3-ft. vein of cannel coal has been discovered near Lynn, on the Northern Alabama Railroad. Options on a large tract have been taken by a syndicate, which proposes to develop the property.

ARIZONA.

PINAL COUNTY.

(From an Occasional Correspondent.)

MAMMOTH COLLINS.—This group of mines, it is reported, will be re-opened and worked during this month. The single compartment shaft is to be enlarged to a double compartment, and work is to be energetically prosecuted under the general management and agency of Hon. M. P. Freeman of Tucson, for the London shareholders.

TORTILLITAS.—At this mine the five-stamp mill has been taken down and removed to the shop of Gardner Worthen & Son, Tucson.

YUMA COUNTY.

RIO COLORADO GOLD EXTRACTION COMPANY.—This company, with a capital stock of \$1,000,000, has been incorporated by Joseph C. Hames, Giles Otis Pearce, N. B. Hames, W. D. Ascoug, William P. Epperson, R. S. Briscoe, C. M. Sherman, John M. Jackson and C. D. Taylor. The company will have its chief office at Colorado City, Colo. This is the company that has recently purchased 12 mines of 600 x 1,500 ft. area, on the east side of the Colorado River. They have a 75-ft. shaft on a good vein of California white quartz, and 14-in. pay streak, 10 tons of which milled \$92 and \$94.96 per ton. This company will at once put on a stamp mill and work the mines extensively.

(From an Occasional Correspondent.)

FORTUNA.—The work at this mine and the production of gold there continues as usual.

KING OF ARIZONA.—At this mine, about 30 miles from water at the Gila River, a contract has been let to John D. Payne and J. Roe Young, for hauling the ore to the mill at that point. They are now delivering about 20 tons a day. An organization of this company has been effected with E. Randolph of Tucson as President. Gold bullion to the value of \$3,000, the result of five days run was deposited in the bank August 7th. The ore is high-grade and free milling.

CALIFORNIA.

Articles of incorporation of the Wah Lock Hin Company, of San Francisco, have been filed in the office of the County Clerk by Jeong Kum Tong, Won Fee, Ng Hung Dap, Wong Shai Him, Lee Shu Kee, Ng Yee Sham. The capital stock is \$20,000 and the purpose of the company is to operate mines in California and Oregon.

(From Our Special Correspondent.)

UNITED ENGINEERING COMPANY.—This company has been incorporated. Capital stock, \$100,000. The directors are S. J. Eva, James R. Christy, Harry P. Gray, Matthew Turner and James M. Turner.

CALAVERAS COUNTY.

UTICA.—The great Utica mines caught fire on August 17th. Flames and smoke were discovered coming from the 800-foot level, Station No. 4. It was with difficulty that the shift made their escape. Six men were cut off, but made their way through the south end of the new shaft. The fire is supposed to have originated from spontaneous combustion, caused by lard and coal oil.

A press report said: "It is impossible at present to estimate the extent of the loss that the fire will cause, but it is safe to say that it will amount to hundreds of thousands of dollars. Not only are the mine-owners affected, but the whole town of Angels, which contains a population of 6,000, who are almost wholly dependent upon the miners employed in the Utica group of mines. There are 1,000 men employed by the company, and should the fire prove as

serious as reported these men will be left in destitute circumstances. Every effort is being made to quench the fire as rapidly as possible, but gas and smoke are escaping from all the shafts, which are being rapidly bulkheaded. While stopping up the Utica shafts several firemen were suffocated. The mine is rapidly being flooded. All the main pipes have been cut and water is pouring into the shafts. An 8-in. hose is playing water into the Stickle shaft, where the fire was first discovered. It will take at least four days to flood the mine, and it is estimated that in case no more serious results should happen afterward, it will take at least two months to pump out the water and fit the mines for regular operation.

On July 21st, 1895, a similar fire occurred, and it was seven weeks before work could be resumed. The shafts are deeper now and it undoubtedly will take a much longer time.

The Utica plant is the largest quartz gold mine worked by the chlorination process. The mill contained 200 stamps and 14 roasting ovens. The Utica is owned by the Hobart estate. A considerable amount of the property formerly belonged to the late Senator Fair. It is estimated that the net profits of the mine exceed \$1,500,000 per annum.

(From Our Special Correspondent.)

INNES.—This old mine, in Mokelumne Hill, has been bonded to W. T. Robinson, of Mokelumne Hill, and J. C. Mathews, of Oakland, for two years, and development work has been progressing rapidly. An upraise from the tunnel to the surface, 55 ft., all in good ore, shows the ore chute to be at least 1,000 ft. in extent, 50 ft. deep and about 4 ft. in width.

THORPE.—The Cornish pump at this mine, five miles south of San Andreas, near Fourth Crossing, has been repaired and will soon free the mine from water.

KERN COUNTY.

(From Our Special Correspondent.)

GOLD BAR & RIGHT HAND BOWER.—These claims, adjoining the Alameda, at Randsburg, have been bonded to H. L. Hollis and G. H. Curtiss. The shaft is down 60 ft. on a large ledge of fair-grade quartz.

LOS ANGELES COUNTY.

RED ROVER.—A gold bar, valued at \$30,000, has been sent from the Red Rover mine, near Acton, owned and operated by Senator Stephen M. White and Henry T. Gage. This is the result of the first run of the mill, which was started up a month ago.

NEVADA COUNTY.

(From Our Special Correspondent.)

NATIONAL.—This mine, a little over a mile southeast of Graniteville, has been worked under bond by A. S. Bigelow for the past three months. He has run a tunnel in 400 ft., which is in on the pay chute 100 ft., the ledge showing 4 ft. of ore in the face, which will mill \$10 per ton. A five-stamp mill on the property will probably be replaced by one of 20 stamps very soon.

PLACER COUNTY.

(From Our Special Correspondent.)

LOST CAMP.—This old hydraulic and drift mine $1\frac{1}{2}$ miles southeast of Blue Canyon, comprises 60 acres on an ancient channel. The gravel is 120 ft. deep and is hydraulicked. A 300-ft. tunnel runs through slate bedrock into the gravel, which carries quartz and coarse gold. The owners are now building an impounding dam on a little canyon tributary to the American River, and are running one giant for the present, but another one will be put on soon and the whole pipe line will be relaid.

PIONEER.—This mine, near Damascus, produced \$14,500 during the month of July at an expense of \$5,500. A dividend \$9,000 was declared for the month. Thirty stamps are crushing ore. J. D. Sullivan is superintendent.

RED ROCK.—The 10-stamp mill at this mine, two miles southeast of Blue Canyon, is running steadily on low-grade ore. Development work is going on under the superintendency of N. B. Willey, of Blue Canyon.

VAN AVERY.—This mine, near Blue Canyon, is owned and operated by the Alder Creek Gold Mining Company, of Des Moines, Ia. The three-stamp mill being replaced by a 10-stamp mill and concentrators will be added. M. T. Barnett is superintendent.

RIVERSIDE COUNTY.

(From Our Special Correspondent.)

LOST HORSE MINING AND MILLING COMPANY.—This company has been incorporated with a capital of \$500,000, to operate the Lost Horse mine in the Pinot District. The directors are T. C. Ryan and N. F. Ryan, of Banning; Jeff. Ryan and A. B. Ryan, of Miles City, Mont., and S. M. Kelsey, of Kansas City, Mo.

SHASTA COUNTY.

(From Our Special Correspondent.)

MILKMAID.—At this mine, in Kline Gulch, three miles from the town of French Gulch, development work on a large scale has been carried on by a syndicate composed of John P. Jones and H. M. Gorham, of Nevada, and W. E. Lester, of San Monica, Cal., which recently purchased the property. While sinking the shaft on the vein a body of ore was encountered which is said to be immensely rich. The extent of the deposit is not known.

SEKIYOU COUNTY.

(From Our Special Correspondent.)

BALLOCHUNGLE COPPER MINE.—The Loftus Bros.

have developed a new industry near Fort George. Their No. 4 tunnel is now in 200 ft. on the ledge, with an upraise of 80 ft. and an incline of 40 ft. at the end of the tunnel. The shaft was sunk in the hanging wall with the ore for a foot. Solid ore has been found the entire distance, and the bottom shows up well. There is every indication of a large body of ore. The croppings show 30 ft. wide on the surface. The oxide ores show streaks of native copper, and assay 35%. The sulphurets assay 12%.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

CONFIDENCE.—At this mine, 13 miles northeast of Sonora, the main shaft is down 800 ft., with a fine 6-ft. ledge at the bottom. There are stations on the 400, 500 and the 800 ft. levels. Drifts are being run, and the ore stoped out for the 20-stamp mill, which crushes 50 tons every 24 hours. The plant includes six concentrators, and a canvas plant for the slimes will be added soon. Thirty men are employed. A. M. McDonald is superintendent.

CARLOTTA.—In this mine, one-half mile north of Carters, the main shaft is down 130 ft. The ledge is 18 in. in width and looks well. A new hoisting plant has been purchased, and will soon be in working order. At present the ore is being shipped to Soulsville to be milled, but in the near future a mill will be erected on the property. Ten men are employed under superintendent L. H. Newton.

PENNSYLVANIA.—This mine is parallel with the Carlotta mine and is under the same management. Two shafts are down 280 ft. apart, each showing about 2 ft. of \$25 ore.

SEMINOLE.—This group of mines, one mile south of Carters, has been divided, and the Lena Bell, Young America, Standard, May Flower, May Flower Extension and Tedshaw will be opened up on a large scale, with J. L. Cole as superintendent. The remaining claims, the Seminole, Georgia, Buckeye and Sulphuret, will be incorporated by another company. The Seminole and the May Flower mines are the only ones developed to any great extent. A number of tunnels and crosscuts have been run, cutting the veins, which show from 3 to 7 ft. of pay ore assaying as high as \$8 per ton. Several shafts have also been sunk in good ore.

TRINITY COUNTY.

(From Our Special Correspondent.)

CHLORIDE & BAILEY.—These mines, which comprise 16 claims, located about 3 miles northeast of Dedrick, are being worked under lease by N. E. Dedrick. A cross tunnel run in the chloride has cut the ledge which averages 4 ft. at a depth of 200 ft. from the surface. The ore carries free gold and sulphurets, and assays as high as \$50 per ton.

INDIAN CREEK MINING COMPANY.—This company has been incorporated with a capital of \$60,000. The stockholders are R. C. Hall, Miss J. C. Lohse, Hypolite Duvergey, Geo. W. Hall, Wm. H. Radford, H. M. Hall and Jean Bergez. The company was organized to operate mining properties in this county.

PAULSEN & HUGHES.—These claims together with several others, comprising 1,500 acres of pay gravel, favorably located along the Trinity River, near Douglass City and Lowden Ranch, are under bond to Alexander Hill and O. H. Simonds, who have had the property well prospected and will probably make arrangements to work it on a large scale. An ample supply of water for hydraulicking can be obtained from the Grass Valley Creek by an enlargement of the Frey Ditch.

TRINITY COUNTY.

(From Our Special Correspondent.)

The Blue Jay claims, comprising 90 acres in the side gulch off of Morrison Gulch, about one mile from Coffey Creek, four miles from Carrville and six miles from Trinity Center, were located two years ago by John B. and Richard S. Graves and Henry Carter. They had run a tunnel in on the ledge, which is of red ocher and black iron formation, over 3 ft. in width, when they struck several pockets of pure gold embedded in the quartz. One of the pockets yielded \$1,000, and several others from \$300 to \$1,000 each. On August 4th a point was reached in the ledge, about 12 ft. from the surface and 18 ft. from the mouth of the tunnel, here they took out \$40,000 from one pocket. The gold was free from quartz, and was found in solid nugget form. The Graves Brothers are now in San Francisco, where they arrived on August 9th with \$21,000 of the gold, which they deposited in the United States Mint. Since their arrival in San Francisco it has been reported that the partner in charge, Henry Carter, has taken out \$50,000 more while running ahead on the face of the ledge in the tunnel in an effort to reach the point of conjunction of a stringer leading to the main ledge.

A report has also been received of a rich gold quartz strike by Murphy & Burgess near the head of Coffey Creek, six miles from the Blue Jay mine. The Brown claim, on Hickory Creek, which is tributary to Coffey Creek, has yielded as high as \$50 to the pan.

COLORADO.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

ALICE MINING COMPANY.—George Crocker, of New York, and son of Charles Crocker, the California railroad man, has purchased the Alice property for \$250,000. The first payment has been met and it was for a large amount. John W. Taylor, also of

phreys Tunnel Company, which proposes to take up the tunnel where the Nelson Company will leave it, at the south end of the United Mines ground, and extend it north through the United Mines and Park Regent ground. The Humphreys Tunnel Company has also made arrangements with the Nelson Company to take all of the contracts made with the latter by the mines on its line and manage the entire tunnel, paying therefor a very handsome bonus to the Nelson Company.

The Nelson Tunnel Company has made a contract with Mason, Hoge & King, of Frankfort, Ky., to complete its tunnel from the present heading to the south end of the United Mines property. The tunnel is to be a single track, with numerous switches, and will be operated and lighted by electricity, the motors having a capacity of 20 cars holding 1½ tons each, or a train capacity of 30 tons. The distance from the present breast of the Nelson tunnel to the line of the United Mines Company is 5,600 ft., and the cost of construction will be in the neighborhood of \$150,000. It is expected that it will be completed in little more than a year. The Humphreys Tunnel Company will then add 4,500 ft. to the length of the tunnel, developing the vein on the United Mines, the White Star and the Park Regent mines.

The total length of this great tunnel, from the mouth to the north end of the Park Regent, will be 1,500 ft., with 900 ft. more running into the mountain in a westerly direction. The tunnel is expected to develop a rich silver-bearing vein, on which are the Bachelor, New York, Last Chance, Amethyst, United Mines, White Star and Park Regent, all of which will use the tunnel for transportation purposes. The Commodore, also on the same vein, will have its own tunnel. The Commodore alone is now producing 300 tons of ore per day from the great ore chute in that property, and the tonnage that will pass through the tunnel from the seven other great properties on the vein when the tunnel is completed will probably be very heavy.

SILVER LEDGE MINING COMPANY.—Articles of incorporation have been filed, with the following board of directors for the first year: John L. Routt, R. W. Speer, Captain Young of the Seventh Infantry, R. B. Hall and Charles Hartzell. John L. Routt is president and R. W. Speer secretary and treasurer. The mine is an old property that has been developed to the depth of 45 ft., and opened up a body of low-grade lead ores carrying gold, silver, lead and some zinc. It has been examined and reported upon several times by experts from the East, who uniformly rejected it on account of the zinc contents. It was taken hold of some time since by Sanford & Warner, the assayers, of Denver, and the present company has secured a bond and lease on the property for \$75,000, and will at once proceed to work it by concentration. The vein is 15 ft. wide, and in some places there are immense ore chutes as much as 52 ft. in width. It is located 10 miles north of Silverton, and about three miles north of Red Mountain on Cement Creek. The refractory character of the ore has heretofore prevented success in its operation. A contract has been let to the Gates Iron Company, of Chicago, for a 50-ton mill, consisting of crushers, rolls, jigs and Wilfley tables.

SAN JUAN COUNTY.

IOWA GOLD MINING AND MILLING COMPANY.—This company, at Silverton, paid August 4th a dividend of ½c. per share, amounting to \$5,000 on the capital stock of \$1,000,000. The total amount of dividends paid by the company has been \$55,000 up to date.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

BLACK BEAR MINING COMPANY.—This company is prosecuting exploitation work on the Black Bear group of claims, lying just south of the Tom Boy, in Savage basin. The most important development consists of driving a crosscut, 150 ft. in length, from the breast of a 900-ft. tunnel, driven on the vein of the Black Bear, to intersect the lead of the Silver Bear and Black Tiger. It is 20 ft. wide on the surface, and is composed of mineral matter similar to that of the Tom Boy. If the vein shows up as well at the intersection as on the surface the company will proceed to open the property up extensively and systematically, and provide milling facilities for the treatment of the product as rapidly as taken out.

HECTOR MINING COMPANY.—It is reported that this company has recently made a rich strike of 18 in. of gray copper ore on the Montana properties in Middle Basin, which it acquired by purchase about three years ago. The stockholders of the Hector Company are the principal owners of the Virginus mine, just over the range from the Montanas, in Ourav County, and the Montana vein has been opened up at an enormous depth by drifting from the Virginus workings. It was while exploring the lead from the intersection of the drift that this large streak of rich gold and silver ore was uncovered, and it has been drifted on for quite a distance, proving its continuity. The Hector Company will also open up the Montana lead at a great depth from this side of the range by the Ophir tunnel, being driven on the vein of the Ophir, in Middle Basin. The tunnel is now in a distance of 1,000 ft. and is going ahead several feet a day. Machine drills are being used. After the vein has been reached by this tunnel the product of the Montanas, it is said, will be treated at the Cimarron 30-stamp mill, now idle, located only a short distance from the mouth of the Ophir tunnel, and owned by the Hector Company.

JAPAN MINES COMPANY—The concentrating ma-

chinery recently installed in the new addition to the Japan mill building, located in close proximity to the company's mines, in Savage Basin, is in operation, and is turning out three carloads, or 30 tons, of concentrates daily, averaging \$100 per ton in gold, silver and lead. The high-grade ore, amounting to several carloads a week, is shipped in its crude state to the smelter, and nets from \$750 to \$1,000 per car.

MIKADO MINING AND MILLING COMPANY.—This company is largely composed of the same stockholders as the Japan Mines Company, and has lately resumed driving the Mikado tunnel crosscut, at right angles from the main level of the Japan, ahead to intersect a western extension of the Tom Boy vein. The tunnel is now in a distance of nearly 1,600 ft. and less than 200 ft., according to surveys, remain to be driven to reach the objective point. It will cut the lead 1,000 ft. below the surface, and it is believed another large producer will be opened up.

NORTH AMERICAN EXPLORATION COMPANY.—E. I. Field, General Manager in Telluride of this company, is installing three new Wilfley concentrators in the Telluride Power Transmission Company's 120-stamp mill, in Bear Creek. The ore from the Nellie mine, the property the North American Exploration is operating, is treated here for closer saving of concentrates. Thirty stamps of this mill have been for some time past dropping on Nellie ore, disposing of about 70 tons a day, which is conveyed down a Huson tramway, a mile and a quarter in length, erected this summer and put in operation one month ago. The mineral runs from \$20 to \$100 in gold on the plates per ton, and, in addition, yields concentrates worth from \$75 to \$100 per ton in the yellow metal. The rapid strides this property is making as a gold producer is attracting considerable attention.

NORTH CHICAGO.—The owners of this property, which is located on the same vein and adjoining the Tom Boy east end line, are preparing to sink a shaft 200 ft. deep. The owners confidently believe the third or main level of the Tom Boy has been driven beyond the east end line of that property, and that the company is now extracting ore from North Chicago ground, and the shaft will be sunk for the purpose of determining this matter.

PORTAGE MINING AND MILLING COMPANY.—This company is developing a group of promising claims in Ingram basin, and a crosscut tunnel that has been in progress for about a year past is expected to break into the main lead at any shot, opening it up at a depth of several hundred feet. On the surface this vein shows about 20 in. of ore, that averages \$75 per ton in gold and silver, and if it is equally as good at the intersection, it is the intention of the company to construct a mill near the mines for the treatment of the product. The company is chiefly composed of Ohio people. J. S. Tilden, of Garrettsville, O., who is secretary and treasurer, was in Telluride a few weeks ago for the purpose of deciding the question of erecting the mill, but the lead at that time had not been reached, and he returned home without taking any action.

PULASKI MINING COMPANY.—This company's new steam stamp mill recently erected in Bridal Veil Basin, near the Pulaski group of mines, was put in operation last week treating \$35 gold ore from the dump of the group.

RUSSELL & MARTIN.—The owners, blacksmiths, of Telluride, are driving a tunnel on the lead of a very promising claim, in Cornet Creek Basin, located early this spring, and the ore being taken out will soon commence to be packed down to the Telluride Sampling Works for treatment. The discovery shaft, sunk on the vein to a depth of 50 ft., reveals a vein of quartz from 2 to 4 ft. in width which runs from \$50 to \$250 in gold per ton.

SAN BERNARDO.—Kraft & Fox, of Rico, who are leasing in the lower level of this mine, are shipping three and four carloads of high-grade gold, silver and lead ore running from \$125 to \$150 per ton in the three metals per week, which nets them a handsome profit. The San Bernardo concentrating plant, having a capacity of treating 60 tons of mineral daily, is now running regularly on San Bernardo dump ore, and the product is yielding very satisfactory results at the smelters.

S. B. KENRICK.—Six sets of lessees are operating in as many levels on this property, near San Bernardo station, and are making regular shipments of chloride of silver and gray copper ore, which also runs well in gold, and thereby realizing a handsome profit over all expenses.

SMUGGLER-UNION MINING COMPANY.—The recent decline in the price of silver has had no effect on the operation of this company, and its 50-stamp mill at Pandora is treating on an average 180 tons of ore per day. The yield is about 30 tons of concentrates that run high in gold and silver. The high-grade ore taken from the Smuggler-Union mines is shipped to smelters in its crude state, and from 12 to 14 carloads are sent out every week.

SUFFOLK-GLOBE MINING AND MILLING COMPANY.—This company's group of mines, on Silver Mountain, near Ophir, is being worked entirely by a number of sets of lessees, who are taking out ore that runs from \$20 to \$150 per ton, which is treated at the Suffolk 40-stamp mill, being operated under lease by Real & Thomas. The lessees in the mine and those on the dump are sending down about 75 tons of mineral a day for treatment. The Suffolk mill is also treating the product from the Shoe-

maker group, and the entire forty stamps are stamping day and night.

GEORGIA.

MERIWETHER COUNTY.

WILKES.—This mine has at length been sold to a Northern syndicate. The deepest shaft is now but 100 ft., although the mine has been worked for 46 years. The new owners intend sinking on the vein for another 100 ft. and then driving levels.

IDAHO.

IDAHO COUNTY.

IDAHO-COMSTOCK MINING AND MILLING COMPANY.—Twenty tons of machinery has been received. The shaft on the Comstock mine has now reached a depth of 110 ft. and the ore continues in sight. A force of 14 men is now employed by the company in excavating the mill site and making flumes for the water supply. The capacity of the mill is rated at 16 to 18 tons per day. The plant is quite complete, there being two vanners, a rock crusher, automatic ore feeder, etc., etc. The plant will be operated by water power and the site selected for the mill is on Rbett Creek, about one mile below the Dillinger claim. The freight is being forwarded as fast as teams can be found, and it is hoped to have the mill up and running by September 15.

OWYHEE COUNTY.

DE LAMAR MINING COMPANY.—The following is the return for the month of July: Crushed during the month, 4,700 tons; bullion produced in the mill, \$44,063; estimated value of ore shipped to smelters, \$655; miscellaneous revenue, \$217; total produce, \$44,905. The total expenses were \$39,015, leaving a profit for the month of July of \$5,890.

TRADE DOLLAR.—For some time there has been a deal pending for the Trade Dollar mine at Silver City. It is now rumored that the scope of the transaction has been extended so as to take in the Black Jack mine and the property of the Florida Mountain Mining Company, these being on the same vein as the Trade Dollar. The Trade Dollar was examined by F. N. Corning some months ago. Recently another examination was made by F. N. Bradley, manager of the Bunker Hill & Sullivan mine, in the Coeur d'Alenes. The deal, according to the rumor, also embraces the railroad being constructed from Nampa to Silver City. The Trade Dollar mine and Black Jack are paying dividends. There are three mills in the group of properties. If all the mines go into the deal, the transaction will be the heaviest ever made in this part of the State.

SHOSHONE COUNTY.

CUSTER.—Ore has been struck again in the Custer, and it probably means more for the Coeur d'Alenes than any strike that has been made for 10 years. In its palmy days the Custer was one of the great mines of the South Fork. A large part of its ore was of a shipping grade and four to six teams used to be kept busy hauling it to the railroad, 6,500 to 8,000 lbs. being a load for four horses. Later a concentrator was built on East Nine Mile about two miles below the mine and the concentrating ore sent down by a bucket line. It closed down, with everything else, in 1892. Six weeks ago James Gearon was placed in charge of the property to do some development work and he has worked five men steadily ever since. In the old work on the property three tunnels were run and the ore chute was pretty well stoped out down to the lowest level. Then a shaft was sunk 100 ft. from the lower level, and they drifted 150 ft. each way from the bottom of it, finding ore all the time. A little stoping was done in there before the work was stopped. Way up the hill east of the old works the lead cropped out, showing 10 ft. of ore on the surface, and when work was resumed this summer it was in the middle tunnel, the intention being to reach that chute. That is the ore body that has just been cut.

WASHINGTON COUNTY.

SEVEN DEVILS COPPER MINING COMPANY.—Three carloads of machinery have arrived from New York for the smelter which will be put up at Cuprum, on the Snake River, to work the ores of the great copper mines in the Seven Devils District. More machinery is on the way, and as soon as possible it will be set up and actual mining and smelting operations commenced. Part of the machinery just received includes a sawmill, which will be erected at Cuprum. Its first work will be to saw out the ties for a railroad it is proposed to build from the smelter to the mines, about 17 miles away.

The smelter is to be built by the Nichols Chemical Works, of Brooklyn, N. Y. The first plant will have a capacity of 100 tons, and if it is found to be successful the capacity will be increased, so that when the railroad is completed there will be no lack of ore. A metallurgist is already on the ground to superintend the construction of the smelter. When it is completed it will be in charge of Isaac E. Blake, who is now at Weiser looking over the field.

MICHIGAN.

COPPER.

CALUMET & HECLA MINING COMPANY.—At the annual meeting in Boston, August 18th, there were represented 73,724 shares, and the following directors were re-elected: Alexander Agassiz, of Cambridge; Francis L. Higginson, Boston; Francis Hunnewell, Wellesley, Mass.; Quincy A. Shaw, Jr., Boston, and James M. Wright, Detroit, Mich. Fol-

owing the annual meeting of the stockholders, the directors met and re-elected former officers.

FRANKLIN MINING COMPANY.—The July output of copper was 148½ tons, which compares with 147½ tons in June and 155½ tons for July last year.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

JOPLIN ORE MARKET.—During the past week the weather was fine for all kinds of mining operations. The output and sales were good, except at Webb City, where the production of lead ore was light, as were the sales of zinc ore. There was a decrease of five carloads of zinc ore, but an increase of eight cars of lead ore in the shipment. Good grades of zinc are sold generally at \$22 per ton, and four carloads sold at \$23. The Oronogo, Alba, Carthage, Stott City and Springfield ores all sold at \$22 per ton. Lead ore was firm all the week at \$23 per thousand pounds in the bins or \$23.25 delivered, the latter price being paid by the Picher Lead Company at their works in Joplin. During the corresponding week of last year zinc ore sold at \$21 for a few choice lots, while lead ore sold at \$13.75 in the bins, showing a gain in the price this year over last of \$2 per ton for zinc ore and \$9.25 per thousand pounds on lead ore. The sales compared with the same week last year were an increase of 39 carloads of zinc ore and 10 carloads of lead ore.

Following are the sales of lead and zinc ore for the week ending August 14th, 1897:

Joplin zinc, 1,175,910 lbs.; lead, 315,800 lbs.; value, \$20,220. Cartersville zinc, 843,920 lbs.; lead, 133,010 lbs.; value, \$11,849. Webb City zinc, 574,260 lbs.; lead, 28,870 lbs.; value, \$6,445. Galena zinc, 2,770,000 lbs.; lead, 542,000 lbs.; value, \$38,088. Aurora zinc, 675,000 lbs.; lead, 35,000 lbs.; value, \$5,917. Oronogo zinc, 158,630 lbs.; lead, 32,620 lbs.; value, \$2,410. Stott City zinc, 144,930 lbs.; lead, 129,630 lbs.; value, \$4,576. Springfield zinc, 41,000 lbs.; lead, 61,100 lbs.; value, \$1,889. Alba zinc, 104,000 lbs.; value, \$1,144. Carthage zinc, 63,560 lbs.; value, \$699. Belleville zinc, 11,350 lbs.; lead, 9,210 lbs.; value, \$336. District totals for last week: Zinc, 6,565,650 lbs.; lead, 1,284,270 lbs.; value, \$93,225. District totals for 32 weeks: Zinc, 208,258,980 lbs.; lead, 35,526,900 lbs.; value, \$2,062,796.

AMERICAN MINING COMPANY.—This company has a 10-acre lease on the Connor land and has put in a complete steam concentrating plant that will handle 350 tubs of dirt a shift. The ground is drained to 180 ft. by a large steam Worthington pump. They will start up the plant this week as they have a large face of zinc ore at 170 ft. in soft ground.

FRED HEROLD MINING COMPANY.—This company occupies an 80-acre lease on the Connor land south of Webb City. It has a concentrating plant that will handle about 350 tubs of dirt every nine hours. The ground is drained to 210 ft., but drifting is going on of zinc ore in shooting ground, and 25 tons of zinc ore are produced weekly.

GOODENOUGH COMPANY are operating on two lots on the McKinley lease. They have a good small steam concentrating plant that will handle 200 tubs of dirt a shift. They are running double shifts, and last week made over 50 tons of top price zinc ore. Next week they will take up a six-foot stoper that is nearly all zinc ore.

GOOSEBERRY COMPANY.—At Belleville, in sinking a prospect shaft at 60 ft. they opened up a good face of lead and zinc ore in open ground, and last week made 4 tons of zinc ore and 45,000 lbs. of lead ore in sinking.

HERING ARGUS COMPANY.—They have made a good strike on the South Joplin Land Company's land. They cleaned out the old Why Not shaft, and started to drift at 135 ft. After cutting 3 ft. they struck a good face of zinc ore, and last week they turned in 6 tons of ore from hand jigs.

MANHATTAN MINING COMPANY.—They have a lease on 40 acres of land near the Chatham lease, and have a fine large double concentrating plant that will handle 700 tubs of dirt every nine hours. They are throwing water with four pumps, two 12-inch force pumps and two large steam pumps, and have the ground drained to 185 ft. They expect to get into the ground this week.

McKINLEY MINING COMPANY.—They have leased 40 acres of the Connor land near Cartersville, and have put in two pumps that drain the ground to 100 ft. They now have a complete steam concentrating plant that will handle 350 tubs of dirt every nine hours. A drift is being cut at 160 ft. in dead ground to get around a cave-in, and good pay dirt is being taken out. The plant will start up this week and make a good output of zinc ore. For a long time this concern made 25,000 lbs. of lead ore every week. The lead ore was found at 105 ft., while zinc ore replaces it at 150 ft.

MOHAWK MINING COMPANY.—They have 10 acres of the Connor land adjoining the McKinley lease. The shaft is down 216 ft., but the force is drifting at 185 ft. on a good run of lead ore in flint ground, with only enough water to wash the ore. They have just started from the shaft, but made 5,000 lbs. of lead last week. They have a body of zinc ore under the lead.

SPOT CASH COMPANY.—They have two lots in the McKinley lease and have put in a good steam concentrating plant that will handle 280 tubs of dirt a shift. They are drifting at 160 ft. on a 25-ft. face of zinc ore in shooting ground, and last week they made and sold 30 tons of high-grade ore.

MONTANA.

CASCADE COUNTY.

BLACKFOOT RESERVATION.—The approaching opening of the mineral portion of the Blackfoot reservation is one of the principal themes of everyday conversation on the streets and in public resorts. Interest in the subject increases as the work of the surveying parties progress and as the date draws near when the ceded portion will be added to the public domain. Notwithstanding statements to the contrary, no person or persons has more than equal rights with all citizens who may enter the opened mineral strip after the maps of the same have been approved in Washington and filed in the land office in Helena.

FERGUS COUNTY.

LUCKY.—This property has been bonded to L. S. Woodbury for \$6,000; the bond has 30 days to run.

GRANITE COUNTY.

MANHATTAN & MONTANA MINING COMPANY.—The properties of this company are situated at the head of Stony Creek, and comprise at the present time 14 claims. The properties of the company originally comprised only three claims—the Blue Bell, Golden Anchor and the Red Star. A short time ago a number of extension claims were acquired by the company, which increased the total number of quartz claims to 14. The company also owns five acres of a mill-site, with plenty of water, and adjoining a placer claim of 40 acres. On the Red Star there is 9 ft. of an ore vein exposed. On the extension claims there is a lava cover of a peculiar ore formation that assays from \$8 to \$18 per ton in gold. The company contemplates running a tunnel through the side of the mountain which will cut three large ore veins at about 600 ft. from the surface.

LEWIS & CLARKE COUNTY.

MONTANA MINING COMPANY.—The total output for July was gold 2,520 oz., and silver, 15,240 oz., resulting from 5,005 tons of ore crushed, and from 6,250 tons of tailings. The realizable value of the return is estimated at \$59,000, while the total expenses for the month are found to be \$47,800, leaving a net profit of \$11,200. The 60-stamp mill having been brought into operation on July 16th the tonnage of ore sent to the mill has been increased.

OVERLAND.—A. M. Esler and Frank W. Esler are putting in a steam hoisting and pumping plant to be completed in a few days, when the present shaft, which is now down 300 ft., will be sunk at least 200 ft. farther. At the bottom of the shaft a level has been run on the ore 350 ft. west and for over one-half of the distance there is iron carrying gold. The pay ore is encased in a belt of jasper and agate, which is about 200 ft. thick, with a granite hanging wall and dolomite lime foot wall. The pay vein varies in thickness from a few inches to 30 ft.

PARK COUNTY.

LIVINGSTON PLACER MINES.—Placer mining has been resumed on the river bar here. The operators built a flume to convey water to their sluice boxes. They find the best pay at a depth of 4 ft. They say they can make \$3 or \$4 per day each.

NEVADA.

ELKO COUNTY.

DEXTER.—The big Blake pump is now running satisfactorily and will prove of ample capacity to handle all the water encountered. Sinking has been resumed to finish the sump and work is being vigorously prosecuted on the vein to open the stoping ground.

GOLD CREEK.—A number of test pits are being sunk along Gold Creek to bedrock, which it is said has never before been reached. The one near the mouth of Hope Gulch required much pumping though bedrock was reached in 11 ft. Not quite 5 yds. of gravel was taken out, and it cleaned up \$7.35. Another pit being put down near the old company house promises even better returns.

STOREY COUNTY.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—The management has arranged with the Kinkead Mill Company to work some 700 tons of low-grade ore, assaying between \$11 and \$12 per ton. The treatment of this ore will be in the nature of a test, which, if it demonstrates that such ore can be worked at a profit, is of vital importance to the future of the mine, which is known to contain a large quantity of ore of low-grade. The result of this practical work or test will therefore be awaited with considerable interest, not to say anxiety, by the managers and stockholders of the mine.

WHITE PINE COUNTY.

(From Our Special Correspondent.)

BEN HUR GOLD MINING COMPANY.—This is a Utah incorporation operating, until August 1st, four claims and a five-stamp mill in Steptoe Valley. Capital, 300,000 shares at \$1 par value. Officers: Otto Leifer, president; P. J. Conway, secretary-treasurer; N. A. Kennedy, C. S. Hansen, directors, all of Salt Lake. The company had an option to buy four mining claims and some agricultural lands and water rights from W. D. Campbell. A five-stamp mill was erected on a very limited showing of mineral, and prior to August 1st the mine produced only enough ore for a total run of five days. Out of this a clean-up was made, variously given by different officers at from \$800 to \$1,200. On August

1st a payment of \$4,250 was due on the bond, and the purchasers being unable to meet it, forfeiture was declared by Campbell. It seems to be another case of building a mill before finding a mine. Some pockets of rich quartz have been found, but the country rock is lime and so far the disclosures have been limited in extent, and, of course, irregular in occurrence.

NORTH MOUNTAIN.—A 40-ton cyaniding plant has just finished its initial run of 8 days, under the supervision of William Orr, which resulted in 80 lbs. of cyanides. After the clean up, before starting for Salt Lake, Mr. Orr said an entirely satisfactory saving was effected, and that there is no question as to the profit-making success with cyaniding this mineral in future. In former mining annals the North Mountain is known as the San Jose, which centered attention on White Pine County when handsome returns were made by amalgamation, so long as the ore continued free-milling. It is now owned by some of the Mercur mine people and others of Utah. The Gilligan, the main lode, has a quartzite hanging and slate foot wall, across which penetrate several small fissures carrying higher values in silver than the big contract vein. The ore, of which there is a generous supply, has a quartz gangue, varies ordinarily from \$5 to \$9 gold, and is excellently well adapted for cyaniding. John Heimrich, who first directed the attention of his associates to the property, has been on the ground for over a month. This week Charles T. Brant, formerly with the cyaniding mill at Mound City, Cripple Creek, is to arrive and will have charge of the mill.

NEW MEXICO.

SIERRA COUNTY.

HILLSBORO PLACERS.—Five hundred thousand dollars is to be spent in thoroughly equipping these mines. The gravel has been estimated at 60 to 80c, the cubic yard, and the prospect covers 1,500 acres. L. B. Tully will be general superintendent and A. M. Dobbie, Jr., resident engineer. A pipe line 2,600 ft. in length and spanning the Animas will be laid and also a further extent of this pipe line about 1,900 ft. in length crossing the Tank canyon. The ditch will be 4 ft. wide at the bottom and 7 ft. at the top and it will be 3 ft. deep and its capacity will be 2,000 miners' inches per second. The fall will be 10 to one-half feet to the mile. The dam will be 330 ft. on the bottom, 8 ft. on top and 100 ft. in height.

NORTH CAROLINA.

CHATHAM COUNTY.

CUMNOCK COAL MINE.—This property is to be sold at public sale September 5th. There are two mortgages on the property amounting to \$300,000. A considerable amount has been spent on the mine, which is in good condition at present.

OREGON.

JOSEPHINE COUNTY.

DENVER CITY LEDGE.—This claim has changed hands at \$28,000; Messrs. A. F. Nelson and James Simpsin, of Eureka, Colo., are the buyers. The quartz is rich, and the lead is believed to be permanent.

PENNSYLVANIA.

ANTHRACITE COAL.

In the new Burnside shaft of the Lehigh Coal and Navigation Company, now down 185 ft., an excellent 12-ft. vein of coal has been discovered. A 62-ft. tunnel has been driven and a large turnout. At the water level a tunnel has also been driven and an 8-ft. vein of coal found.

Twenty-five hundred miners of the Lehigh and Witkes-Barre collieries in the Honeybrook district went on strike on August 16th. This is the first defection among the miners of Eastern Pennsylvania. Apart from the wage question, the men demand the discharge or transfer of Superintendent Jones, and the feeling against him is so strong that he moves about with an armed escort and his house is guarded day and night.

SOUTH CAROLINA.

Since the reduction in royalty the Coosaw Company has shipped about 20,000 tons of phosphate rock. Only river mining is now being carried on. The other three operating companies are getting out rock per month as follows: Farmers' Mining Company, 3,000 tons; Beaufort Phosphate Company, 3,000, and James Reid, about 700 tons.

SOUTH DAKOTA.

LAWRENCE COUNTY.

ROCHESTER-GREENBACK.—George E. Brettelle, of Lead, manager of this company, whose large property interests adjoin the Homestake on the east, has begun the erection of a 1,200-H. P. electric plant on Spearfish Creek, a mile below Elmore Station. The erection of this plant will be followed by the establishment of various manufacturing and milling industries on the Spearfish, power for which will be furnished by this electric plant.

SPANISH R.—It is said that much high-grade ore is being taken from this mine, in the old Carbonate camp. This mine was first developed by Ridpath & Son and Frank S. Bryant, who were searching for silver, and in their efforts overlooked the gold-bearing rock. The present lessees run crosscuts from this tunnel and have discovered the ore in fissure veins. A large quantity of ore is in sight.

TENNESSEE.

DAVIDSON COUNTY.

KANNON MINING AND MANUFACTURING COMPANY.—This company has been incorporated for the

purpose of doing such business as may under the laws of the State be done by mining and manufacturing companies. The capital stock is \$2,500, and the incorporators are W. W. Kannon, J. E. Morris, J. E. Goodwin, A. F. Goodwin and J. H. Zarecor.

UTAH.

NET MINE EARNINGS.—The State Board of Equalization has just received the last of the statements from the different counties of the net mine earnings of 1896, as duly reported by the owners, for purposes of taxation. According to the summing up of the schedules furnished the several county assessors, these official statistics are by counties:

Carbon County.....	\$61,670
Juab County.....	844,369
Salt Lake County.....	17,273
Summit County.....	448,938
Tooele County.....	247,691
Utah County.....	29,890
Uintah County.....	2,967
Total.....	\$1,643,246

It is the prevailing custom in valuing property, when given to the assessor for taxation purposes, to give one-third to one-half its reputed worth, and the same may be considered the rule in making out statements of net mine earnings. Beyond any reasonable peradventure it is within bounds to assert that Utah mines made a profit aggregating fully \$3,250,000 in the 12 months of 1896. In view of all conditions the record is not unfavorable.

GOLD KING CONSOLIDATED MINING COMPANY.—This company's property, in Gold King basin, is being worked principally by lessees who are operating in the upper levels and on the dump of No. 6 level. The lessees in the mine are taking out free milling gold ore that runs from \$25 to \$75 per ton on the plates of the Gold King 40-stamp mill, while those on the dump are sacking and hauling down to the mill quartz that runs \$10 per ton on an average. Company ore will not commence to be treated until the long surface incline tramway between the mine and mill is repaired, some of the trestle work having been demolished by a snowslide last winter. There are thousands of tons of company ore blocked out in the lower workings where systematic development work has been prosecuted since last fall by a good sized force of men.

UNION LIGHT AND POWER COMPANY.—An important consolidation of electric power transmission schemes is on the eve of consummation. The Pioneer Electric Power Company, the Salt Lake & Ogden Gas and Power Company, the Big Cottonwood Power Company, the Little Cottonwood Power Company, the Citizens' Electric Light Company, and several smaller incorporated wheels within the foregoing are to be merged into the Union Light and Power Company, with capital stock of \$4,500,000. At this writing the articles of incorporation are not on file in Secretary of State's office, though details of the union are practically agreed upon. It is a necessary move to prevent a considerable loss, even in thriving times, and particularly so in a period of industrial quiet. The Union Company will have ample power for sale for manufacturing, smelting, mining and other purposes.

(From Our Special Correspondent.)

SHIPMENTS FROM SALT LAKE.—During the week ending August 14th there were shipped East 24 cars, or 873,398 lbs., lead-silver bullion; 69 cars, or 1,416 tons, lead-silver ore.

UNION LIGHT AND POWER COMPANY.—Articles of incorporation were filed in the Secretary of State's office August 9th; capitalization, \$4,550,000; shares \$100, of which 3,000 shares are preferred, 8% per annum cumulative. The corporation is to continue 50 years. Head office, Salt Lake. The first stockholders' meeting for election of directors will be held on the 2d Monday in July, 1907, and on the same Monday every 10 years thereafter. Directors and officers are: George Q. Cannon, president; Thomas G. Webber, first vice-president; L. S. Hills, second vice-president-treasurer; Joseph F. Smith, John R. Winder, Frank J. Cannon, C. K. Bannister, William S. McCormick, all of Utah; W. J. Curtis, of New York. R. S. Campbell, of Salt Lake, is chosen secretary and general manager. This incorporation completes the union of the Pioneer Electric Power Company, the Salt Lake and Ogden Gas and Electric Light Company, the Big Cottonwood Power Company, the Little Cottonwood Power Company, and several of smaller moment. So soon as the new regime gets squared around for business, which it purposes to carry on in over half a dozen counties, it is said electrical power can be had at lower rates than formerly, for there is an ample abundance to be marketed; it will also have a tendency to lower the price of coal, and the users of power generally anticipate a benefit as an outcome of the union. Smelters, samplers and mines are within the proposed field of operations and already electric transmission power is supplied to the first. A few weeks ago there was a report current that the consolidated company was to be a New Jersey corporation, which plan was abandoned, if ever seriously thought of.

JUAB COUNTY.

(From Our Special Correspondent.)

ANITA MINING AND MILLING COMPANY.—Incorporation articles were filed in Secretary of State's office, August 12th; capitalization, \$150,000; shares

\$1, with 50,000 shares set aside for treasury stock. Head office, Salt Lake; annual meeting, first Tuesday in September. Stock is subject to assessment; no one assessment to exceed one-half of 1% of the capital stock, nor shall assessments be levied oftener than 90 days and \$10,000 is named as the maximum total assessments during life of the corporation. Officers and directors are: H. E. Zerbe, president; W. J. Browning, vice-president-treasurer; W. H. Tibbals, secretary-manager; George A. Wake, all of Salt Lake; T. C. Hanford, Silver City; W. F. Osman, Grant City, Mo.; T. M. Osman, of Mercur. The reaty consists of Anchor, Hanford and Constellation, a mile south of Diamond. It is the intention to begin development in about a fortnight.

EMERALD.—Shaft 700 ft., where station is being cut for drifting. The management is sanguine of a favorable outcome to this deep prospecting venture.

RABBIT FOOT.—A contract to continue shaft 100 ft. is under way by Phil Richards. This will give a depth of 307 ft. However, the company reserves the right to end the contract at 50 ft., should it so desire.

SIoux MILL.—H. C. Bacon and F. H. Peyton have given up their lease, and it is possible a new lease will be taken by F. H. Peyton and Grant Snyder. A test lot of Humburg second-class will be put through in a few days. The cost of getting mineral from several mines which have desirable milling products is proving a serious stumbling block to steady running.

TINTIC SHIPMENTS.—For the week ending August 14th: Bullion-Beck, 20 cars; Centennial-Eureka, 2 cars; Eureka Hill, 6 cars; Gemini, 12 cars; Uncle Sam, 6 cars; Grand Central, 2 cars; Bull Domingo, 1 car; foregoing all ore; Eureka Hill, 5 cars; Sioux Mill, 2 cars; both concentrates; Dragon Iron, 26 cars hematite for fluxing.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

CONGOR GOLD AND COPPER MINING AND MILLING COMPANY.—Incorporation articles were filed with Secretary of State on August 13th; capitalization, \$200,000; shares, \$1, with 50,000 shares set aside for treasury purposes. Stock assessable, but no one assessment to exceed 1% of the amount of capital stock, nor shall assessments be levied oftener than 60 days, nor shall total assessments exceed \$20,000 during the 50 years' life of the corporation. Head office, Salt Lake; annual meeting, third Monday in August. Officers and directors are: Glen R. Bothwell, president; Porter J. Conway, vice-president; Gordon J. Hall, treasurer; Abial B. Sawyer, secretary; Charles C. Slade, all of Salt Lake, and Egos I. Pittman, of Ennis, Tex. Realty consists of Congor in process of patenting and Buckley (or Buckley) fraction adjoining in Pine Gulch, West Mountain District.

NORTH LAST CHANCE.—On Friday, August 13th, one side of the mill tumbled in, and a day or two later it burned to the ground. As this is written no particulars are at hand of the extent of the damage. A lot of new machinery, fortunately not on the ground, consisting of a boiler, four Hodge jigs, etc., was about to be put in. It is expected the mill will be speedily rebuilt, as the concentrates from this low-grade mineral, of which there is a large store, run high in lead and not particularly so in silver.

SAN JUAN COUNTY.

(From Our Special Correspondent.)

BLUE MOUNTAIN TUNNEL AND MINING COMPANY.—Incorporated April, 1897; capitalization, \$25,000; shares, 5c., or 500,000 shares; with the proviso that each director must hold and have standing in his name not less than 10,000 shares. Head office, Salt Lake; annual meeting, second Monday in April. Officers and directors: Mark W. Musgrove, president-manager; Heber M. Wells, vice-president; Frank D. Kimball, treasurer; A. Hanauer, Jr., secretary; Henry Rives, C. W. Bennett, all of Salt Lake; Robert James Thomson, of Monticello. Realty consists of Flagstaff, Flagstaff No. 2, Hidden Treasure, Gold Eagle, Bay State, Blue Mountain, Water, and half interest in Emma, Jeffie B., Laura and Snow Drift, for which negotiations are pending for the other half, besides a tunnel site, water rights, etc. There are several veins. The chief work is on tunnel in 200 ft., which is expected to cut vein at 250 ft. from mouth, where, owing to the mountain rising so abruptly, a depth of 600 ft. will be attained. Upper workings show a strong 5 ft. ledge, carrying \$8 to \$30 gold at bottom of 35 ft. shaft.

COPPER QUEEN GROUP.—It is reported that a sale is accomplished for \$11,000, and that D. H. Moffat, the Denver banker, is the new owner. This is generally cited as one of the best prospects of the Blue Mountains. There is a well-marked vein, on which are a 30-ft. shaft and several open cuts; best ore is said to run \$300 gold, though average mineral is under \$15.

EUREKA.—John Shafer, only a few days since was receiving congratulations on the opening of a 6 ft. ore body at 40-ft. depth, which is said to average \$20 gold. The Eureka is east of the line of the tunnel of the Blue Mountain Tunnel and Mining Company.

GOLD QUEEN MINING COMPANY.—Incorporated in August, 1896; capitalization, \$1,000,000; shares, \$10; head office, Salt Lake; annual meeting, second Monday in November. Officers and directors are: J. H. Erikson, president; B. B. Heywood, vice-president; Frank D. Kimball, treasurer; J. L. Heywood,

secretary; A. A. Cahoon, A. Hanauer, Jr., N. Erikson, all of Salt Lake; T. D. Pitt, of Corinne, Utah. The reaty consists of Gold Queen and Silver King lodes, patented; Sunrise and C. O. D. in process of patenting, with no conflicts. All told 800 ft. of development is accomplished, the most extensive a 205-ft. tunnel. There is a 10-stamp mill, steam power, complete, with a Hallidie 3,200-ft. train connecting mine and mill, the difference in altitude being 1,200 ft., erected last December; which on the initial run, under adverse conditions, accomplished a saving of \$6.33, or about 65% of the values. Heavy snow during winter hindered further working of the train, necessitating a shut-down. B. B. Heywood, the vice-president, is now on the ground, and it is said intends pushing matters.

RENEWED EXPLORATION.—As frequently happens, the Blue Mountain District will not record the advance for the season of 1896 anticipated in the early spring. For this condition Captain Jackson's unfortunate death is responsible in part; while distance from rail communication, lack of funds of most of the advance guard and the difficulty of interesting capital in a new low grade mining region, even when gold is the attraction, are other causes. The season opened late, and after considerable activity there was a let-up of a month or more, and now, with August half gone, a sort of revival is under way. There are fully 75 prospectors in the field besides 35 working miners, and good reports are coming to hand from the western portion of the range, which hitherto has received little attention. Monticello, a Mormon town, the trading point, is distant 75 miles from Dolores, on the Rio Grande Southern, or 80 miles from Thompson's Springs, on the Rio Grande Western. There is an abundance of water, fine timber and good grazing. The ore carries gold with some silver, mostly free milling; reports of valuable copper finds, recently given wide circulation, are without foundation. Porphyry, lime and quartzite form the country rock.

VIRGINIA.

UNITED MINES COMPANY.—A charter has been granted to this company, of Richmond, Va. The objects of the company are to purchase, lease, or otherwise acquire, and to operate and also sell, convey, lease and otherwise dispose of gold, silver, copper and other mineral properties and mineral rights in the State of Virginia; also to establish, maintain, and operate stamp mills, chlorination and all other machinery and apparatus necessary and proper for mining and treating ores. The capital is \$5,000,000. The officers of the company for the first year are as follows: H. F. Sawyer, president, New York; L. I. Thomas, secretary and treasurer, Richmond. The directors are as follows: H. F. Sawyer, New York, N. Y.; A. W. Magerhaus, New York, N. Y.; W. S. Foreman, East St. Louis, Ill.; Charles T. O'Ferrall, Chesterfield County, Va.; H. L. Denoon, Richmond, Va.

WASHINGTON.

STEVENS COUNTY.

NIAGARA.—A carload of ore has been shipped to the Trail smelter for a test. The company is building a wagon road half a mile from Myers Falls station, and is pushing development.

WYOMING.

ALBANY COUNTY.

PINEY CREEK COAL FIELD.—Professor Knight, of the Wyoming State University, who has been examining the Piney Creek coal deposits in this county, states that the coal is of fine quality, containing 75 to 79% of carbon, 20% more than any other Wyoming coal.

CARBON COUNTY.

CARBON COUNTY MINING AND MILLING COMPANY.—A strike is reported from this mine. The ore is free milling and assays high. The ore was taken out about 60 ft. from the mouth of the tunnel. A small lead was followed in this distance, when the main body of ore was struck. At this point a cross-cut was made until a breast of ore 24 ft. long and 5 ft. thick was laid open. The entire body is free-milling ore and the formation is a yellow, honeycombed quartz.

FOREIGN MINING NEWS.

ASIA.

INDIA.

COLAR GOLD-FIELD OF MYSORE.—The output of the mines for July was 33,276 oz. gold, an increase of 268 oz. as compared with the preceding month, and an increase of 6,157 oz. as compared with the corresponding month of 1896. The production in crude ounces for three years has been as follows:

	1895.	1896.	1897.
January.....	19,672	29,986	28,912
February.....	19,358	27,418	30,480
March.....	20,257	26,171	30,807
April.....	20,399	26,866	31,425
May.....	20,797	26,840	32,100
June.....	20,939	25,751	32,008
July.....	19,280	26,119	32,276
Total.....	140,602	189,151	218,968

The production of the leading mines for July last was as follows: Mysore, 10,309 oz.; Champion Reef, 10,297 oz.; Nundydroog, 4,772 oz.; Ooregum, 4,657 oz.; Coromandel, 1,170 oz. These five mines furnished 96.7% of the whole output for the month.

CANADA.

BRITISH COLUMBIA—AINSWORTH DISTRICT.
(From Our Special Correspondent.)

ORA PLATA.—Recent assays made from samples of ore taken from this group show \$13 in gold and silver, with a good proportion of copper and lead. The vein is 3 ft. wide and has been traced for a considerable distance. The vein traverses the four claims comprising the group. It is strong with good surface indications. Mr. John W. Cover is the managing director. This property is situated on Grouse Mountain in the Ainsworth District.

BRITISH COLUMBIA—ALBERNI DISTRICT.

CHINA CREEK.—This hydraulic proposition is to be worked, as Mr. W. H. Bainbridge, during his recent trip to England, was successful in securing capital.

GOLDEN EAGLE.—This property is being opened up by Mr. Appiewhaitte, of Nelson, for an English syndicate.

SIMPSON.—On the Simpson ledge—which only a short time ago was found to run from the Alberni through the Chicago, and which was traced in open cuts for 600 ft.—a tunnel has been run 12 ft. at the spot where the strike of coarse gold was made on the Chicago. This tunnel has opened up a 20 in. pay streak which is freely spotted with gold.

On the north drift on the Alberni the work shows that with 40 ft. more there will be 100 ft. of stopping ground.

BRITISH COLUMBIA—BOUNDARY CREEK.
(From Our Special Correspondent.)

REPUBLIC.—Considerable free gold has been struck on this property at the depth of 100 ft. The ore is quartz with galena pyrite and blende and the gold occurs in the blende.

GOLDEN CROWN.—Fifteen men are working; the tunnel is in 150 ft. and the shaft 35 ft. Tenders are being called from pump hoist and boiler. The ore is high-grade gold, with copper pyrites in a gangue of pyrrhotite and quartz.

KNOT HILL & IRONSIDES.—Ten men are working great difficulty is found in breaking the rock in the Ironsides shaft. Several contracts have been thrown up at \$30 per foot.

LAST CHANCE.—Drifting is proceeding at a depth of 80 ft. The ore is high-grade quartz, carrying mispickel, galena, blende and ruby silver.

SUMMIT CAMP.—This property is bonded to the Mines Selection Company, of London; A. L. McEwen is in charge. The bond is for 90 days and the figure is \$60,000. This is one of the most promising prospects found in the district. The vein was uncovered this spring. It is soft, wide and has been crossed a distance of 300 ft. Numerous samplings across the vein by careful men give from 12 to 14% copper, 10 to 12 oz. silver, and \$3 to \$5 gold per ton. The ore is chalcopryrite and bonite in a gangue of lime quartz and specularite.

BRITISH COLUMBIA—CARIBOO DISTRICT.

The Cariboo Hydraulic Company, which made a cleanup of over \$72,000, will soon be ready to make another wash about \$200,000 this season. The Horsely Hydraulic Company, after washing for the first year, in which it took out \$65,000, found that there was too much cement in the ground for successful operations by this method, put in a 10 stamp mill, which started July 10th, and crushes 120 tons a day. In the same camp the Micocene Mining Company, a San Francisco outfit with Senator Campbell at its head, has a shaft down 240 ft., sinking for the bed of the old channel, and has put in machinery to sink deeper. The theory of a number of experts is that the old channel is here 1,000 ft. wide and that the Fraser, Clearwater, Quesnelle, and perhaps other streams formerly passed through it. This theory is well borne out by the fact that the Horsely Gold Mining Company has shown the present channel of the Horsely River to be simply a cross-cut of the old channel. This mine is being worked by two hydraulic elevators and will make a good showing. Nearly 40 miles of this old channel have now been located.

BRITISH COLUMBIA—KASLO.

(From Our Special Correspondent.)

ORE RECEIPTS.—The receipts of Slocan ore at this point have averaged about 700 tons per week during the present summer. This represents only the ore carried over the Kaslo & Slocan Railway.

BRITISH COLUMBIA—LARDO DISTRICT.

This very inaccessible district promises to be one of the richest in the province. It is 80 miles from Sandow, and the only way to reach it is by steamer from Arrowhead to Thompson's Landing, on the northeast arm of Arrow Lake, and then stage 16 miles to Ferguson. Ferguson is another example of the rapid growth of towns in the Northwest. Last spring there were not over half a dozen houses there; now the town has 600 or 700 people. Fully 600 prospectors are looking over the country, and it is one of the roughest a miner ever traveled. In the mountains, which are almost straight up and down, there are numerous glaciers. Prospectors sometimes travel in pairs across the mountains, tied by ropes to each other to prevent a fatal slip.

BLACK PRINCE.—The Black Prince, a property on the north fork of the Lardo River, is a silver-lead proposition. Half a dozen men are working on it and the shaft is down 40 or 50 ft. The miners are

taking out ore which should pay well when it is gotten to the smelter.

GEORGIA AND LULAS.—New discoveries in the Lardo District include the Georgia, a silver-lead proposition. The ledge will average a number of ounces in silver, those directly interested say 80 to 100, and \$12 in gold. The Lulas, another discovery, is working four men, and is down 20 ft., the shaft running on a galena ledge.

GREAT NORTHERN.—This mine is owned by a Scotch syndicate and is another prominent mine. It has been worked for some time and has been shipping at intervals. The Bad Shot, an adjoining prospect, looks well. A high-grade galena ledge is the wealth uncovered in this mine, and some people think it will be the richest proposition in the Lardo District.

MINDO GROUP.—On Lake Creek there is the Mindo group, owned by Captain Davey, William Sanders and others. Five or six men are working on the property. The ore looks like Trail Creek ore. The owners say they have assays which run high in gold and copper.

SILVER CUP.—There are 80 men working in this mine, and a contract has recently been let for a shipment of 400 tons to the smelter. Some of the ore is said to be marvelously rich. The mine is worked by the Horne-Payne syndicate, which also operates the Sunshine and Broadview. The company is building a concentrator at Ferguson, and the survey for an electric road from Galena Bay to Ferguson is completed. It has been said that the road was to be completed by winter, but this seems hardly probable.

WAGNER GROUP.—The Wagner group, on Hall Creek, which is largely owned in Spokane, is working 14 men. Several hundred feet of tunnel show the labor expended, and there are many tons of ore on the dump which would be shipped to the smelter if there were shipping facilities. A railroad seems to be necessary to make the average mine pay at all in that district.

BRITISH COLUMBIA—NELSON DISTRICT.

DENVER SMELTING COMPANY.—It is now announced that this company will locate its sampling works at Rosebery, on the Nakusp & Slocan, instead of Nakusp, as contemplated. The company has secured an eight-acre site, in return for which it has entered into a contract to erect a mill with a capacity of 100 tons per day. The mill is to be in running order by December 1st.

ELISE GOLD MINING COMPANY.—This mine is to be sold to pay a mechanic's lien on it of \$1,100. The Elise property is located on Wild Horse Creek, between 5 and 6 miles from Ymir, and is connected by the same with a pack trail. It is generally understood that the property was sold in the first place for something like \$30,000. Since the present company took the property considerable development has been done upon it, but very little authentic information has been given to the public concerning the result of the work.

BRITISH COLUMBIA—WEST KOOTENAY.

During the past six months there has been shipped from West Kootenay a total value in ores and matte amounting to, approximately, \$3,500,000. This is by no means a fulfillment of the sanguine predictions of a million a month. Still it compares quite favorably with the output of the preceding year, which for the corresponding period produced a value of \$1,650,000, so that the gain in production is somewhat over 100%.

There is, however, a general slackness in outside investments and speculations. Stocks are very weak in the multitude of "Jim Crack" mining companies formed during the past 18 months. The public had the appetite and the unknown and unscrupulous promoter had the bait. The public is not biting now. That is the trouble. Development continues where it is warranted, and legitimate mining looks very healthy indeed.

The mining public could not take up the propositions offered in past times to a great extent, except for speculative purposes. The prices of prospects were forced above the reasonable value, so the legitimate miner stepped out and the speculator stepped in. These positions are now being reversed, and the district in general will not lose by it.

WAR EAGLE.—The old War Eagle company is paying its last dividend. The War Eagle sold its mine to a Canadian syndicate and afterward discontinued. The value of the remaining assets is said to be about \$22,500, to be distributed among the former shareholders. This would give a 4% dividend. Since the mine was sold for \$700,000 it has paid a dividend of 6c. a share or \$30,000. Prior to the sale the mine had paid \$187,500 in dividends. So, all told, the War Eagle mine has returned to its owners \$940,000. This, for an expenditure of about \$30,000, is not bad, being a little more than 31 for 1. But the original owners did better than that, receiving more than \$2.50 per share for their original holding. The War Eagle and the Iron Mask are showing up well under development. It is said the owners of the War Eagle expect to push development work for two years before trying to pay dividends.

(From Our Special Correspondent.)

CALIFORNIA.—A report is in circulation that this property has passed into the hands of some British stockholders who intend to develop it.

COXEY.—The management of this company has suspended work pending the installing of machinery. In the upper tunnel there is a good showing of chalcopryrite, and the ore body is believed to be large and well defined.

HOMESTAKE.—It is stated that this mine will shortly begin work under the consolidation recently made. Mr. W. S. Haskins, the late superintendent, will continue as manager.

LE ROI COMPRESSOR.—The management of the Le Roi mine is laying a pipe from the compressor works to the dam at the head waters of Trail Creek to tap that source for an additional water supply, as the Josie Creek materially diminishes in mid-summer. The new supply is unflinching summer and winter. It will be carried a distance of 1,500 ft.

ORE SHIPMENTS.—The shipments of ore from Rossland mines to the various smelters from January 1st to August 11th of this year amounted to 47,300 tons.

During the period from January 1st, 1897, to August 11th, the value of ore and matte exported from this district amounted to \$4,600,000.

ST. PAUL.—This company has closed down. It is not known how long this suspension will continue.

WHITE BEAR.—The ore which has just been found, in the north drift at the 150-ft. level in this mine shows a decided improvement in grade on that hitherto found in the shaft, and in the west crosscut. This ore has always been coarse with massive cubes of pyrrhotite, and some marcasite. The ore now found in the new drift is a clean fine chalcopryrite, with a fair percentage of copper, and it is otherwise well formed.

NOVA SCOTIA—GUYSBORO COUNTY.

(From Our Special Correspondent.)

GOLDENVILLE GROUP.—The produce is 483 oz. for July, made up as follows: Blue Nose, 230 oz.; Newglasgow, 120 oz.; Hirschfeld, 133 oz. This district is looking remarkably well. All operators are making handsome profits. The Blue Nose is bonded to James D. McGregor, M. P. P., of Newglasgow. The price is said to be \$41,000. Mr. McGregor has been very successful in his gold-mining operations. His profits from the New Edgerton mine have been large.

RICHARDSON.—The returns from this mine for July are 248 oz. The ore belt is now 20 ft. wide, all of which is milled. The company is shortly to increase its milling capacity by an addition of 20 stamps.

NOVA SCOTIA—HALIFAX COUNTY.

(From Our Special Correspondent.)

GUFFEY JENNINGS COMPANY.—This Caribou District concern, which recently bought the Lake Lode mine, has been making a series of tests, the results of which are so satisfactory that they now conclude to add 20 stamps to their present 10-stamp mill and have also determined to sink a shaft 1,000 ft. This effort may bring about a new era in Nova Scotia gold mining, as the deepest shaft up to the present time is 600 ft.

TOUQUOY.—Perhaps the most interesting mine in this district at present is the Touquoy, which changed hands last winter. Mr. Touquoy, who had made a snug competency and is well on in years, sold to local people for \$24,000. The purchasers capitalized at \$80,000 and have paid up to the end of July 30% on the capitalization, with a snug reserve fund. To-day the writer examined \$4,000 worth of specimens just taken from the new lead found some two months ago and from the bottom of the shaft, which is only 20 ft. deep. This shaft is 12x4 ft. and the gold produced from it has paid \$500 per foot in depth. In other words, the ore from the shaft has yielded \$10,000 worth of gold. The stock in this mine is above par.

NOVA SCOTIA—HANTS COUNTY.

(From Our Special Correspondent.)

DIMMOCK.—This Rawdon District mine in driving a 400-ft. level has encountered a large body of good ore heavily charged with mineral. They have just added three new Frue vanners to their already extensive plant. This mine bids fair to be one of our largest producers in the near future.

NOVA SCOTIA—QUEENS COUNTY.

TEMISCAMANGUE DISTRICT.—Indians have, it is said, found a big seam of coal on the borders of Lake Temiscamangue. Pembroke capitalists have gone to investigate. Silver also exists along the shores, though not, it is believed, in paying quantities.

(From Our Special Correspondent.)

BROOKFIELD ASSOCIATES.—This mine continues its satisfactory output. July's returns were 325 oz.

ONTARIO—LAKE OF THE WOODS DISTRICT.

BURLEY GOLD MINING COMPANY.—An order-in-council has been passed, giving the Burley Gold Mining Company, of Ottawa, the right to construct a crib in Lake of the Woods, opposite the Sultana mine, for the purpose of sinking a shaft. The matter is rather an interesting one. The Burley Company, which is composed chiefly of Ottawa men, holds a mining location under the surface of Lake of the Woods. The location is believed to include the prolongation of the Sultana lode beneath the lake. They accordingly applied to the Dominion for a permit to put a crib in the lake. The permit has now been granted, and the company will get to work to put down the crib-work, beneath which

to sink a shaft to the ore vein, which is over 100 ft. beneath the bottom of the lake.

GOLD COIN.—This mine, both because of its extensive ore body and because of its proximity to the Mikado, is considered a promising property. Its sale to an English syndicate is now pending. Known as mining location D 218 it consists of 255 acres of land, abutting both on Hell Diver Bay and Shoal Lake. The present owners are Messrs. Thomas Walsh, William McVey and Israel Gagne. A trial shaft has been sunk on the lead showing a continuation of the mineralized vein.

HELL DIVER.—This prospect is two miles to the southeast of the Mikado mine, and is believed to have a continuation of the Mikado's main vein, besides the other leads. This No. 1, or Mikado vein, occurs at the contact of the granite and trap formations, the ore body being accompanied by a gangue of chloritic slates. It is traceable almost entirely across the property. The ore body proper is 5 ft. wide for 25 ft. on each side of the lead the country rock also assays gold. The shaft now down 50 ft. maintains its surface width, and exposes a clearly defined and smooth foot wall, though the hanging wall is somewhat irregular and broken up, as is the case at the Mikado mine.

IMPERIAL DEVELOPMENT COMPANY.—This company has purchased from the Wabigoon Land Agency the minerals and mining rights on their property at Wabigoon, and intend to proceed at once in active development. There are three well-defined veins on the Lakeside property, having a width of 6, 8 and 2 ft. respectively, all of which pan free gold, and as the property is on Wabigoon Lake and the Canadian Pacific the shipping facilities are unsurpassed. Ten thousand dollars will be spent on buildings and development work this fall.

REGINA.—The Regina boasts, next to the Sultana, the most development work of all the properties in the Lake of the Woods District, and it may now be considered among the regular producers of the gold. The mine is situated on Whitefish Bay, about 45 miles to the southeast of Rat Portage. The Regina is owned and controlled by an English syndicate. Five or six leads of more or less promise have been found upon the thousand odd acres belonging to this company, but development work is being confined to a vein known as No. 3. This lode traverses obliquely a contact of trap and granite; it has an outcropping 4 or 5 ft. wide, and has been traced for a couple of miles across the syndicate's land.

MEXICO.

SONORA.

(From An Occasional Correspondent.)

SAN MANUEL.—At this mine, in northern Sonora, the work of sinking and exploring is progressing rapidly. A small steam hoist for this property recently arrived at Tucoon, and was sent to the mine. This property was recently acquired under bond by New York parties. The ore is a massive pyrites in many respects, resembling the ore of the Congress mine, which continues in successful operation.

(From Our Special Correspondent.)

PAN-AMERICAN MINING AND MILLING COMPANY.—A Utah corporation, composed of Salt Lake men, is carrying on some unique but profitable mining operations at Torres, on the rich gold ores of Las Prietas mine. Two hundred and sixty thousand tons of tailings have accumulated and a cyanide plant of 50 tons daily capacity is now successfully treating them. Officers: C. L. Dignowity, president; Gill S. Peyton, vice-president; E. H. Scott, secretary; E. G. Rognon, treasurer; J. W. Houston, director—all of Salt Lake, Utah. Several large blocks of the stock are held in the East. James E. Beveridge, formerly a Utah mine superintendent, is manager.

SOUTH AMERICA.

PERU.

In answer to many inquiries regarding the gold mines of Peru, the legation of that country at Washington has issued the following circular:

"The richness of the veins and gold placers in the provinces of Sandia and Carabaya, and of the Department of Amazonas, and in many other localities of Peru, is extraordinary.

"The climate is healthy, being neither extremely hot nor cold, and entirely without the inconveniences found in other places. The roads leading to many mines are not good; prospectors for gold should bear this in mind.

"The government grants mining claims free of cost, without other obligation or condition than a semi-annual payment of the sum of 15 Peruvian soles, equivalent to about \$7 gold. The extent of each claim is limited to 600 ft. in length, by a width varying according to the inclination of the vein; maximum, 600 ft. In the placers each claim is limited to 40,000 sq. m. (more than 360,000 sq. ft.). Each individual can possess one claim on a vein, and companies or syndicates organized to work on a large scale may have 10 or more claims on the same vein or placer, in proportion to their working capital. A law passed in 1890 provided that during the lapse of 25 years the said semi-annual tax would not be increased, but lately the government has asked Congress to modify this law as relating to gold mines and placers.

"Until Congress decides this modification, grants of gold claims are suspended to any persons or company who, in their petition, do not express their willingness to abide by whatever resolution Congress may reach on the increase of taxes on gold claims."

COAL TRADE REVIEW.

NEW YORK, Friday Evening, August 20.

Statement of shipments of anthracite coal (approximately) in tons of 2,240 lbs., for the week ending August 13th, 1897, compared with the corresponding period last year:

	1897.		1896.
	Week.	Year.	Year.
Pennsylvania Railroad.....	71,800	2,016,894	2,136,612

PRODUCTION OF BITUMINOUS COAL in tons of 2,000 lbs. for week ending August 13th, and for years from January 1st, 1897 and 1896:

	1897.		1896.
	Week.	Year.	Year.
Shipped East and North:			
Allegheny, Pa.....	47,534	1,491,892	1,411,466
Berclair, Pa.....	524	27,169	27,861
Beech Creek, Pa.....	82,512	2,345,572	1,886,777
Broad Top, Pa.....	8,491	272,470	253,964
Clearfield, Pa.....	80,969	2,828,794	2,969,199
Cumberland, Md.....	88,192	2,359,527	2,311,418
Kanawha, W. Va.....	112,160	2,859,117	2,100,061
Phila. & Erie.....	610	179,340	45,796
Pocahontas Flat Top.....	493,211	1,437,368	2,297,229
Totals.....	514,203	13,795,159	13,365,771

	1897.		1896.
	Week.	Year.	Year.
Shipped West:			
Monongahela, Pa.....	1,540	744,651	639,543
Pittsburg, Pa.....	54,962	1,164,694	1,228,983
Westmoreland, Pa.....	75,140	1,311,978	1,211,455
Totals.....	131,642	3,220,723	3,079,981

Grand totals..... 645,845 17,015,882 16,445,752

Production of coke on line of Pennsylvania Railroad for the week ending August 13th, 1897, and year from January 1st, 1897, in tons of 2,000 lbs.: Week, 97,403 tons; year, 2,744,144; to corresponding date in 1896, 2,713,924 tons.

! For week ending August 7th. † For week ending July 17th.

Anthracite.

There is not much that is new in the trade at present, and it is quite as quiet as for several weeks past, so far as actual selling is concerned. There is a more hopeful feeling among operators, however, and a general impression that fall trade is going to be good. Indeed, some are inclined to predict that it will be necessary to increase production in September again, and that the 2,000,000 tons decrease now shown as compared with last year, will have all disappeared before September. Up to the present time, however, nearly all the coal coming forward for delivery is on old contracts, and at July circular rates.

Some complaint is heard of short car supply, but most operators have as much transportation as they need.

It does not now appear probable that the strike will affect the anthracite region. The strike of some 2,500 of the Lehigh & Wilkes-Barre Coal Company's miners seems to be entirely a local affair, and most operators think it will not extend to any other collieries. While the condition of the miners has not been satisfactory, there is a general expectation that production will be larger, there will be fewer stoppings and less half-time working for the balance of the year. All this will improve the miners' condition.

Bituminous.

Soft-coal men ridicule the claim that small sizes of anthracite can ever replace bituminous coal for steam purposes, except where local regulations forbid the use of the other. Hence they do not fear that the present strike will end by creating a permanent demand for hard coal that will interfere with the future demand for soft. Soft coal is much cheaper, and gives better satisfaction for steam purposes.

So far the region tributary to the Atlantic coast has not been affected by the strike, and as the store system is not in vogue in it the men are thought to be fairly satisfied.

Freights from Philadelphia have risen rapidly during the past week, and so great is the scarcity of vessels that it is quite impossible to quote any reliable figures. The vessel market is in a very excited and disturbed condition. It is reported that in extreme cases as much as 30c. over standard rates has been paid from Philadelphia to Savannah. Freights are undoubtedly high all round.

There seems as yet to be plenty of coal on hand to meet any probable emergency, with the exception of stocks in the Lake districts, where bins are running low. New England and Sound trade are good, as is New York harbor trade.

Owing, it is said, to a dispute between the West Virginia operators and the Norfolk & Western Railroad, the former are shipping largely over the Baltimore & Ohio. At any rate, coal is not being moved in any great quantities over the Norfolk & Western, and empty cars are rolling northward.

Some of the more far-seeing operators think they detect trouble ahead through an inadequate car supply. Should the prosperity of the country become as marked during the next three months as seems assured, there should be a large demand for coal springing up. How is it going to be met? Car supply is limited even now, and it would be quite impossible to hurry forward any great increase in tonnage upon short notice. Most of the railroads had let their rolling stock down to its lowest level while the depression lasted, and unless they take immediate steps to remedy this state of things op-

erators are pretty sure to feel the pinch for cars before long. Not only is there likely to be much coal to forward, but just at the same time comes one of the largest crops of wheat that has ever had to be moved, and which will employ a vast amount of rolling stock all the winter.

Buffalo.

Aug. 19.

(From Our Special Correspondent.)

The anthracite coal trade is fairly active at nominally unchanged quotations. Bituminous coal is in fair demand with dealers firmly adhering to slightly advanced prices, trading depending, however, on supply and the news from the strike situation. Lake freights on coal are unchanged, with an increased volume of shipments.

The Rochester & Pittsburg Company, the Fairmount Coal & Coke Company and Messrs. Osborn, Teager & Company, of Cleveland, are the contractors for supplying the New York Central Railroad Company with bituminous coal for the current year at \$1.20@1.25 per net ton delivered.

The movement of coal through the Sault Ste. Marie canals this year to August 1st was 1,130,654 net tons, as compared with 1,478,097 net tons in 1896 and 806,523 net tons in 1895.

The Buffalo Fire Commissioners opened bids for coal for the department for the current year yesterday. Mr. Hanrahan was the lowest; his figures were \$1.73 for Pittsburg lump bituminous and \$1.60 for anthracite per net ton delivered, the sizes of the latter, stove, egg and chestnut. Messrs. Gavin & Company's bid was \$1.90, and J. M. Brinker & Company's \$2.40, for Pittsburg lump.

The shipments of coal from Buffalo westward by lake have improved in quantity. The movement for the week ending August 14th, inclusive, aggregated 86,783 net tons, distributed as follows: 47,142 tons to Chicago, 5,250 tons to Milwaukee, 12,800 tons to Duluth, 10,100 tons to Superior, 3,070 tons to Toledo, 1,500 tons to Washburn, 2,200 tons to Green Bay, 850 tons to Sault Ste. Marie, 850 tons to Marinette, 1,071 tons to Lake Linden, 400 tons to Hancock, 1,050 tons to Bay City and 500 tons to Gladstone. The rates of freight were unchanged, viz., 20c. to Chicago, Milwaukee, Duluth, Superior, Toledo, Washburn, Portage, Hancock, Lake Linden and Gladstone, and 25c. to Green Bay, Bay City and Sault Ste. Marie, closing with no indication of an advance in quotations, but with good inquiry for vessels.

The following statistics of the coal trade of Buffalo, N. Y., were compiled by Mr. William Thurstone, secretary of the Merchants' Exchange: Receipts of coal for July by railroad not reported by request. Receipts by lake for month of July, none; nor for several years past. Shipments by Lake for the month of July, 239,345 net tons, as compared with 249,615 net tons in 1896, and 299,600 net tons in 1895; for the season to August 1st, 669,588 net tons, as compared with 893,798 net tons in 1896 and 829,829 net tons in 1895. Receipts by canal for the month of July none as compared with 1,887 net tons in 1896, and 1,633 net tons in 1895; for the season to August 1st none, as compared with 8,897 net tons in 1896, and 1,973 net tons in 1895. The shipments by canal for July none as compared with 491 net tons in 1896 and 1,144 net tons in 1895; for the season to August 1st none, as compared with 731 net tons in 1896 and 3,392 net tons in 1895. The shipments by lake this far this season show a decrease under 1896 of 224,210 net tons and a decrease under 1895 of 160,271 net tons.

Lake freights on coal from Buffalo for July this year were 20c. to Chicago, Milwaukee, Duluth, Gladstone, Lake Superior ports, Toledo, Washburn; 25c. to Racine, Green Bay, Bay City and Sheboygan; and 35c. to Saginaw. A year since the rates were as follows: 50c@25c. to Chicago; 45c@25c. to Milwaukee; 25c. to Duluth and Lake Superior Ports; 35c@3 c. to Saginaw; 40c@25c. to Green Bay; 35c. to Sheboygan; 25c. to Toledo, and Bay City; and 40c. to Racine.

The distribution of coal thus far this season by lake was to the following places: 278,051 tons to Chicago, 128,750 tons to Milwaukee, 98,600 tons to Duluth, 11,750 tons to Racine, 7,550 tons to Green Bay, 90,439 tons to West Superior, 6,710 tons to Saginaw, 21,680 tons to Toledo, 900 tons to Lake Linden, 3,600 tons to Marquette, 3,128 tons to Fort William, 1,400 tons to Sault Ste. Marie, 1,100 tons to Manitowoc, 6,275 tons to Kenosha, 2,100 tons to Bay City, 1,675 tons to Port Huron, 2,750 tons to Gladstone, 800 tons to Washburn, 600 tons to Portage, 5,250 tons to Hancock, 195 tons to Alpena, 500 tons to Byng Inlet, 800 tons to Michigan City, 1,100 tons to Amherstberg, 330 tons to Sand Beach, 25 tons to Oscoda and 9,400 tons to miscellaneous points by vessels clearing from Tonawanda west.

Chicago.

Aug. 18.

(From Our Special Correspondent.)

Anthracite Coal.—The buying of hard coal has been fairly good, and it is noticed that there is more coal moving to out-of-town points. Some dealers are beginning to observe that they cannot wait very much longer before placing their orders, as freight rates may be advanced at any time on account of the enormous number of cars that will be used to haul the crops of the West. The price of hard coal remains rather firm and quotations are: Gate, \$5.35; egg, stove and chestnut, \$5.60. Retail prices hold at \$6.25@6.50.

Bituminous Coal.—The movement in soft coal remains about on a par with the previous week.

There appears to be a plentiful supply of soft coal here and the receipts are, if anything, becoming larger. There is not as much profit in bituminous coal just now as the dealers expected. The price of soft coal is rather higher than a few weeks ago, but on the whole the business transacted is not large enough for large profits.

Coke.—Sales have increased somewhat on account of increased activity in the iron line. Shipments are more active. Prices are fair.

Cleveland. Aug. 18.

(From Our Special Correspondent.)

The decision of the operators of the Pittsburgh District to operate the mines will have the effect of increasing the price of steam coal in this city, according to the statements made by operators of this city to-day. At a meeting held in this city Tuesday afternoon it was decided that one or two of the mines controlled by the Pittsburgh operators' association should be opened. The price of steam coal is the same this week as last week, but if an attempt is made by the operators to resume work it will be advanced. The supply of steam coal is equal to the demand, and promises to be for some time to come.

Pittsburg. Aug. 22.

(From Our Special Correspondent.)

Coal.—The contest is still unsettled; reports show a wide difference in regard to the movements of the miners. The injunctions asked for by De Armit in regard to holding meetings and marching have been granted against the miners, but in other respects there is little change. The local supply of coal is abundant. Coal in the pools and harbor is estimated at about 5,000,000 bu.; Cincinnati coal afloat, 4,000,000 bu., with considerable in the elevators. The price of coal afloat is 5½¢ a bushel. The Pittsburgh market is firm; run-of-mine railroad coal is \$1.15@1.25 per ton; river coal 5¢ per bu. on wharf. Lake shippers say that they cannot entertain the idea of granting the miners' demand, and until they are modified there is no use of talking about a settlement.

At Greensburg the largest pay in the history of mining was made on Saturday; over \$35,000 was paid for two weeks' work. In one or two instances over \$100 was paid to a single miner for two weeks' work.

At St. Louis the price of coal has been advanced to \$2.25 per ton on board cars.

Connellsville Coke.—The demand for coke continues strong. The shipments increased 5,000 tons, reaching the high-water mark since last summer. This is the strongest indication of the stability of the coke trade. No coke is being stocked. The conditions this week indicate a better trade. The strike talk in the region has all subsided and their is evidently no thought of strike among the men. The agitators have given up all efforts and the region is expected to keep working right along. Continued agitation would bring about a readjustment of the present scale rates, and that the men do not want, as it would mean much lower prices. Summary of the region for the week: 11,680 ovens in blast with 6,972 idle. W. J. Rainey fired up 70 ovens at Moyer; Rainey has now 1,775 ovens, and last week ran all his six plants. There is an enlarged Eastern demand. Production in the region amounted to 119,374 tons, a decrease of 121 tons. In the running order of the ovens in blast, 4,225 ovens made six days, 7,209 ovens five days, 196 ovens four days and 50 ovens Semet-Solvay plant, seven days. Shipments for the week 6,715 cars, distributed as follows: To Pittsburgh, 2,982 cars; to points West, 2,465 cars. Shipped East, 1,264 cars. The shipments reached 120,740 tons. Prices are nominal; good Connellsville coke is \$1.40 for furnace; outside furnace, \$1.25.

Shanghai, China. July 16.

(Special Report of Wheelock & Co.)

Coal.—During the last fortnight there has been a very large business done owing to advices from Japan that a fresh demand had sprung up there, and coals of all kinds were being rapidly contracted for at greatly enhanced prices; the market here has also become considerably stronger, notwithstanding the fall in freights. Karatzu (Yoshonotani) having been placed as high as 6.25 taels per ton, while for the more common kinds 5.70 taels per ton has been paid with a further inquiry. Cardiff is not in demand, prices being prohibitive. In the Australian Wollongong market a small demand has suddenly set in, one cargo being placed at 9 taels per ton. This seems to have satisfied native demands.

We quote Cardiff, 13 taels per ton; American anthracite, 9 taels per ton; Sydney Wollongong, 9 taels per ton; Japan coal, 5.75 taels per ton; Takasima lump, 5 taels per ton; Namazuta lump, 5.75 taels per ton for Miike lump, and 6.25 taels per ton for other sorts, with an upward tendency.

Kerosene Oil.—During the past month prices have stiffened somewhat. For spot cargoes very little has been done, but a large business in cargo to arrive has been transacted at 1.57½ taels to 1.60 taels per case, the former being the present quotations. Stocks in godowns 320,000 cases. The quotations in Russian Batum stocks have not altered, a small business still being done at 1.45 taels per case per Horse Chop. The markets for cargoes to arrive is weak and prices are likely to be somewhat easier. Stocks of all Russian kinds 340,000 cases. Langkat remains at 1.40 taels per case, with a total

stock of 75,000 cases. Quotations per case are as follows: Devoe's, 1.56 taels; Horse Chop, 1.45 taels; Langkat, 1.40 taels. The following are per two tins quotations: Bulk oil, 1.40 taels, Langkat, 1.35 taels.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Aug. 20, 1897.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending				From Jan., '96.	From Jan., '97.
	Aug. 21, 1896.	Aug. 20, 1897.	Aug. 21, 1896.	Aug. 20, 1897.		
Anthracite.	35	21,430	21	12,125	855,080	510,212
Coke.	112	133,110	111	150,475	5,243,494	4,236,307
Charcoal.	23	6,760	20	4,153	186,255	137,207
Totals	170	161,300	152	166,750	6,284,729	4,903,726

The iron market generally shows an improved condition, though the changes have been irregular and sometimes on unexpected lines. Thus Bessemer pig has shown comparatively little movement and at irregular prices, while for steel billets very heavy orders have been placed, especially in the West. It is said that the contracts booked run up to a total of 300,000 tons for deliveries extending to November. Notwithstanding this it must be said that the changes in the trade have been rather in the way of increased confidence than increased business, and the improvement is rather in anticipation than accomplishment. Of course the better sentiment is a distinct gain and will probably lead to more business in due time.

There has been little or no improvement in prices, since production is still fully up to consumption or a little above it, and sellers realize the impossibility of obtaining any better quotations at present. The most that can be said is that shading prices has practically ceased, except on an occasional tempting cash order, and that some manufacturers are beginning to hesitate about taking contracts too far ahead at present prices.

Inquiries for export continue fair, and a good deal of pig iron is still going forward. How far the higher ocean freights will check this movement is still uncertain. We hear of one large export order just placed for about 20,000 tons of rails and other material for electric railroads in Ireland. The contract was taken by the Johnson Company, of Lorain, O. Some other orders for steel rails for export are also reported under negotiation.

NOTES OF THE WEEK.

The English papers have been discussing the recent underbidding of English steel rail makers by American manufacturers. An East Indian railway company invited tenders for 7,544 tons of rails, and the English rails were offered at an average of \$27.50. The American quotation, understood to come from the Maryland Steel Company, was \$23.50, delivered at Calcutta. This tender was accepted, together with a tender for accessories, which was also lower. The Secretary of State for India is quoted as saying that further orders for rails for India have been placed in the United States. The Bengal & Nagpur Railroad recently accepted 2,000 tons from an American firm at \$23, compared with \$27.25, which was the British bid. Lord George Hamilton adds that the quality of the material was tested before acceptance by an official sent to the United States.

The *Journal of Commerce*, an excellent authority, says that recently a number of satisfactory orders have been placed for manufactured goods for the Japanese market. Principally among these were three boilers of 400 H. P. each, and two slide valve engines, each of 500 H. P., which are to be used in a machine shop at Tokio, and were bought by a Wall street banking firm from an Erie, Pa., manufacturer. Several good-sized lots of round and square bar iron have also been purchased for account of a firm identified with the Japanese trade. There are prospects of closing a contract for iron pipe, and another for quite a quantity of boiler plates, punched and ready to make into boilers. There are very good indications that further orders for rolling stock for a private Japanese railroad will be placed in this market during the next few days.

New York. Aug. 20.

The local market for all classes of iron continues to show signs of improvement without any advance in prices, notwithstanding the efforts of the daily press, whose reports, if they were to be relied upon, indicate a boom, which has as yet not materialized. The volume of business which is being done at present is all of a legitimate character, speculation having apparently dropped out of the market and all prices obtained are based on actual sales. The high ocean freight rates, caused by the heavy exports of grain, still act as a damper on the placing of foreign orders, and this condition is likely to last for six or eight weeks at least.

Pig Iron.—All speculation has for the time disappeared from the market. There are better inquiries and firmer prices to report.

Quotations are: Northern No. 1 X Foundry, \$11.50 @ \$12 per ton; No. 2 X foundry, \$10 @ \$11; No. 2 plain, \$10 @ \$10.50; gray forge, \$9.50 @ \$10; Southern No. 1 foundry, \$10.50 @ \$10.75 per ton; No. 2, \$10 @ \$10.25; No. 1 soft, \$10.50 @ \$10.75; No. 2 soft, \$10.00 @ \$10.25; gray forge, \$9.50 @ \$9.75; Basic, \$10.50 @ \$10.75. All prices are for tidewater delivery.

Cast-Iron Pipe.—Trading continues in small quantities with steady prices.

Spiegeleisen and Ferro-Manganese.—As noted in our last report, domestic ferro controls the local market, with prices firm. Quotations are: Spiegeleisen, 20%, \$19 @ \$19.50; ferro-manganese, 80% foreign, \$46, delivered at buyer's mill.

Steel Billets and Rods.—Improved inquiry and the large business transacted recently has strengthened prices, although no advance has taken place. Wire rods continue quiet, with prices unchanged. Quotations are \$16.25 @ \$16.50 for billets at tidewater and \$20, nominal, for rods at mill.

Merchant Iron and Steel.—The trade in merchant material has been steady with a firmer tone in prices than has prevailed for some time. Quotations are: Common bar, 1 @ 1.05¢; refined, 1 @ 1.15¢; soft steel bars, 1 @ 1.10¢; steel hoops, 1 @ 1.35¢; steel axles, 1 @ 1.60¢; tire steel, 1 @ 1.10¢; spring steel, 1 @ 1.40¢; base; links and pins, 1 @ 1.60¢; cotton ties, 60¢ per bbl. at mill.

Plates.—The volume of business transacted has been of a decidedly improved condition, with better inquiries for immediate delivery and a firm stand in prices, which have remained stationary. We quote for universal mill plates 1 @ 1.15¢. For steel plates prices are: Tank, 1 @ 1.15¢; boiler shell, 1 @ 1.30¢; flange, 1 @ 1.40¢; firebox, 1 @ 1.60¢; and 2 @ 2.50¢ for locomotive firebox, according to quality. Charcoal iron plates are 2 @ 2.5¢ for shell, 2 @ 75¢ for best flange and 3 @ 25¢ for firebox. Rivets are 2 @ 25¢ @ 2 @ 50¢ for iron and 1 @ 75¢ @ 1 @ 85¢ for steel. Prices are for tidewater delivery in large quantities.

Structural Iron and Steel.—The general improved condition of affairs in structural material noted in our last report continues without abatement, and although prices have not advanced, several prominent dealers have refused to book any further business, stating as a reason that their mills are running full and they will not accept any further orders until an advance has taken place, which they seem to think will be in the very near future. We quote for angles, 1 @ 1.15¢; tees, 1 @ 1.25 @ 1.35¢; channels, 1 @ 1.25¢. The price of beams, New York delivery, is 1.15¢ for ordinary sizes, 1 @ 20¢ for 20-in., and 1 @ 25¢ for 24-in., carload lots.

Steel Rails and Rail Fastenings.—The market for steel rails has improved during the past week, and although no material advance in prices has occurred, the general tone seems to point in that direction. Quotations for steel rails are \$18.50 @ \$19 per ton for standard sections and \$23 for girder rails. Lighter rails are figured on by a reliable concern as follows: 12-lb. rails, \$26 per ton at mill; 16-lb., \$24, 20-lb., 25-lb. and 30-lb., \$22 per ton.

The volume of business done has improved with better inquiry, with prices steady. Tidewater quotations are: Angle bars, 1 @ 1.25¢; spikes, 1 @ 1.60¢; bolts, 1 @ 1.85¢; square nuts, 1 @ 1.85¢; hexagon nuts, 1 @ 1.95¢.

Wrought-Iron Pipe.—Business in wrought iron pipe continues steady with prices stationary. Discounts are as follows: For plain pipe, out of store: 1½ in. and over, 57, 10, 10, 10, 10 and 10%; 1½ in. and under, 57, 10, 10, 10 and 10%. Galvanized pipe, 1½ in. and over, 55, 10, 10, 10, 10 and 10%; 1½ in. and under, 52, 10, 10, 10, 10 and 10%. For fair-sized orders these discounts are made with an additional 5% for less than carload lots. For carload lots this additional discount is 7½% to 10%.

Nails.—The condition of the trade in nails is much better than for some time past, with an advance of 50¢ per keg and an improved inquiry. For carload lots on dock here \$1.45 is quoted, while smaller quantities bring \$1.55 @ \$1.65 per keg. Cut nails remain firm and prices are \$1.20 per keg for carload lots at mill and \$1.30 on dock, New York. Smaller quantities are being sold at \$1.40.

Old Material.—The domestic market continues firm, with a better inquiry and a larger volume of business the order of the day. Export business is quiet, resulting from the high ocean freight rates. Quotations are: Iron T rails, \$12.25 @ \$12.50 per ton; steel rails, \$9 @ \$10; No. 1 wrought scrap iron, \$10.50 @ \$12; hammered car axles, \$15.50 @ \$17.50 all f. o. b. cars; car wheels, \$9 @ \$10 per ton, delivered at buyer's works; machinery scrap, \$9 @ \$10; wrought pipe and tubes, \$7 @ \$8, delivered, New York; wrought turnings, \$8 @ \$9; cast borings, \$6 @ \$7; burnt iron, \$5 @ \$6 per ton, delivered at mill.

Buffalo. Aug. 18.

(Special Report of Rogers, Brown & Co.)

So far August has shown up remarkably well. There has been a slight increase in the volume of business done over last week, both in the way of new orders, and requests for shipments on existing contracts. Prices remain unchanged. We quote below on the cash basis f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$10.50; No. 2 strong foundry coke iron, Lake Superior ore, \$10; Ohio strong softener No. 1, \$10.50; Ohio strong softener No. 2, \$10; Jackson County silvery No. 1, \$14; Southern soft No. 1, \$10.75; Southern soft No. 2, \$10.50; Niagara malleable, \$10.50.

Chicago. Aug. 18.

(From Our Special Correspondent.)

Pig Iron.—The buying of pig iron during the past week has been in only a moderate way, no sales of any importance having been transacted. Carload up to a couple of hundred tons represented the majority of the transactions. Inquiry appears

to be very much improved and the outlook is certainly good for an increased business here shortly. Charcoal iron has been only in limited demand for some time, and this has occasioned surprise, as it was expected that the buying would be on a much larger scale. Prices are fairly steady and are as follows: Lake Superior charcoal, \$13.50; Local Coke No. 1, \$10.75@11.25; No. 2, \$10.25@10.75; No. 3, \$10@10.50; local Scotch No. 1, \$11@11.50; No. 2, \$10.50@11; Bessemer, \$12; Jackson County silvery No. 1, \$15; No. 2, \$14; Southern coke foundry No. 1, \$10.35@10.60; No. 2, \$9.85@10.10; No. 3, \$9.60@9.85; soft No. 1, \$10.10@10.35; soft No. 2, \$9.85@10.10; Tennessee charcoal No. 1, 2 and 3, \$13@14.

Bar Iron.—A number of mills have again resumed business, and naturally prices have gotten to a basis of a month or six weeks ago. Sales for the week have been fair, and most of the mills have enough business on hand to keep them running for some time to come. Quotations are: Common iron, 105@110c, and guaranteed, 115@120c.

Billets and Rods.—Business in both lines continues moderate, and sales continue to run small. Prices remain for billets \$15 and for rods \$20.50.

Steel Rails.—Sales of steel rails have been rather larger, and the buying is about equally distributed between the heavier and lighter sections. Quotations for rails are \$19@21 for the heavier sections and \$24@28 for light rails.

Structural Material.—There continues to be a fair run of business in structural material, but most of the trade is in small lots. The building of small buildings and small bridges throughout the West insures a good steady run of small orders for the mills. There are a number of inquiries in the market for large quantities and it is expected some of them will result in business before a great while. A new building to be erected at Monroe and Fifth avenue in this city will require 1,100 tons. Prices are as follows: Beams and channels, 115@120c; angles, 110@120c; tees, 140@145c; plates, 110@120c.

Cleveland. Aug. 18.

(From Our Special Correspondent.)

Iron Ore.—Moderate sales of Bessemer and non-Bessemer ores have been made during the past week, and although none of them have been large the total is fully as large, as is often the case at this season of the year. Movements have been good in other ways, although the above is the reported fact. The movements toward the furnaces have been quite active, and such movement has helped solve the question of dock room. The carriage rates are the same as have been reported for some weeks, 50c. from the head of the lakes and 40c. from Escanaba. The prices paid for ore during the past week were the following: Specular and magnetic ores, Bessemer quality, \$3@3.75; specular and magnetic ore, non-Bessemer quality, \$2.50@2.75; hematite ore, Bessemer quality, \$2.50@3; hematite ores, non-Bessemer quality, \$2@2.50.

Pig Iron.—The trade in pig iron has been satisfactory during the past week, notwithstanding the fact that it has not been large. The demand for Bessemer has been small, and mill irons have been dull. Following are the quotations: Lake Superior charcoal, \$13.25; Bessemer, \$9.75@10; No. 1 Foundry, \$10.25@10.50; No. 2, \$9.75@10; No. 1 Ohio Scotch, \$10.40; No. 2, \$9.90; gray forge, \$8.50@8.75.

Pittsburg. Aug. 19.

(From Our Special Correspondent.)

Raw Iron and Steel.—All the news of the week has been of an encouraging character. The merchandise movement is steadily enlarging, industrial activity is increasing, railroad earnings show larger gains, and on all sides there is confidence in the permanency of the business improvement that is now visibly in progress.

Improvement is manifest in the iron and steel trade, although it has not realized expectation, and has not been sufficient to stimulate prices to the extent that was expected. The demand, however, has been better and the prospects are favorable for a steadily expanding business, particularly in finished products.

The supply in many departments is still greatly in excess of the demand. There is a good deal of business to come out, but buyers, as a general thing, seem content for the moment to watch developments. That the consumption is greater than it was a month ago is evidenced by the fact that September deliveries, in many cases, are being called for already. This means that additional contracts will have to be placed to cover that month's requirements. Inquiries in all departments are more plentiful than they were a week ago, and the transactions closed have approached a greater magnitude. Facts like these point to a largely increased consumption in the near future, a condition which must be reached before better prices are obtainable all around. Steel billets have advanced at several points under an increased demand and quotations for future delivery are exceedingly hard to get. The advance in steel is without doubt one which can be maintained, judging from the active demand existing for steel billets at present. It is expected that a further advance is near at hand. With steel in such improved shape, it is quite reasonable to expect that a little strength will be imparted to the pig-iron market.

Finished Material.—The demand has largely increased and prices tend upward; there is little disposition to contract at present prices. For wrought-iron and steel pipe the demand is larger;

prices, however, show no quotable change. For sheet bars the market is firm and active; we can report sales of 13,500 tons, \$16.75@17, delivered. Wire nails are firmer, with an increased demand; prices have an upward tendency.

The Latest.—Business continues to improve; reports from all sections of the South and West are favorable for a heavy fall and winter trade. At Cleveland, O., structural material advanced \$2 per ton and a further rise is expected. For Bessemer pig to day \$9.35 was refused at Valley furnace for an order of 30,000 tons and \$9.50 asked. Pittsburg Bessemer is firm, but shows no advance. Billets are firm and advanced 20@25c. Skelp iron sheared advanced 5c. Skelp steel sheared and grooved advanced 5c. Structural material is advancing here.

COKE, SMELTED, LAKE AND NATIVE ORE.		SHEET BARS.	
Tons.	Cash.	Tons.	Cash.
5,000 B. O., N. P.	\$9.70	5,000 Delivered, Pitts.	\$16.80
5,000 B. S. O., N. P.	9.65	3,000 Delivered, Pitts.	17.60
4,000 B. S. O., N. P.	9.60	2,500 Delivered, Pitts.	16.75
4,000 Bess., A. S., Val.	9.00		
2,500 Bess., N. D. P.	9.75		
1,500 M. L. prompt, P.	8.25		
1,500 Bess., A., Pitts.	9.60		
1,000 M. L. A., Pitts.	8.15		
1,000 M. L. A., S. P.	8.60		
500 Mill Iron, A. Val	7.50		
300 No. 1 F., spec., P.	10.50		
300 M. L. S., Pitts.	8.40		
300 No. 1 F., spec., P.	10.40		
300 No. 2 F., spec., P.	10.00		
150 No. 2 F., all ore, P.	10.35		
100 No. 1 Fdy., Pitts.	10.35		
75 No. 2 Fdy., Pitts.	9.50		
75 No. 1 Fdy., Pitts.	10.50		

SKELP IRON.
500 Sheared, Pitts. \$1.30 4 m.
500 N. G., Pitts. 1.07 1/2 4 m.
200 W. G., Pitts. 1.10 4 m.
100 N. G., Pitts. 1.10 4 m.

SKELP STEEL.
1,000 N. G., Pitts. \$1.00 4 m.
800 Sheared, Pitts. 1.15 4 m.
500 N. G., Pitts. 1.09 4 m.

MUCK BAR.
1,500 Neutral, prompt, Pitts. \$18.25

OLD RAILS.
1,000 I. R., gr., Pitts. \$11.50
1,000 S. R., gr., Pitts. 9.25
250 I. R., gr., Pitts. 11.75

OLD MATERIAL.
500 C. W., gr., Pitts. \$8.25
450 C. S., gr., Pitts. 8.35
300 W. S., gr., Pitts. 11.00
200 W. S., net, Pitts. 9.00
200 C. B., gr., Pitts. 5.25
200 C. W., gr., Pitts. 8.50

CHARCOAL.
50 No. 2 Fdy., Pitts. \$15.25
50 Cold Blast, Pitts. 22.00
25 Cold Blast, Pitts. 21.50
25 No. 2 Fdy., Pitts. 15.30

BLOOMS, BILLETS, SLABS.
5,000 Bill., A., N., mill. \$14.90
2,500 Bill., S., O., mill. 14.50
1,250 Bill., A., mill. 14.35
1,200 Bill., A., S., mill. 14.6
1,000 Bill., S., mill. 14.4
1,000 Bi. L. O., N., mill. 14.5
500 Bill., A., S., mill. 14.2
500 Bill., A., mill. 14.2

Philadelphia. Aug. 20.
(From Our Special Correspondent.)

Pig Iron.—The feature of the iron market this week has been the rejection of several offers made by users of pig iron. This was a blank surprise and when it was noised about it had more effect than many large sales. Considering the prices offered for iron nothing else could have been expected. The tone of the market is steadily improving, but there is no wild rush for iron. The heavy production protects us. Besides makers are now willing to take orders for 30 to 60 days' delivery at moderate margins. Some parties whose offers were declined late last week have bought smaller lots at maker's prices. Foundrymen are all booking new business and this is having an almost instantaneous effect. Since Monday, considerable foundry iron has been bought. The average selling price is \$12, though up to \$12.50 is asked. For No. 2 X \$11 is the average, though a few fine brands bring more. Makers of it are trying to scatter it among a good many buyers, even shading prices to accomplish this purpose. Plain No. 2 is worth \$10@10.50. Forge iron is gaining in strength, though quotations continue \$9.75@10.25. We hear very little about basic iron, but it is to be had at \$10.50. Low phosphorus is \$14.50. Bessemer is picking up fast at \$11.50, which on a large purchase is shaded 25c.

Steel Billets.—The widespread decline of stocks of billets coupled with the evidences of a rapidly advancing demand in the West occasioned quite a tepid tempest here in billets. The result is there is a stronger feeling and it will probably remain. One or two parties are quoting early deliveries at \$17. All buyers are obliged to do with rather small purchases. They admit the danger of forcing the market upon themselves. Business is being done at \$16.50.

Merchant Bar.—Until our mills all have a fair amount of reliable business booked there will be no allowance in force on medium and large orders. The current demand is for present requirements for the most part. Some buyers are looking ahead and millmen say they are wise. Store sales are made at an advance over July prices averaging \$3 per ton.

Pipes and Tubes.—The pipe mills and also the tube mills are getting more work, but it is not sufficient to satisfy.

Sheets.—During the past six days a good deal of new business came in and more is promised. Millmen are now calculating on running full capacity by September, though a portion of the production will be for the store and warehouse racks.

Merchant Steel.—The dealers are getting more liberal supplies from the mills and general trade in merchant steel is picking up. Hardware factories are also doing better. Wagon shops are busy.

Plate and Tank.—While we are not favored with details as to purchasers, quantities and prices, it can be said there is a general expansion in plate iron business. The grasping for work keeps prices low.

Structural Iron.—To-day an advance was made of one-tenth on early deliveries and it is said it will

be extended to later deliveries. In fact, a general improvement in structural iron prices is said to be at hand. A great deal of work is coming in and prospects are good. Angles are 115c.; beams and channels, 130c.

Steel Rails.—There are some inquiries and negotiations in progress with South Atlantic roads, through their New York managers, and an increased tonnage of standard sections will soon be sent to two of our mills.

Old Rails.—Local handlers are interested to some extent in securing rails for export. The local demand is somewhat better. Quotations for iron ore, \$11.50; steel, \$10.50.

Scrap.—All scrap dealers report a heavier movement in most kinds. Turnings and borings have been picked up. Old iron axles are wanted and are quoted at \$13; steel axles, \$11.50; railroad scrap, \$12; heavy steel scrap, \$10.50; clippings, \$10;

METAL MARKET.

NEW YORK, Friday Evening, August 20, 1897.
Gold and Silver.

Price of Silver per Ounce Troy.

August.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.	August.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.
14 1/8%		25 1/2	55	.425	18	4.85 1/2	24 1/2	52 1/2	.405
16 1/8%		25 1/4	54 1/2	.420	19	4.85 1/4	24 1/4	52	.401
17 1/8%		25 1/2	54 1/2	.420	20	4.85 1/2	24 1/2	52	.401

On continued flatness of demand, silver has kept on its downward course, with spasmodic reaction. While the total exports from London this year are about the same as for the corresponding period last year the shipments to China and the Straits are about 80% less, leaving India to absorb about \$1,000,000 more than the year before. This extra amount has only been sold to India by continual concessions in price. With the prevailing conditions unchanged, the quotation is likely to fall until production is affected, when the price will reach an equilibrium on the basis of supply and demand. The market closes weaker, at 24 1/2 d. in London, a drop below the day's average.

The United States Assay Office in New York reports the total receipts of silver at 103,000 oz. for the week.

Average Monthly Prices of Silver

in New York and London, per ounce Troy, from January 1st, 1897, and for the years 1896 and 1895.

Month.	1897.		1896.		1895.	
	Lon- don. Pence.	New York. Cents.	Lon- don. Pence.	New York. Cents.	Lon- don. Pence.	New York. Cents.
January	29.74	61.73	30.69	67.13	27.36	59.69
February	29.68	64.67	31.01	67.67	27.47	59.90
March	28.96	63.06	31.34	68.40	28.33	61.98
April	28.26	61.85	31.10	67.92	30.39	66.61
May	27.86	60.42	31.08	67.88	30.61	66.75
June	27.8	60.10	31.46	68.69	30.47	66.61
July	27.36	59.61	31.45	68.75	30.48	66.75
August			30.53	67.34	30.40	66.61
September			30.19	65.68	30.54	66.90
October			29.68	65.05	30.89	67.64
November			29.46	64.98	30.79	67.42
December			29.70	65.24	30.40	66.47
Year			30.67	67.06	29.53	65.28

The New York prices are always per fine ounce, or ounce of pure silver; the London quotation is per standard ounce, or for metal .925 fine.

Gold and Silver Exports and Imports

At all United States ports, July, 1897, and years from January 1st, 1897 and 1896:

	Coin and bullion.		In ores.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
GOLD					
July	\$5,460,119	\$592,147	\$2,750	\$345,843	E. \$4,424,879
1897.	30,462,123	1,409,065	95,948	2,737,029	E. 23,391,947
1896.	34,844,692	26,672,625	79,256	939,974	E. 27,310,349
SILV.					
July	4,701,874	1,013,391	180	1,579,315	E. 2,113,448
1897.	32,390,874	5,432,901	259,330	12,245,365	E. 17,219,938
1896.	33,601,881	6,783,537	370,575	10,653,897	E. 18,388,125

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York
For the week ending August 20th, 1897, and for years from January 1st, 1897, 1896, 1895, 1894:

We'k	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1897.	\$11,310	\$421,928	\$915,825	\$36,362	E. \$435,835
1897.	\$28,056,476	3,209,341	26,088,974	1,333,133	E. 49,602,982
1896.	40,369,448	17,634,198	21,990,732	1,795,945	E. 45,930,037
1895.	43,798,828	25,237,873	26,353,498	1,172,221	E. 43,682,232
1894.	81,869,435	12,791,494	23,566,525	1,099,062	E. 91,545,401

All the gold and silver exported went to London.

The gold and silver imported came chiefly from Central and South America.

FINANCIAL NOTES OF THE WEEK.

The speculative markets have been strong this week, with a general tendency to operate for a rise, and a disposition to look for improved conditions. This movement has been strongly supported by the state of the wheat markets and the active demand for grain. Wheat has continued to rise in price, the New York quotations going over \$1 per bushel for future deliveries, while on one day cash wheat actually touched \$1.06 on a few transactions. Actual business also shows some gain, although it is far behind the speculative movement. There is undoubtedly an increase in the volume of trade, and general belief in a further growth. In some directions this finds manifestation in the opening of factories, but in others changes are still slow. Upon the whole, however, there is progress to be recorded and a more confident feeling for the future.

There is still some uncertainty about gold movements. In view of the heavy buying of wheat for export and of the comparatively light imports of merchandise, there would seem to be some probability of gold imports next month. On the other hand, discount rates are going up abroad, and the demand for gold from Russia and Austria continues large, with a further prospective demand for Japan when the next installment of the indemnity due from the Chinese government is paid. It is evident that all possible steps will be taken in London to limit the outflow of gold. It was generally expected that the Bank of England would raise its discount rate this week, but the directors' meeting passed without action.

Exports of merchandise into the United States in July show an increase of \$3,694,696, as compared with July, 1896, and imports an increase of \$1,579,937. For the seven months ending July 31st the foreign trade of the United States is given by the Bureau of Statistics of the Treasury Department as below:

	1896.	1897.
Exports	\$312,329,786	\$561,174,647
Imports	421,764,119	566,494,902
Excess, exports	\$90,565,677	\$54,679,745
Add excess of exports, silver	15,219,938	15,219,938
gold	23,391,947	23,391,947
Apparent balance		\$93,291,630

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

The subcommittee appointed by the executive committee of 15 selected at the sound money conference in Indianapolis held a session at Saratoga, N. Y., on Wednesday. There were present Hugh H. Hanna, of Indianapolis, chairman; H. H. Kohlsaat, of Chicago; J. W. Pr es, of Salem, N. C.; George Foster Peabody, of New York; A. E. Willson, of Louisville, and J. F. Hanson, of Macon, Ga. The currency question was thoroughly discussed, and the recommendation of President McKinley that Congress should appoint a committee to consider the whole currency question having failed to find favor in the Senate, his alternative suggestion that such a committee should be appointed by this conference was acted upon. The committee consists of 11 members, representative of all interests in relation to the currency. It was decided to withhold their names until their acceptance had been secured. The subcommittee appointed John J. Mitchell, of Chicago, treasurer, and selected a finance committee consisting of Mr. Mitchell, J. F. Hanson, of Georgia, and Alexander E. Orr, of New York. It then adjourned until September 10th.

The statement of the United States Treasury, on Thursday, August 17th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	Aug. 12.	Aug. 19.	Changes.
Gold	\$141,150,724	\$142,475,698	I. \$924,974
Silver	31,094,811	28,135,414	D. 2,959,397
Legal tenders	30,339,817	28,066,919	D. 2,272,898
Treasury notes, etc.	31,454,880	31,059,842	D. 395,038
Totals	\$234,040,232	\$229,727,903	D. \$4,312,329

Treasury deposits with national banks amounted to \$17,201,963, a decrease of \$266,695 during the week.

The American Bankers' Association held a very successful meeting at Detroit this week, which was largely attended. Mr. Joseph C. Hendrix, of New York, was chosen president, and Mr. George H. Russell, of New York, first vice-president.

The statement of the New York banks—including the 66 banks represented in the Clearing House—for the week ending August 14th gives the following totals, comparisons being made with the corresponding weeks in 1896 and 1895:

	1895.	1896.	1897.
Loans and discounts	\$511,275,209	\$464,918,200	\$555,170,800
Deposits	577,223,300	467,393,740	630,589,900
Circulation	13,254,800	15,789,800	13,185,500
Reserve:			
Specie	65,689,200	46,863,000	92,612,300
Legal tenders	119,883,500	79,855,600	103,917,900
Total reserve	\$185,572,700	\$126,718,600	\$196,530,200
Legal requirement	144,375,825	116,818,425	157,617,750
Surplus reserve	\$41,206,875	\$9,900,175	\$38,912,450

Changes for the week this year were increases of \$5,008,400 in loans, \$482,500 in specie, and \$4,357,600 in deposits; decreases of \$2,119,400 in surplus reserve, \$1,512,500 in legal tenders, and \$199,200 in circulation.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding dates last year:

Banks.	1896.		1897.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Asso.	\$46,863,000	.....	\$92,612,300	.....
England	237,374,000	.....	180,293,516	.....
France	415,560,205	\$250,727,729	407,025,200	\$245,240,500
Germany	228,200,000	.....	215,980,000	.....
Austro-Hun.	142,225,000	61,490,000	188,283,500	62,964,000
Netherlands	13,178,000	35,086,000	13,153,000	35,183,000
Belgium	20,280,000	.....	21,491,600	.....
Spain	42,028,000	56,811,000	44,597,000	54,418,000
Italy	60,625,000	10,350,000	58,715,000	10,910,000
Russia	447,370,000	.....	484,735,000	.....

The return for the Associated Banks of New York is of date August 14th; all the others are of August 17th, except the Bank of Italy, June 20th, and the Bank of Russia, July 1st-13th. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England and the Bank of Russia report gold only. The Imperial Bank of Germany and the Belgian National Bank do not report gold and silver separately.

Shipments of silver from London to the East for the year up to August 5th are reported by Messrs. Pixley & Abell's circular as below:

	1896.	1897.	Changes.
India	\$2,175,578	\$3,149,420	I. \$973,842
China	574,413	124,058	D. 450,355
The Straits	545,686	111,305	D. 434,381
Totals	\$3,295,677	\$3,414,983	I. \$119,316

Arrivals for the week this year were \$211,000 in bar silver from New York. Shipments were \$283,820 in bar silver to India and \$12,100 in Mexican dollars to Penang, \$100,920 in all.

Indian exchange continues strong, and the full amount of Council bills offered in London was taken at an average price of 15 1/2d. per rupee. The amount of bills offered has been reduced to 20 lakhs of rupees weekly.

The report of the Chilean Mint, for the year 1896, shows that the purchases for the year amounted to \$752,032 (Chilean) in gold, and \$12,907,669 in silver. At the close of the year the mint held a total of \$8,106,562 in specie and bullion, of which \$271,434 was in gold, and the balance in silver. The gold coinage for the year was \$2,980,600 in condones, \$11,568,320 in doblones and \$118,945 in escudos, a total of \$14,667,925. The silver coinage was \$1,556,270 in pesos, \$44,830 in 20-cent pieces and \$256,097 in 10-cent pieces, a total of \$1,857,197. The Treasury coinage was \$4,311 in 2 1/2-cent pieces.

Prices of Foreign Coins.

The following are the latest market quotations for the leading foreign coins:

	Bid.	Asked.
Mexican dollars	\$.40	\$.42 1/2
Peruvian sole and Chilean pesos .....	.39	.49
Victoria sovereigns	4.85	4.90
Twenty francs	3.85	3.90
Twenty marks	4.74	4.80
Spanish 25 pesetas	4.78	4.85

Other Metals.

Copper.—As a result of the better demand, and a material improvement in the statistical position, the market for this metal has improved considerably. The United States mines, during the month of July, produced only 15,300 tons, as against 19,600 in June. The exports for last month were 13,700 tons, leaving but 1,600 tons for domestic consumption. It seems hardly possible that consumption here, which must have been very poor during July, should not now improve in view of the more favorable conditions which are surrounding us. Inasmuch as there are no indications of a falling off in European consumption, it stands to reason that an improvement here would probably be accompanied by better values. Transactions in copper during the past week have been of a much larger magnitude than for some time past. It is reported that the Calumet & Hecla Company have made a large sale at 11 1/2c., the quantity involved said to be 10,000,000 lbs. All the other companies appear to have found a ready market at 11 1/2c., and are now holding for higher prices. Electrolytic copper is also in better demand, cakes, bars or ingots being quoted at 10 1/2c. @ 11c., cathodes at 10 1/2c. @ 10 1/2c. Casting copper has shared in the improvement, and must now be quoted at 10 1/2c. @ 10 1/2c.

The foreign market, which early in the week advanced to \$49 for spot, has since eased off to \$48 1/2s. 6d., but closed at the highest, \$49 for spot, and \$49 5s. for three months. Manufactured sorts are quoted: English tough, \$51 5s. @ \$51 10s.; best selected, \$52 @ \$52 5s.; strong sheets, \$50 5s.; India sheets, \$51 @ \$55; yellow metal sheets, 5d.

The following figures give the production (in tons of 2,240 lbs.) of copper in the United States, and also by the chief foreign mines, and the exports from the United States for July and the seven months ending July 31st:

	July.	Seven months.	
		1896.	1897.
Production fine copper, long tons:	1897.	1896.	1897.
Reporting mines in U. S.	14,244	99,575	117,895
Pyrites and outside sources, U. S.	1,100	8,460	6,100
Reporting foreign mines	7,327	50,102	51,590
Total production, tons	22,671	158,077	175,585
Exports from U. S., fine copper	13,728	69,203	78,239

The total United States production for the seven months was 123,995 tons, an increase over 1896 of 16,020 tons. The exports show an increase of 9,036 tons over last year.

Tin.—The lower silver prices had quite a depressing effect on values, but inasmuch as a decrease in the production amounting to several thousand tons is confidently expected for this year, the decline was not as pronounced as would otherwise have been the case. Demand on the part of consumers, especially for prompt delivery, continues very satisfactory indeed, and most of the tin is shipped away as fast as it arrives. The ruling quotations are about 13:80 @ 13:85c. for spot, and 13:70 @ 13:75c. for futures.

The London market opened at \$62, declined to \$61 7s. 6d., but later on rallied, and the closing quotations are cable as \$61 15s. @ \$61 17s. 6d. for spot; \$62 5s. @ \$62 7s. 6d. for three months.

Lead.—The improvement reported last week has made further progress. While refiners do not as yet show more disposition to enter the market, consumers have bought more freely and higher prices have again been established, 3 1/2c. being freely bid at the close.

The foreign market has advanced somewhat, the quotations being cable at \$12 11s. 3d. @ \$12 13s. 9d. for Spanish and \$12 13s. 9d. @ \$12 16s. 3d. for Spanish.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Since our last report the market has improved perceptibly. Sales of soft Missouri have been made at 3:65c. and desilverized at 3:67 1/2c. The market closes tonight much stronger and higher prices are asked.

Spelter is rather dull and neglected. While production continues on quite a heavy scale, consumption leaves a great deal to be desired. Quotations remain unchanged at 4:05 @ 4:07 1/2c. St. Louis.

The foreign market is somewhat firmer at \$17 2s. 6d. for ordinaries and \$17 5s. for specials.

Antimony.—The demand seems to be quite satisfactory. However, quotations remain unchanged at 8c. for Cookson's; 7 1/2c. for Hallett's; 7 1/2c. for U. S. French Star, and 7 1/2c. for Japanese.

Imports and Exports of Metals.

Port.	Week, Aug. 12.		Year, 1897.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum, boxes	134	.....	2,422	.....
Antimony ore .....	.....	.....	.....	902
" regulus .....	.....	.....	.....	471
Brass, old	53	.....	506	160
Copper, fine	\$1,993	58	27,993	5,394
" matte .....	.....	.....	4,780	161
" sulphate	10	.....	4,652	.....
Ferro-chrome .....	.....	.....	.....	5
Ferro-manganese .....	.....	.....	2,213	62
Iron ore .....	.....	.....	.....	9
Iron, pig, bar, rod	709	93	9,715	2,682
" pyrites .....	.....	.....	.....	5,370
Lead, antimonial .....	.....	.....	.....	100
" bullion	\$1,386	921	24,204	48,365
Manganese ore .....	.....	.....	.....	3,545
Nails	157	.....	367	.....
Nickel	67	.....	886	115
Rails, old .....	.....	.....	7,629	.....
Spiegeleisen .....	.....	95	15,355	11,608
Steel billets, rods	12	414	15,367	13,088
Tin .....	.....	1,510	1,127	5,639
" dross	7	.....	134	41,793
" and black plates, boxes .....	.....	15,527	.....	211,837
Zinc .....	.....	.....	2,164	.....
" dross	70	.....	238	.....
†Baltimore.				
Brass scrap	8	.....	9	.....
Chrome ore .....	.....	.....	10	5,511
Copper, fine	961	.....	24,756	.....
" sulphate .....	.....	.....	1,610	.....
Ferro-manganese .....	.....	.....	3,314	385
Ferro-silicon .....	.....	.....	.....	231
Iron ore	6,203	.....	173,368	.....
" pig, bar, etc.	397	180	2,670	.....
Lead .....	.....	.....	120	500
Manganese .....	.....	.....	.....	6,459
Spiegeleisen .....	.....	.....	.....	931
Steel	691	2,710	4,015	.....
" wire	377	1,613	9,745	.....
Tin .....	.....	.....	770	5,744
" and black plates, boxes .....	.....	.....	.....	19,227
Zinc .....	.....	.....	63	48
" dross .....	.....	129	115,202	.....
‡Philadelphia.				
Antimony .....	.....	.....	.....	2,712
Chrome ore .....	.....	.....	.....	300
Copper ore .....	.....	.....	.....	2,915
Ferro-manganese .....	.....	.....	.....	48
Iron ore .....	.....	3,060	135,202	.....
Iron pyrites .....	.....	.....	.....	1,500
Manganese ore .....	.....	.....	.....	79,865
Tin .....	.....	.....	.....	449
" and black plates, boxes .....	.....	1,281	.....	43,148

*New York Metal Exchange returns. †From our Special Correspondent. ‡Week ending Aug. 12. §Week ending Aug. 19.

Nickel.—Business continues quiet, and no change in prices can be reported. We quote for ton lots 33½¢@36¢. per lb., and for smaller orders 35½¢@38¢. London prices are 14@16d. per lb., according to size of order. The London price is about on a parity with New York, allowing for the duty of 6¢. per lb.

Platinum.—Prices are firm at \$14@15 per oz. New York. The London quotation is 55s.@56s. per oz.

For chemical ware, best hammered metal, Messrs. Eimer & Amend, New York, furnish the following quotations, the prices given being respectively for orders of over 250 grams, for orders of over 100 grams and less than 250 grams, and for orders of less than 100 grams: Crucibles and dishes, 34¢, 55¢, and 56¢. per gram. Wire and foil are 52¢, 53¢. and 54¢. per gram.

Quicksilver.—The New York quotation has been again reduced \$1 and is now \$38 per flask. The London price has also been reduced and is now at £6 17s. 6d., with £6 16s. 3d. quoted from second hands.

Quicksilver receipts at San Francisco in July were 1,572 flasks. For the seven months ending July 31st they were 8,881 flasks, against 18,316 in 1896, and 19,168 in 1895. Exports for the seven months were: New Zealand, 20 flasks; Central America, 870; Mexico, 2,144; British Columbia, 38; total, 3,072 flasks, against 9,533 flasks in 1896, when the shipments included 2,500 flasks to New York and 3,000 flasks to Hongkong. Overland shipments for first six months of 1897 were 6,948 flasks. No returns for July.

The Minor Metals.—Quotations are given below or New York delivery:

Aluminum:	Bismuth, 7 lb.	\$1.50@1.80
No. 1, 98% ingots, 37@47c.	Phosphorus, 7 lb.	50¢@55c.
No. 2, 91%	Tungsten	70c.
Ingots, scrap,	Tungstic acid,	45c.
Rolled sheets,	Ferro-tungsten, 60%	60c.
Alum.—Nickel,		35¢@40c.

Variations in price depend chiefly, on the size of the order.

Average Monthly Prices of Metals

In New York, for the years 1897 and 1896; in cents per pound.

Month.	COPPER.		TIN.		LEAD.		SPELTER.	
	1897.	1896.	1897.	1896.	1897.	1896.	1897.	1896.
Jan.	11.75	9.87	13.44	13.02	3.04	3.08	3.91	3.75
Feb.	11.92	10.64	13.59	13.44	3.28	3.19	4.02	4.03
March	11.80	11.03	13.43	13.30	3.41	3.14	4.12	4.20
April	11.48	10.98	13.31	13.34	3.32	3.07	4.13	4.07
May	11.03	11.15	13.44	13.51	3.26	3.05	4.21	3.98
June	11.11	11.67	13.77	13.59	3.33	3.03	4.21	4.10
July	11.11	11.40	13.89	13.63	3.72	2.96	4.32	3.97
August	10.98	10.98	13.49	13.49	2.73	2.73	3.76	3.76
Sept.	10.66	10.66	13.15	13.15	2.77	2.77	3.60	3.60
October	10.66	10.66	12.94	12.94	2.80	2.80	3.72	3.72
Nov.	11.23	11.23	13.09	13.09	2.96	2.96	3.99	3.99
Dec.	11.28	11.28	12.96	12.96	3.04	3.04	4.14	4.14
Year	10.88	10.88	13.29	13.29	2.98	2.98	3.94	3.94

CHEMICALS AND MINERALS.

(For current prices of chemicals, minerals and rare elements see page 240.)

New York. Aug. 20.

Heavy Chemicals.—The market just now is very strong, and even large buyers cannot obtain any shading of current rates. Imported stocks are, however, large, and it will take some time to work them off, and until they begin to fall prices are not likely to increase very much. The higher price quoted for chlorate of potash is for goods imported under higher schedule of duty. Quotations are as follows: Caustic soda, 60%, \$2.22½@2.42½; 70@78%, \$2@2.25 per 100 lbs. Alkali, domestic, 58%, 60c. for 50-ton lots and over, and 70@80c. for smaller quantities; 48%, \$1@1.20 for jobbing lots. Carbonated soda ash, 48%, 90@95c. per 100 lbs.; 58%, 75@80c. per 100 lbs. Bleaching powder, prime brands, \$1.90@2.10; Continental F brand, \$1.85@1.90; other brands, \$1.80@2.00 per 100 lbs. Bicarb. soda, English, 1.75@2c. per lb.; American, bulk, \$1.50@1.50 per 100 lbs., according to brand. Sal-soda, English, 65@67½c. per 100 lbs.; American, 65@70c. per 100 lbs. Chlorate of potash, \$9.50@10.50 per 100 lbs.

Acids.—The promised demand has matured, and there has been a marked advance during the past few days.

The price of sulphur is up \$2 a ton. After January 1st there will be an advance on prices on all contracts; this is not quite decided upon as yet, but is being talked of by the more influential dealers and is likely to come to pass. There is 25% more business doing than at a corresponding time last year, but as compared with more distant periods its volume is as yet almost insignificant. Prices are held to stiffly, and the big buyers find that they cannot obtain the favors that have been vouchsafed to them during the last year.

Prices are per 100 lbs. in New York and vicinity in lots of 50 carboys or over. We quote as follows: Acetic acid, commercial No. 8 (in barrels), \$1.40 @ \$1.50; in carboys, \$1.50@1.65; redistilled, 28% in bbls., \$1.70@1.80; in carboys, \$1.90@2.05. Muriatic acid, 18%, 75@85c.; 20%, 85@95c.; 22%, \$1.15@1.25, according to make and quantity. Nitric acid, 36%, \$3.50@4.40; 40%, \$4@4.50; 42%, \$4.50@5.50. Oxalic acid, \$7 ex-dock and \$7.25 ex-store. Mixed acids, according to mixture. Sulphuric acid, 66%, 85c.@1 in carload lots, 10@15c. higher for small quantities.

Chamber acid, \$6@6.50 per ton at factory. Blue vitriol, \$3.75@4, according to grade and order.

Brimstone.—The market is absolutely dead. During the week two vessels have arrived, the *Victoria* and the *Pouhattan*; the former with 800 tons, and the latter with 500 tons.

We quote: Spot sulphur, for best unmixed seconds, \$20½; to arrive, \$20½. Best mixed thirds, spot, \$19.50; ditto to arrive.

Fertilizing Chemicals.—There is a wonderful demand for material, considering that this is usually a slack time of the year. Sulphate of ammonia is selling at 2.10c. for shipment, and 2.25c. for spot; bone, \$2.@2.05 per 100 lbs. Dried blood, high grade Western, \$1.85@1.87½ per unit New York; \$1.65@1.70 per unit f. o. b. Chicago. Azotine, \$1.70@1.75 basis New York. Concentrated phosphate (30% available phosphoric acid), 57½c. per unit. Acid phosphate, 13½@15%, av. P₂O₅, 54@65c. per unit at sellers' works in bulk. Dissolved bone black, 17½@18% P₂O₅, 80c. per unit. Acidulated fish scrap, \$10@10.50, and dried scrap \$18@18.50, f. o. b. fish factory. Tankage, high grade, \$14.50@14.75 per ton; concentrated, \$1.35@1.40 per unit, f. o. b. Chicago; New York, \$18.50; low grade, \$16.50@17. Bone tankage, \$19@20; ground bone, \$21@23. Bonemeal, \$19.50@22.50.

Sulphate of Potash: 90%, New York and Boston, \$1.90½; Philadelphia, Baltimore and Norfolk, \$2.01; Southern ports, \$2.03.

Double Manure-Salt: Quotations for 48@49%, less than 2½% chlorate, are 1.01@1.01½c., to arrive, and 1.02@1.03c. on spot; basis of 48%. High grade, 90@95% sulphate of potash, 1.96½@2.00½c. to arrive; basis of 90%. In bulk 24@36%, 36½@37½c. per unit O. P.

Muriate of Potash: We quote: New York and Boston, 1.75@1.78c. Philadelphia and Norfolk, 1.76@1.79½c.; Charleston, Savannah, Wilmington and New Orleans, for 80@85% basis of 80%, 1.78½@1.81c. in lots of 50 tons and upward.

Kainit.—Invoice weights, as taken at port of shipment, per ton of 2,240 lbs., testing 12.1% actual potash, equivalent to 23% sulphate of potash, \$3.80 @ \$3.90.

Nitrate of Soda.—The market for this chemical is a very speculative one, and prices are apt to fluctuate somewhat rapidly. During the week that is closing demand has been decidedly light, and in consequence there is a yet further decline in price to chronicle. The general quotation now is 1.65c.

Charleston, S. C.

(From Our Special Correspondent.)

The shipments of phosphate rock from this port for the month of July, 1897, are given in the accompanying summary. Shipments of 1896 and 1895 are added for comparison.

	1895.	1896.	1897.
Crude rock (2,240 lbs.)	11,144	8,422	5,720
Ground rock (2,000 lbs.)	301	.....	.....

It will be noticed that the falling off in June has been continued through the month of July.

Liverpool.

Aug. 10.

(Special Report of Joseph P. Brunner & Co.)

Although the chemical trade lacks animation, there is a very steady tone almost generally.

Soda ash in light demand. Quotations depend upon export market, and nearest spot range for tierces may be called about as follows: Leblanc ash, 48%, £1 5s.@1 10s. per ton; 58%, £1 10s. @£1 15s. per ton net cash; ammonia ash, 48%, £3 7s. 6d.@£4 1s. per ton; 58%, £3 12s. 6d.@£4 5s. per ton, net cash. Bags 5s. per ton under price for tierces. Special terms for American business. Soda crystals in request, and prices for barrels range from £2 7s. 6d.@£2 17s. 6d. per ton, less 5% according to market, while an allowance of 7s. per ton is made if taken in bags. Special quotations for American orders.

Caustic soda is not active, but there is a fair trade passing, and makers are firm in their ideas. We quote spot range, as to market, as follows: 60%, £6 2s. 6d.@£6 5s. per ton; 70%, £7 2s. 6d.@£7 5s. per ton net cash; 74%, £8 2s. 6d.@£8 5s. per ton; 76%, £8 15s.@£9 per ton, net cash.

Bleaching powder is meeting with rather more inquiry, but without much actual business resulting, so far. We quote hardwood packages, £6 12s. 6d.@£6 17s. 6d. per ton net cash, as to destination.

Chlorate of potash dull, at 3¾@4d. per lb. Bicarb. soda is selling at £6 15s. per ton, less 2½% for the finest quality in 1-cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia steady, at about £7 15s.@£8 per ton, less 2½% for good gray 24@25% in double bags f. o. b. here, as to quality.

Nitrate of soda quiet, at £7 17s. 6d.@£8 per ton, less 2½% for double bags f. o. b. here, according to quantity and quality.

MINING STOCKS.

Complete quotations will be found on pages 236, 237 and 238 of mining stocks listed and dealt in at:

Aspen.	Helena.	London.
Baltimore.	Los Angeles.	Mexico.
Boston.	New York.	Paris.
Butte.	Philadelphia.	Rossland.
Cleveland.	Pittsburg.	Shanghai.
Colo. Springs.	Salt Lake.	Valparaiso.
Denver.	San Francisco.	

New York. Aug. 20.

The local mining stock market has experienced a very dull week with practically no business doing,

which condition has been caused chiefly by the activity in the general stock and wheat markets which have absorbed all speculation. Another factor in the market has been the recent drop in silver bullion, which prevents intending purchasers of silver stocks from investing.

On the Consolidated Stock and Petroleum Exchange little or no attention has been paid to mining stocks, which has left most business transacted to the Mining Exchange. The latter does not seem to have been benefited, as the trading done during the past week would indicate.

The Comstocks have been almost lost sight of; among transactions noted are 100 shares of Comstock Tunnel at 4c.; \$1,000 bond of Comstock Tunnel at 4%; Consolidated California & Virginia declined from \$1.30 on August 14th to \$1.10 on August 17th, but closed at \$1.20 on sales of 955 shares. Gould & Curry records one sale of 200 shares at 35c. Mexican also appears with sales of 500 shares at 20@25c. Of the remaining companies on this lode Sierra Nevada sold at 75c., Union Consolidated at 25c., Utah Consolidated at 9@12c., and Yellow Jacket at 30@32c.

Of the California stocks traded in, Quicksilver, common, appears with 3,550 shares at \$3@4, the latter being the closing price. Quicksilver, preferred, shows sales of 1,040 shares at \$13@10, Standard Consolidated appears on the list with one sale of 100 shares at \$1.75. Fortuna was active and records sales of 3,400 shares at \$10.25@11. Brunswick Consolidated remains steady at 20@21c., with sales of 1,500 shares.

The Colorado contingent other than Cripple Creek is represented by Belmont at \$15@16, 800 shares changing hands; Brece, with 300 shares at 33c; Catalpa, 1,000 shares at 10c.; Chrysolite, 100 shares at 12c.; Leadville Consolidated, 1,000 shares at 10c., and Mollie Gibson at 18@25c., with sales of 1,800 shares.

Horn Silver, of Utah, appears, and we record sales of 1,000 shares at \$1.50. The Cripple Creek stocks traded in during the past week are as follows: Alamo, Annette, Argentine J., Cannon Ball, Creede & Cripple Creek, Cripple Creek Consolidated, Elkton, Ferry R., Garfield G., Gold Magnet, Jack Pot, Jefferson, Miami, Mt. Rosa, Pharmacist and Work.

The great Ontario mine, at Park City, Utah, which is now indefinitely closed because there is no longer a profitable market for the silver, was discovered on June 16, 1872, by Herman Buden. The piece of cropping that attracted Buden's attention was no larger than a man's hat. Rich ore was found from the grass roots, and within a month Mr. Chambers was called upon to examine the new mine for the late Senator Hearst. His report was favorable, and on August 21st, of the same year it was purchased by Senator Hearst for \$30,000. Since that time the Ontario has produced over \$31,000,000 in gold and silver, and has paid dividends amounting to \$13,445,000. Even with this immense drain it has at no time exhibited a sign of exhaustion, and those familiar with its 80 or more miles of underground workings say that its future would have been greater than its past had the favorable conditions that existed in the silver market during the early years of its life not been interrupted.

Boston.

Aug. 19.

(From Our Special Correspondent.)

The market for copper stocks this week has been active and strong, owing to the firmness of ingot copper and the trading for higher prices in some of the specialties, notably Butte & Boston and Kearsarge. The former advanced from \$20½ to \$22½ under heavy sales, and with slight reactions the latter touched \$23, the highest price for many months. This price was not, however, maintained, falling off in later dealings to \$22. Butte & Boston closed fairly strong at \$28½. Calumet & Hecla broke off former records by selling up to \$425 on the rumor that increased dividends were probably this year. Later the stock sold off to \$417½, recovering to-day to \$420. Osceola continues in favor and good buying orders carried it up from \$37 to \$39½, with latest sales at \$33½. Quincy advanced to \$120, closing at \$119½, a net gain for the week of \$1 per share. Tamarack sold up from \$135 to \$140, but later declined to \$136, and closed at \$137. Boston & Montana has ceased in a great measure to be a speculative stock, being held now largely for investment. It sold at \$140½ early in the week, but orders to buy at market carried it up to \$145½, and it closed at \$145. Old Dominion has held its own at \$19½@21½, with very little change in quotations; the closing price was \$19½. Tamarack, Jr., is also steady, with sales at \$19½@20½. Centennial was active at an advance from \$8 to \$9½, with closing sales at \$9½. Atlantic touched \$25, but closed at \$24½, same as last week. Franklin sold at \$16½, but lost the fraction later. Wolverine seems to be gaining in favor, and there have been large dealings this week on favorable reports, causing an advance from \$12½ to \$14; later it sold at \$13½. Tecumseh sold at \$3 in a small way. Arnold was strong and advanced from \$3½ to \$3½ on limited sales. Allouez sold at 75c. for a small lot.

The gold stocks have shown more activity and better prices generally. Pioneer early in the week sold at \$4½. The good report from the mine to-day started buying, which caused an advance to \$5½, closing at \$5½. Santa Ysabel is growing in favor, and it has been quite active, selling at from \$14 to \$15½, with closing sales at \$15½. Gold Coins was

without feature, sales at \$3. Merced sold at \$5½, declined to \$4¼, and rallied to \$4¾, closing sale. The market closed fairly strong, with a good demand for stocks.

Cleveland. Aug. 18.

(From Our Special Correspondent.)

The mining stock market weakened somewhat during the past week. While the holders of Chandler increased the value of their stocks in their own estimation, Cleveland Cliffs stock dropped; Lake Superior followed, and Minnesota declined \$2. Pittsburg & Lake Angeline, which was held at \$70 last week, is now offered for sale at \$63. Republic has declined 50c. per share during the past week.

Salt Lake City. Aug. 14.

(From Our Special Correspondent.)

Silver's collapse caused the expected decline and occasioned considerable local trade. But few outside orders are as yet reported, though a change in this regard may follow the reopening of the exchange next week, after the summer vacation. Many believe bottom is reached, though a further drop in silver can hardly strengthen the market, in spite of the general excellent physical condition of the mines.

Ajax supplied the only flurry of the week, which became the object of a lively demand toward the close. Inquiry shows it to be due to a move to fill up in spots where the stock is short, and not to any change in the mines or the company. The advance made, however, gives signs of permanency, and before much of a reaction can be accomplished something tangible will be in evidence as to re-organization and mine development. Bullion-Beck directors met on the 10th and passed the dividend which had been almost promised. Buckeye was active, the result of favorable mine developments and the readiness with which the assessment was met. Of Centennial-Eureka there is nothing to say more than that the stock sold down and there is a prevailing belief operations at the mines will be curtailed, if not entirely suspended.

Daly and Daly-West are both without movement. At the former, operations are rapidly drawing to a close and another week will probably see the fires drawn. Daly-West has been closed down for a month, with no hope of resuming until silver brings a much better price. An assessment on Eagle has rather strengthened the stock, as it presages operations.

Geyser-Marion does not recover strength and the small-block sales are recorded at \$1.20. The wholesale unloading of 100,000 shares—one-third of the capital stock—from the inside, has not yet been satisfactorily accounted for. Mammoth sold as low as \$1, with plenty of sacrifice stock in sight. The proportion of gold in this company's product exceeds 70% of the value, so the low silver market does not apply; yet the stock is without strength.

Mercur is almost without fluctuation and is beyond question the strongest stock on this market.

Ontario is the lowest in 26 years, a result of the suspension of operations, and is offered at \$4.50, with no takers. Sacramento took an upward movement early in the week and sold at 25c., in anticipation of a dividend. Silver King paid its regular monthly dividend of 25c. on August 10th. Swansea paid 5c. on August 10th, since which time mine forces have been reduced, and an inactive policy announced. South Swansea passed the August dividend and announced a reduced output pending an advance in the price of silver.

San Francisco. Aug. 14.

(From Our Special Correspondent.)

There was a very dull opening this week, and on Monday very little business was done, but later the market took an unexpected turn and there was some active buying, especially in Sierra Nevada and in Consolidated California & Virginia. About all the floating stock of the latter was picked up in short order, and the brokers were a little surprised. This spurt lasted only a couple of days, and the market dropped off into dullness again. The close was very quiet, with prices a little lower all round than they were a week ago.

Some quotations noted are: Consolidated California & Virginia, \$1.15@1.20; Chollar, 68@70c.; Sierra Nevada, 63@66c.; Ophir, 60@62c.; Potosi, 29@31c.; Mexican, 23@24c. There was a little spurt in Caledonia, a stock which has hardly been heard of for some time, and it was run up to 16@17c. Some business was done in Standard Consolidated, which has gone up considerably, and closes \$1.90@2.

The arguments in the Hale & Norcross case are all in this week, and the court is preparing its decision. The annual meeting of the W. Y. O. D. Mining Company has been postponed to September 15th.

The Champion Mining Company, of Nevada City, has declared a monthly dividend of 25c. per share. The Powning Gold Mining Company, of Nevada County, has levied an assessment of ¼c. per share, delinquent September 14th.

The following mining companies report having had money on hand August 1st, 1897: Andes, \$2,008; Alta, \$172; Bullion, \$2,644; Caledonia, \$1,381; Chollar, \$7,075 in cash, unsold bullion at the mint valued at \$6,333 and clean-up shipment of bullion to be received; Confidence, \$2,877; Consolidated New York, \$201; Challenge Consolidated, \$2,876; Consolidated Imperial, \$2,143; Crown Point, \$446; Exchequer, \$1,127; Gould & Curry, \$8,950; Julia Consolidated, \$663; Justice, \$600; Morgan, \$1,356; Ophir, \$61; Overman, \$5,755; Potosi, \$1,753; Savage, \$1,244; Segregated Belcher, \$735; Sierra Nevada, \$2,516;

Standard Consolidated, \$21,452; Syndicate, \$882; Union Consolidated, \$11,176; Utah Consolidated, \$213.

The following mining companies report having had an indebtedness August 1st, 1897, with July expenses paid: Alpha Consolidated, \$882; Best & Belcher, due bank \$3,500; less \$641 cash on hand; Belcher, \$3,933; Consolidated California & Virginia, due bank \$26,000; Hale & Norcross, \$2,473; Lady Washington, \$2,000; Mexican, due bank \$500, less \$127 cash on hand; Occidental Consolidated, due bank \$2,500, less \$280 cash on hand.

London. Aug. 11.

(From Our Special Correspondent.)

The South African mining market has been very lively during the past week, in fact there has been quite a boom. The causes were enumerated in my last letter and they have been considerably accentuated since. These causes were the speech of Mr. Chamberlain a fortnight ago and the publication of the Transvaal Mining Commission's report. Everyone considers that there will be a great boom in South Africans, so that preparatory buying is considerable. In many cases the rises of prices have been so substantial that profits have been taken, but whenever shares are offered in this way they have been absorbed immediately.

An important step has been taken by the Chartered Company, by the issue of new capital for the Mashonaland Railway. Instead of creating new Chartered shares they have issued debentures in the Mashonaland Railway Company, Limited, to the amount of £1,150,000. These bonds bear interest at 5% per annum, which is guaranteed by the Chartered Company for 22 years. The line is to be built between Salisbury, the capital of Rhodesia, and Umtali, the terminus of the Beira Railway, a distance of 100 miles. The distance from Umtali to Beira is 222 miles, so that Salisbury will be only 382 miles by railway from the port. On the other hand, the distance from Salisbury to Capetown is 1,646 miles. The German bankers are taking a considerable interest in this issue and no doubt will secure a large amount of it.

The recommendations of the Rand Mining Commission are so favorable to the deep level companies that there is special attention paid to them on the Exchange. Several have taken the opportunity of making new issues and this week I hear that Jumpers Deep is to come on the market, the £1 shares to be offered at £5 10s. This company is controlled by the Rand Mines, Limited, the Consolidated Deep Levels, Limited, and the Barnato Consolidated, conjointly. Two shafts have been sunk and the reefs struck at depths of 908 ft. and 1,245 ft. respectively. A 200-stamp mill is in course of erection and probably will be ready to start in six months time. I have not seen any definite estimate of the contents, nor do the promoters seem to care to publish any. The three houses mentioned expect their clients to go through everything with them, without even any prospectus being issued. They are respectively controlled by Mr. Beit, Mr. Eckstein and Mr. Woolf Joel (since the death of Mr. Barnato). It is through Consolidated Deep Levels that the Exploration Company is connected with Transvaal gold mining.

The West Australian market has been quite deserted, for many of its usual supporters have deserted it for the South African markets. Indians, New Zealanders, etc., have also been quite neglected.

The Klondike boom, which I mentioned last week as being such an important feature, seems to have come to an end at present. The press has been almost universally against expeditions being sent to that country, and promoters evidently think it best to wait a bit.

The meanest little people are trying to get up syndicates to exploit Klondike; people who have to beg £50 to register a company with. This is evidently much like the doings of people in America, as chronicled in your pages of the issue of July 31st.

Paris. Aug. 8.

(From Our Special Correspondent.)

There has been rather more attention paid to the mining market, notwithstanding the summer season, which indisposes many for serious business. Political matters have been quiet and the international securities have shown fewer fluctuations.

The African gold stocks have been growing somewhat in strength, and there is a prospect of a general revival in that department, though not of a renewal of the active speculation which we saw two years ago.

Our London friends seem to have taken up with enthusiasm your Klondike discoveries in the far North. Here they have excited little attention and receive only passing comment as a new "American boom."

The copper market continues firm, and the shares of the copper companies are well supported. The works engaged in electric construction are all busy, and new projects for electric railroads and for chemical factories are constantly coming forward. All these installations require quantities of copper, and it looks as if the demand for the metal would be very large, at least for the next year or two.

We are still buying the metallurgical shares at high prices, since our works are all busily and profitably engaged. Most of them have paid their dividends for 1896 without increasing the rate; but there seems to be no doubt that the returns for 1897 will show much larger results. The coal stocks have also been strong, and buyers for investment regard them with much favor.

Some time ago I sent you the regulations made for prospecting for deposits of the precious metals in Madagascar, and for granting concessions for such mines. A new decree was published in the *Journal Officiel* for July 27th, giving the rules which are to govern all mines other than those of the precious metals and gems. Much latitude is allowed prospectors, and concessions will be granted to discoverers, on very liberal terms by the administration of mines. It is required that applicants for concessions must make, in addition, arrangements either by lease or purchase with the owners of the surface soil. The chief minerals believed to exist in the great island are coal, iron ore, phosphates and salt; and the regulations give four heads or groups under which concessions will be granted. These are as follows:

1. Mineral combustibles, including coal, petroleum, bitumen and asphalt.
2. Rock salt and other salts which may be associated with it.
3. Phosphates, rock or pebble, in beds, veins or pockets.
4. Ores of iron and other metals, and minerals not included in classes 1, 2 and 3.

Beds of limestone, building stone, slate, etc., are classed as quarries, and do not come under the head of mines. These deposits, and also beds of peat, are held to belong to the owners of the surface soil and may be worked without any special concession.

It is believed by those who have some knowledge of our great island colony that its mineral resources are extensive and valuable, and that they will in time become of great importance.

One must not look too far into the future; but taking into account situation, climate, natural wealth and a population of industrious and docile people, it seems quite possible that Madagascar may some day supply coal, iron and many other necessities of commerce to all the East. AZOTE.

Rosstand, B. C. Aug. 11.

(From Our Special Correspondent.)

The question of placing an export duty on Kootenay ores is receiving some attention. The Dominion government some time ago caused the enactment of legislation by which at any time through an order in council passed at Ottawa an export duty could be placed on ores, though there is no demand in the Dominion for Kootenay ores, nor even for matte, which is the produce of smelters in Kootenay. In the face of these facts there is an agitation which is slowly acquiring force in this as well as in other parts of the province for the imposition of a duty on ores which are exported, those which find a market in the United States being especially aimed at. A petition has already originated at Nelson and it has secured a considerable number of signatures, and here the subject is to be settled at a public meeting to be held to-morrow evening. The location of the Le Roi smelter at Northport, it is said, is the cause of the present agitation. The proposal, however, is meeting with strong opposition, especially among those who have investigated the subject.

The list of properties which have been suspending work of late is still increasing, but so is the out-turn of the producers. There are still five producing mines in Trail Creek, exclusive of the War Eagle, which has an abundance of shipping ore, but which has suspended shipments for reasons already given.

The prospects for several large sales of working properties to capitalists are very good. These, no doubt, will be hastened by the strikes which must from time to time occur in those properties, which are being pluckily developed to the fullest extent.

MISCELLANEOUS DIVIDENDS.

The American Coal Company, of Allegheny County, Md., semi-annual dividend of 4%, payable September 1st. Transfer books closed August 19th and reopened September 2d.

MEETINGS.

Golconda Gold Mining and Milling Company, special meeting at room 632 Cooper Building, Denver, Colo., on September 6th at 9 a. m.

Crescent Mining Company, special meeting at room 73 Commercial Block, Salt Lake City, Utah, on August 26th at 2 p. m.

Morgan Silver Mining Company of Park City, at corner of Second South and Main streets, Salt Lake City, Utah, on August 30th, at 8 p. m.

LATE NEWS.

Mr. C. C. BURGER has been appointed Superintendent of the Delano Mining and Milling Company's plant at Boulder, Colo. Mr. Burger recently had charge of chlorination works in Idaho.

The Raub Coal Company, of Luzerne, Pa., is increasing the capacity of its plant from 500 to 1,000 tons a day. The company has been reorganized and on last Wednesday was incorporated, with the following officers and directors: Andrew G. Raub, of Luzerne, president; George H. Flanagan, of Kingston, secretary and treasurer; C. R. Marcy, of Luzerne, superintendent; John E. Nugent, of Kingston; J. L. Cake, of West Pittston, and C. C. Bowman, of Pittston, directors. The company was formerly a limited partnership concern. The capitalization of the new company is \$100,000.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Alamo, Alice, Anaconda, and others with columns for location, par value, and prices for various dates from Aug. 14 to Aug. 20.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Alamo, Alice, Anaconda, and others with columns for location, par value, and prices for various dates from Aug. 13 to Aug. 19.

* Official quotations Boston Stock Exchange. *Bid and ask quotations. Total sales, 119,555.

BALTIMORE, MD.

Week ending Aug. 19.

Table of stock quotations for Baltimore, Md., listing companies like Atlantic Coal, Big Vein Coal, and others with columns for location, par value, and prices.

* Official quotations Baltimore Stock Exchange.

CLEVELAND O.

Table of stock quotations for Cleveland, O., listing companies like Aurora, Chandler, and others with columns for par value and prices.

* From our special correspondent.

ASPEN, COLO.

Aug. 6.

Table of stock quotations for Aspen, Colo., listing companies like Agnes C, Alta Argent, and others with columns for location, capitalization, par value, and prices.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Alamo, Anaconda, and others with columns for par value and prices for various dates from Aug. 9 to Aug. 14.

* Official quotations Colo. Springs Mgr. Stock Assoc. Total shares sold, 732,230; unlisted, 315,810.

COAL AND INDUSTRIAL STOCKS.

Table of coal and industrial stocks, listing companies like American Coal, Col. C. & L. Dev, and others with columns for par value and prices.

* Official quotations. New York Stock Exchange, mining, 5,900 shares; other stocks, 36,935 shares; Consolidated Stock and Petroleum Exchange, mining, 26,773 shares; Mining Exchange, 32,600 shares. Total shares sold, 109,513. * Bid and ask quotations. † Ex-div.

PHILADELPHIA, PA.

Table of stock quotations for Philadelphia, Pa., listing companies like Cambria Iron, Choc. & Gf. Clifs, and others with columns for location, par value, and prices for various dates from Aug. 12 to Aug. 18.

* Official quotations Philadelphia Stock Exchange. * Bid and asked quotations † Ex-div. Total sales, 6,327.

PITTSBURG, PA.

Week ending Aug. 18.

Table of stock quotations for Pittsburgh, Pa., listing companies like Allegheny, Carborundum, and others with columns for location, par value, and prices.

* Official quotations Pittsburgh Stock Exchange.

STOCK QUOTATIONS.

DENVER, COLO.

Table of stock quotations for Denver, Colo., listing company names, par values, and prices for various dates from Aug. 9 to Aug. 11.

Official quotations Colorado Mining Stock Exchange. *Bid and ask quotations. Total shares sold, 816,830.

BUTTE, MONT.

Aug. 13.

Table of stock quotations for Butte, Mont., listing company names, par values, and prices for Aug. 13.

HELENA, MONT.*

Week ending Aug. 11.

Table of stock quotations for Helena, Mont., listing company names, locations, par values, and prices for the week ending Aug. 11.

*Special Report of Samuel K. Davis. Total shares sold, 5,900.

SAN FRANCISCO, CAL.*

Table of stock quotations for San Francisco, Cal., listing company names, locations, par values, and prices for various dates from Aug. 13 to Aug. 19.

*Official telegraphic quotations, San Francisco Stock Exchange.

LOS ANGELES, CAL.*

Table of stock quotations for Los Angeles, Cal., listing company names, locations, par values, and prices for various dates from Aug. 2 to Aug. 7.

*Official quotations, Los Angeles Mining and Stock Exchange. * Bid and ask quotations. Total sales, 208,430 shares.

SALT LAKE CITY, UTAH.*

Week ending Aug. 14.

Table of stock quotations for Salt Lake City, Utah, listing stocks, par values, and prices for the week ending Aug. 14.

*From Our Special Correspondent. † Utah companies. ‡ Mines in Venderbilt, Cal. § Mines in Tuscarora, Nev.

ROSSLAND, BRITISH COLUMBIA.*

Aug. 11.

Table of stock quotations for Rossland, British Columbia, listing company names, par values, and prices for Aug. 11.

*From Our Special Correspondent.

MEXICO.

Week ending Aug. 11.

Table of stock quotations for Mexico, listing company names, states, par values, and prices for the week ending Aug. 11.

Note.—In most of the older Mexican mining companies the shares have no fixed par value. The capital is formed of a certain number of shares, the total value not being named. Many newer companies have a nominal par value, usually \$5 or \$100. Prices are in Mexican dollars.

STOCK QUOTATIONS.

LONDON.

Aug. 6

Table of stock quotations for London, listing company names, countries, authorized capital, par value, last dividend, and quotations (buyers/sellers).

PARIS.

Week ending Aug. 6.

Table of stock quotations for Paris, listing company names, countries, products, capital stock, par value, and prices (open, high, low, close).

*From our special correspondent.

VALPARAISO, CHILE.*

July 3.

Table of stock quotations for Valparaiso, Chile, listing company names, locations, capital paid, share value, last dividend, and prices.

* Special Report of Jackson Bros.

Values are in Chilean pesos or dollars.

SHANGHAI, CHINA.*

July 23.

Table of stock quotations for Shanghai, China, listing company names, countries, number of shares, value, and prices.

* Special Report of J. P. Blake & Co

The prices quoted are in Shanghai taels.

DIVIDENDS.

Table of dividends for various companies, listing company names, current dividends, paid since Jan 1, 1897, and total to date.

ASSESSMENTS.

Table of assessments for various companies, listing company names, locations, number of shares, date, and amount.

NOTE.—This table does not give all the dividends paid by mining companies, as it is impossible to obtain a complete list of dividends declared. Many companies are close corporations and refuse to give the information. Readers of the Engineering and Mining Journal will confer a favor on the publishers if they will notify the Journal of any errors or omissions in the above table. * July dividend paid.

* New assessment.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns: Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last), Dividends (Total Paid, Date and Amount of Last). Rows include Adams, s. l. c., Alma Cons., Alaska-Mexican, Alaska-Treadwell, etc.

Table with columns: Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last), Dividends (Total Paid, Date and Amount of Last). Rows include Ada Cons., Ajax, Alice, g. s. c., Alliance, g. s. l., Alpha Cons., g. s., etc.

G. Gold, S. Silver, L. Lead, C. Copper, B. Borax. * Non-assessable. + The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. - Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends and the Cons. Virginia \$42,390,000. † Dividends paid since consolidation. ‡ Bodie, Bulwer and Mono transferred to Standard Cons., January, 1897. * Dividends have not been paid in several years. Note.—This table is corrected up to August 1. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.

RARE ELEMENTS, CHEMICALS AND MINERALS—CURRENT PRICES.

NOTE.—This table is revised up to August 12th. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.

CHEMICALS AND MINERALS.

These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts.

Table listing various chemicals and minerals such as Abrasives, Acids, Alcohols, Alums, Ammonia, Ammonium, Argols, Arsenic, Asbestos, Asphaltum, Barium, Barytes, Bismuth, Bitumen, Bone Ash, Borax, Bromine, Cadmium, Calcium, Cement, China Clay, Chlorine, Cobalt, Copper, Explosives, Feldspar, Flint, Fluorspar, Fuller's Earth, Gilsomite, Gold, Graphite, Gypsum, Iodine, Iron, Kaolin, Lead, Lime, Magnesite, Manganese, Marble, Mercury, Mineral Wool, Nickel, Oils, Mineral, Oxide, Potash, Potassium, Pyrites, Quartz, Sal Ammoniac, Salt, Silver, Sodium, Strontium, Sulphur, Tellurium, Tin, Zinc, Zirconium.

Table listing various oils and minerals such as Oils, Mineral, Pyrites, Quartz, Sal Ammoniac, Salt, Silver, Sodium, Strontium, Sulphur, Tellurium, Tin, Zinc, Zirconium.

Table listing various rare elements such as Argon, Barium, Beryllium, Boron, Calcium, Cerium, Chromium, Cobalt, Didymium, Gallium, Germanium, Glucinum, Helium, Indium, Iridium, Lanthanum, Lithium, Molybdenum, Niobium, Niobium, Radium, Rubidium, Ruthenium, Selenium, Silicon, Strontium, Tantalum, Thallium, Thorium, Vanadium, Zirconium.

Table listing various rare elements such as Argon, Barium, Beryllium, Boron, Calcium, Cerium, Chromium, Cobalt, Didymium, Gallium, Germanium, Glucinum, Helium, Indium, Iridium, Lanthanum, Lithium, Molybdenum, Niobium, Niobium, Radium, Rubidium, Ruthenium, Selenium, Silicon, Strontium, Tantalum, Thallium, Thorium, Vanadium, Zirconium.

THE RARE ELEMENTS.

Prices given are at makers' works in Germany, unless otherwise noted.

ALPHABETICAL INDEX TO ADVERTISERS.

(-) Indicates every other week or monthly advertisements.

Table A-D listing advertisers such as Adams, W. H., Advertising Rates, Ainsworth, Wm., etc., with page numbers.

Table E-K listing advertisers such as Denver Fire Clay Co., Denver Leadville & Gunnison Ry., etc., with page numbers.

Table L-R listing advertisers such as Laidlaw-Dunn-Gordon Co., Lambert Hoisting Engine Co., etc., with page numbers.

Table S-Z listing advertisers such as Raymond Lead Co., Raymond, Rosier W., etc., with page numbers.

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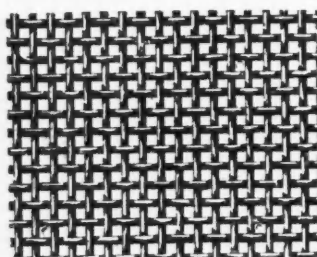
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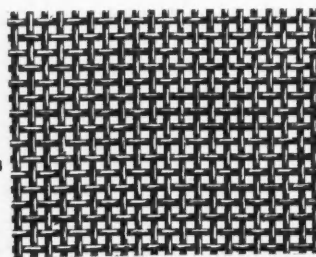
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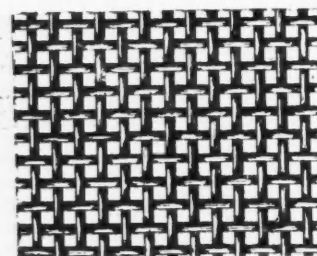


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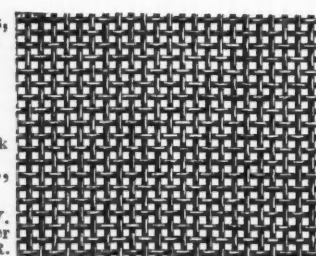


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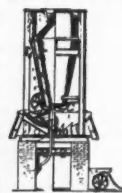
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Zeitschrift fur Praktische Geologie.
Fraser & Chalmers.

So African Mg. Jour.

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POSITIONS VACANT

Free Advertising.

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE, whether subscribers or not.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

Applicants should inclose the necessary postage to insure the forwarding of their letters.

1536 WANTED - AN ASSAYER AND Chemist for the City of Mexico; preferably one having had experience in Western smelter practice. Salary \$150 Mexican currency per month. Address, stating age, experience and references, PUENTE, ENGINEERING AND MINING JOURNAL.

1537 WANTED - A MINING ENGINEER experienced in silver mining and graduate of a technical school, to go to Peru; must have best references as to competency and reliability, and good knowledge of Spanish language. Address, stating salary expected, etc., LIMA, ENGINEERING AND MINING JOURNAL.

1538 WANTED - COMPETENT ASSAYER and Refiner for Jewelry Factory at Seat le, Washington. One who is ready to go without delay for good pay. Address SEATTLE, ENGINEERING AND MINING JOURNAL.

1539 WANTED - MINING SUPERIN- tendent for coal mines. Must be energetic, reliable, good manager of men and have practical knowledge of the most economic methods and management. Address giving references and stating experience and salary expected, WEST VIRGINIA, ENGINEERING AND MINING JOURNAL.

1540 WANTED - A FIRST-CLASS BITU- minous coal mining engineer for mine. Capacity, one to five thousand tons per day; located West Virginia; must be thorough in all branches of the business. Address, with references, JUNO, ENGINEERING AND MINING JOURNAL.

1541 WANTED - A COMPETENT PARTY for the position of General Manager for a first class bituminous coal company. Capacity of mines, from one to five thousand tons per day; location, West Virginia. Must be able to manage the business and dispose of the product. Address, with references, salary, etc., CYNTHIA, ENGINEERING AND MINING JOURNAL.

1542 WANTED - MAN OF LARGE EX- perience in fine concentration of lead-iron ores carrying gold and silver, with rolls, trommels, jigs and vanners. Must also be thoroughly conversant with stamps and amalgamating plates. To a competent man entire charge of property in the Southwest, making seven tons daily, will be given. Must furnish gilded references. Address CONCENTRATION, ENGINEERING AND MINING JOURNAL.

SITUATIONS WANTED.

Advertisements for SITUATIONS WANTED will be charged only 10 cents a line.

WANTED - POSITION WITH MINING COM- pany, by graduate engineer, B. E., with univer- sity gold medal, 1893; M. C. E., 1895, having held fellow- ship for two years; knowledge of geology and chemis- try; gained geology scholarship at University; two years' engineering experience; highest references. Ap- ply W. H. L., ENGINEERING AND MINING JOURNAL, No. 18,065, Aug. 28.

WANTED - POSITION AS MINING ENGI- neer; have been employed as engineer of mines for past five years in Columbia, South America; best references. Address H. L. E., ENGINEERING AND MINING JOURNAL, No. 18,066, Sept. 4.

A MAN, 27 YEARS OLD, WITH TECH- nical education, previously assistant chemist at a large smelter and now with a consulting engineer, de- sires a position in the fall with a milling, smelting or refining company. Good references. Address C. D., ENGINEERING AND MINING JOURNAL, No. 18,067, Oct. 9.

WANTED - POSITION BY COMPETENT Assayer with practical experience; excellent references. Address "EDNA," ENGINEERING AND MINING JOURNAL, No. 18,071, Sept. 4.

MINING ENGINEER AND METALLUR- gist, who is a first-class Chemist and Assayer, desires engagement. Is an Associate of the Royal School of Mines, London, and a Fellow of the Chemical Society. Good references. Address F. C. S., ENGINEER- ING AND MINING JOURNAL, No. 18,069, Sept. 4.

WANTED - A POSITION OR WORK IN assaying, by a graduate of Colorado University. Address A. B. ADAMS, Takoma Park, D. C., No. 18,070, Aug. 28.

CHEMIST - A RECENT GRADUATE OF Lehigh University wishes position. Some experi- ence in assaying. Address J. M., ENGINEERING AND MINING JOURNAL, No. 18,071, Aug. 28.

ANALYTICAL CHEMIST AND ASSAYER. - Young graduate desires situation as assistant at above work; references. Address NINETY-SIX, ENGINEERING AND MINING JOURNAL, No. 18,072, Aug. 28.

METALLURGIST, SPEAKING ENGLISH, French and German, with wide experience in re- fining by electrolysis and smelting copper, silver and gold, extraction of gold and silver from tailings and ore, construction of plants therefor and their manage- ment, desires position at \$500 per month. C. H. P. II, ENGINEERING AND MINING JOURNAL, No. 18,068, Sept. 11.

MINING ENGINEER WHO HAS HAD over 20 years' experience in mining and mining superintendence of large properties in California and the Pacific States, wants to make engagement with reliable parties. Hydraulic and general mining a specialty. Address G., ENGINEERING AND MINING JOURNAL, No. 18,073, Aug. 28.

\$7,800 GIVEN AWAY TO PERSONS making the greatest number of words out of the phrase "Patent Attorney Wedgerburn." For full particulars writethe National Recorder, Wash- ington, D. C., for sample copy containing same.

CONTRACTS OPEN.

TREASURY DEPARTMENT, Office Supervising Architect, Washington, D. C., August 16th, 1897. - Sealed proposals will be received at this office until 2 o'clock p. m. on the 15th day of September, 1897, and opened immediately thereafter, for furnishing all the labor and materials and fixing the place complete, low- pressure, return-circulation, steam heating and venti- lating apparatus required for the U. S. Court House and Post Office building at Savannah, Georgia, in ac- cordance with drawings and specification, copies of which may be had at this office or at the office of the Superintendent at Savannah, Ga. Each bid must be accompanied by a certified check for a sum not less than 2% of the amount of the proposal. The right is re- served to reject any or all bids and to waive any defect or informality in any bid should it be deemed in the in- terest of the government to do so. All proposals re- ceived after the time stated for opening will be re- turned to the bidders. C. E. KEMPER, Acting Super- vising Architect. Orig.

TREASURY DEPARTMENT, Office Supervising Architect, Washington, D. C., August 14th, 1897. - Sealed proposals will be received at this office until 2 o'clock p. m. on the 1st day of September, 1897, and opened immediately thereafter, for the removal and purchase of debris at the U. S. Immigration Station, Ellis Island, N. Y. Harbor, in accordance with thesepec- ification, copies of which may be had at this office and the office of the Superintendent of Repairs U. S. Court House and Post Office, New York, N. Y. Each bid must be accompanied by a certified check for the sum of one hundred dollars (\$100.00). The right is reserved to reject any or all bids, and to waive any defect or informality in any bid, should it be deemed in the interest of the government to do so. All proposals received after the time stated for opening will be returned to the bidders. C. E. KEMPER, Acting Supervising Architect. Orig.

DREDGING PLANT. - United States Engineer Office, Chattanooga, Tenn. - Sealed proposals for hire of dredging plant will be received here until noon, Tues- day, August 31st, 1897, and then publicly opened. Infor- mation furnished on application.

PUMPING ENGINE - Sealed proposals will be received by the Department of Public Works, City of Chicago, until 11 a. m., Monday, September 6th, 1897, for furnishing and erecting on the foundations to be constructed at the Sixty-eighth street pumping station in the city of Chicago, one horizontal compound con- densing pumping engine of fourteen (14) million gallons capacity per 24 hours, with a total lift of one hundred and fifty (150) feet, together with necessary boilers and all accessories and appurtenances, according to plans and specifications on file in the office of the Depart- ment of Public Works of said city.

Proposals must be made out upon blanks furnished at said office and be addressed to said Department, en- dorsed "Proposals for New Pumping Engine for Sixty- Eighth Street Pumping Station," and be accompanied with five thousand (\$5,000) dollars in money or a certified check for the same amount on some re- sponsible bank doing business in the city of Chicago, and made payable to the order of the Commissioner of Public Works. The Commissioner of Public Works reserves the right to reject any or all bids. Due consid- eration will be given to general merits of design, dura- bility of construction, economy of operation and main- tenance, facility for repairs and proved performance and record of similar works in actual service elsewhere. No proposal will be considered unless the party offer- ing it shall furnish evidence satisfactory to the Com- missioner of Public Works of his ability, and that he has the necessary facilities, together with sufficient pecuniary resources to fulfill the conditions of the con- tract and specifications provided such contract should be awarded to him. Companies or firms bidding will give the individual names as well as the name of the firm with their address.

SUBWAY. - Sealed bids for building Section 11 of the Subway will be received at the office of the Transit Commission, 20 Beacon street, Boston, Mass., till 12 o'clock m. of Thursday, September 2d, 1897. Each bid must be accompanied by a certified check for the sum of \$2,500. The section is under and near the site of the old Boston & Maine station at Haymarket Square. A portion of the subway will be an open incline, and the remaining portion will be covered. The structure will consist of a combination of steel and masonry. Some of the items are estimated to be as follows: 19,300 cu. yds. earth excavation; 330 tons iron and steel, furnished by the Commission, to be set in place; 7,000 cu. yds. concrete and brick masonry; 22,000 lin. ft. of piles in place. Plans can be seen and specifications and forms of contract can be obtained at 20 Beacon street, fifth floor. A bond will be required for the faithful performance of the contract in a sum of 20% of the amount. The Commission reserves the right to reject any and all bids and reserves the right to award the contract as it deems for the best interest of the city of Boston.

STEEL WATER-TOWER. - Sealed bids will be received by the Board of Trustees for the water-works and improvement bonds of the city of Jacksonville, Fla., until 3 p. m., Tuesday, September 7th, 1897, for furnishing all materials and erecting complete on foundations a steel water-tower. Tower to be 100 ft. in height above foundations; the tank on tower to be 30 ft. in diameter and 45 ft. in height, with conical bottom and roof. With bid must be submitted a certified bank check, in the sum of one thousand dollars, payable to the chairman of the Board. Specifications can be had and plans seen at the office of the Board. For further information apply to R. N. ELLIS, C. E., Superintendent. The Board re- serves the right to reject any or all bids. Informal bids will not be received.

ELECTRIC LIGHTING. - Sealed proposals will be received at the office of the Board of Public Works, in Louisville, Ky., until 12 o'clock noon of September 14th, 1897, for the public electric lighting of the city of Louisville, Ky. Separate bids are asked for lighting the city for each term of 5, 7, 10, 15 and 20 years, as the bidder may select, based on a minimum of the 1,200 2,000-c. p. lamps, as at the present time, and which are to be increased as required by the city. Proposals must be made per lamp, lamps to burn 3,900 hours per year. A certified check for \$1,000 on a Louisville bank must be deposited with the City Treasurer, and his receipt for the same must accompany each bid to insure execu- tion of contract. Blank proposals to be furnished by the Board of Public Works. The full name and residence of all the bidders, as well as their security, must be signed to all proposals. The Board of Public Works reserves the right to reject any or all bids and readvert- ise for new.

OIL ENGINES, ROTARY TRANSFORMERS and Storage Batteries. - U. S. Engineer Office, Willets Point, N. Y. - Separate sealed proposals for furnishing and delivering at New York City oil engines, rotary transformers and storage batteries will be received here until 12 m., September 6th, 1897, and then publicly opened. Information furnished on application. JOHN G. D. KNIGHT, Major, Engrs.

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DIVIDENDS.

SABELLA GOLD MINING COMPANY,
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DIVIDEND NO. 11.

A dividend of ONE-HALF CENT PER SHARE (\$11,250) has been declared, payable June 25th, 1897, to stockholders of record June 15th, 1897.

The stock transfer books will be closed June 15th, 1897, at 3 o'clock p. m., and will be reopened on the morning of June 26th, 1897.

PERCY HAGERMAN,
Vice-President and Treasurer.

THE FORTUNA GOLD MINING AND MILLING COMPANY has declared, August 27th, its twelfth consecutive monthly dividend of **TEN CENTS A SHARE**, payable at office of Company, 65 Broadway, August 30th. Books close August 25th and open August 31st, 1897. **B. L. HARDING, Treasurer.**

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CONTRACTS OPEN.

Continued from Page 20.

SEWER SYSTEM.—Sealed proposals will be received by the Board of Sewer Commissioners of the village of Oneida, N. Y., until 1 o'clock p. m., on Aug. 31st, 1897, for the construction of sewers in the village of Oneida, consisting of about three and one-half miles of pipe sewers with their manholes, lampholes and other accessories, including all materials, tools and labor necessary to complete the same. Bids will be received for the whole work. Plans can be seen and specifications obtained from the Clerk of the Board after August 20. The Board hereby reserves the right to reject any or all bids, or to accept any that, in the judgment of the Board, will be for the best interest of the village. Bids satisfactory to the Board in amount and sureties will be required of those to whom the contract may be awarded. The sureties shall be residents of the State of New York, or a surety company organized under the laws and doing business in the State of New York—the latter preferred. Each bidder will be required to state in his proposal the names and addresses of his proposed bondmen. Cash or a certified check made payable to the President of the Board of Sewer Commissioners of Oneida, N. Y., to the amount of \$500, must be deposited by each bidder and accompany his bid as a guarantee that in case the contract is awarded him, he will, within seven days after notification of award, execute said contract. Bids must be sealed and addressed to E. H. Boden, Clerk, Oneida, N. Y., and marked on the outside of the envelopes enclosing them, "Proposals for Oneida Sewers."

PUMP REPAIRS.—Sealed proposals will be received for the city of Willimantic by James Haggerty, Chairman of the Water Committee, No. 117 Main street, Willimantic, Conn., until 12 o'clock noon, September 6th, 1897, for repairing the power pumps and foundations for same, at the pumping station of said city. The Water Committee reserves the right to reject any or all bids as the interest of the city may appear. Specifications may be seen at the residence of **JAMES HAGGERTY, No. 117 Main street.**

SEWERS.—Proposals will be received until 5 o'clock p. m. on Monday, September 13th, 1897, by James J. Bergen, President of the Board of Commissioners of Somerville, N. J., for constructing approximately four miles of sewer at Somerville aforesaid, as follows: 2,375 ft. of 24-in. pipe, 890 ft. of 18-in. pipe, 2,181 ft. of 15-in. pipe, 1,607 ft. of 12-in. pipe, 1,370 ft. of 10-in. pipe, 12,840 ft. of 8-in. pipe, with manholes, flush tanks, inlets and appurtenances. A certified check for \$500, payable to the order of William H. Taylor, treasurer, must accompany each bid as a guarantee of good faith. The Board of Commissioners reserve the right to reject any or all bids. Plans and specifications may be seen at the office of the subscriber, and at the office of Joshua Doughty, Jr., the engineer in charge of the work. The bids will be opened at the meeting of the Board of Commissioners, at 8 o'clock on the evening of the same day, and no bids will be considered unless filed with the subscriber before 5 o'clock.

WATER-WORKS AND SEWER SYSTEMS.—Sealed proposals for the construction of a system of water-works and a system of sewers will be received by the Board of Commissioners of the village of Summerville, Ga., until 12 o'clock m., of Tuesday, September 14th, 1897, and at that time will be publicly opened and read. Each bid to be upon printed forms and to be accompanied by a certified check for five hundred (\$500) dollars, payable to the village of Summerville. The successful bidder to file a bond of five thousand (\$5,000) dollars. The Board of Commissioners reserves the right to reject any or all bids.

BRONZE CASTINGS.—U. S. Engineer Office, Montgomery, Ala.—Sealed proposals for furnishing and delivering cement, broken stone, pebbles, fertile earth, steel I-beams, steel bolts, trolleys and rails, plumbing supplies, bronze castings, and electric lighting plant, at U. S. Engineer Wharf, Fort Pickens, Pensacola Harbor, Fla., will be received here until 12 m. (noon), September 22d, 1897, and then publicly opened. Information furnished on application to Lieut. J. P. JERVEY, Engineers, U. S. A., Warrington, Fla., or to F. A. MAHAN, Mayor Engrs.

BRIDGE PIERS.—Sealed proposals will be received until September 1st, 1897, for the construction of bridge piers along the line of the Peoria, Decatur & Evansville Railway, at Evansville, Ind.; Grayville, Ill., and Newton, Ill. The work will require about 1,600 cu. yds. first-class masonry in the piers, and about 4,000 lin. ft. of piling in the foundations. The right to reject any or all bids is reserved. For plans, specifications, etc., call on or address A. J. DAVIS, Engineer, Mattoon, Ill.

BREAKWATER.—U. S. Engineer's Office, Duluth, Minn.—Sealed proposals for building two breakwater piers, each some 2,700 ft. long, at Lake Superior entrance to Portage Lake Ship Canals, Mich., will be received here until noon, September 10th, 1897, and then publicly opened. Information furnished on application.

DREDGING.—U. S. Engineer Office, Rock Island, Ill.—Sealed proposals, in duplicate, will be received here until 11 a. m., September 7th, 1897, and then publicly opened, for dredging in Galena River. Information furnished on application.

WATER-WORKS.—Sealed proposals for improving wasteway at Kennera, in the town of Berlin, will be received at the office of the Superintendent of Water-Works for the city of Meriden, until 8 p. m., Saturday, September 4th, 1897. Approximate quantities are as follows: 213 cu. yds. rubble masonry; 803 cu. yds. cement paving; 300 cu. yds. concrete; 5,500 ft. 3 in. white pine sheeting; 35,000 ft. chestnut timber in place; 400 cu. yds. of cobbles; 8,000 cu. yds. of excavation. Proposals must be made on blank forms furnished by the Superintendent of Water-Works, and must be accompanied by a properly certified check for \$300, made payable to the city of Meriden. All work to be completed on or before November 25th, 1897. The Superintendent of Water-Works and the Water Committee reserve the right to reject any or all bids. Further information may be obtained at the City Engineers' office, Room 2, Town Hall.

DREDGING.—U. S. Engineer Office, 601 18th Street, N. W., Washington, D. C.—Sealed proposals for dredging and rock excavation in Rappahannock River, Va., and dredging in Urbanna Creek, Va.; also for dredging in Mattaponi and Pamunkey rivers, Va., will be received here until 12 M., September 25th, 1897, and then publicly opened. Information furnished on application. **CHAS. J. ALLEN, Lieut.-Col., Engrs'**

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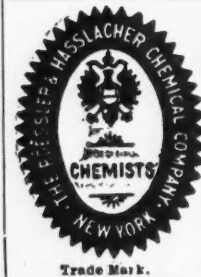
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