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A METALLURGIST who is at the same time accustomed to copper refining, is a good chemist and experienced business man, is wanted to take charge of large works. Apply to the Managing Editor ENGINEERING AND MINING JOURNAL.

THE Nova Scotia meeting of the American Institute of Mining Engineers promises to be memorable. It will be attended by a very large number of members, probably 200 or 250, and professionally as well as socially, it promises to be a great success. The Secretary will in a few days issue circulars, of which a proof lies before us, giving full information for the guidance of members.

THE recent meeting of the Latin Monetary Union in Paris has not been harmonious. Greece has withdrawn from the Union. Belgium now

withdraws, and objects to redeeming in gold all of its share of the five-franc pieces coined under the agreement. The Bank of France consequently demands that the government, if the convention be renewed, shall guarantee the bank from loss through recoinage. It will be interesting to see how Italy, Switzerland, and France will now proceed to make Belgium redeem its silver. It is said that a bureau of monetary statistics will be established in Paris to collect and distribute information on the production of metals, circulation of coin, etc.

THE most disastrous mine accident that has occurred in the Wyoming Valley for years was that at the Moca aqua mine, situated at the western extremity of the coal basin. Twelve men lost their lives by suffocation. The mine produced some fire-damp, but it was not this but the presence under ground of four steam-boilers that was the cause of the disaster. An accident to the fan caused a stoppage of the ventilation, and the gases from the boiler fires, carbonic acid, nitrogen, probably some carbonic oxide, and a little sulphurous acid from the pyrites in the coal, quickly spread along the levels and through the workings, and overcame the men who were entering the mine. The smell of the sulphurous acid gave abundant warning had it been heeded, and had the men been prevented from entering the mine until, as required by law, it had been inspected by the foreman.

The accident to the fan was probably unavoidable; but the presence of steam-boilers in a mine has already caused several of the most serious disasters that have occurred in the Pennsylvania coal regions. It caused the fire in the Lehigh & Wilkes-Barre Company's mines, at the Empire shaft. It was the cause of the fire in the Baltimore mine of the Delaware & Hudson Canal Company. Both we believe, still burn after the expenditure of a vast amount of money in endeavors to extinguish them. A ventilating-furnace fire in the Avondale mine caused the loss of more than 100 lives in that memorable "accident." Many other so-called "accidents," due to the presence of furnace fires in mines, might be mentioned, but we had hoped the practice had been abandoned, if not actually forbidden by law. Some years ago, an "accident" similar to this occurred in the anthracite regions by the suffocation of a number of men from the gas of a mine locomotive. Mr. JOHN TEASDALE, the superintendent of the Moca aqua colliery, is well aware of these facts; for we happened ourselves to be with him in the rescuing party after one of these disasters, and the placing of boilers in this mine was not done in ignorance of its serious danger. Was it, then, done to save a few dollars of expense?

JAMES W. MARSHALL.

Could any thing be more pathetic than this brief notice that comes to us over the wires from Placerville, California?

"Aug. 12.—James W. Marshall, the discoverer of gold in California, died on Monday at his home in Kelsey. He was seventy-four years old, and died a poverty-stricken, disappointed man."

This was the man whose discovery in 1848 made the State of California, and led to that production of gold that has since then amounted to one thousand six hundred million dollars. Many a time since that fateful 18th of January has the unfortunate man cursed the day when he found the glittering nugget in the mill-race at Coloma, and full of golden dreams, flew with the news to his partner, General SUTTER.

Alas for the golden dreams, and for the peace and happiness of industrious obscurity!

His discovery was his great misfortune—a veritable curse through life. Adventurers flocked in from every part of the world. They dispossessed him of his hard-earned property and coolly appropriated his houses. His cattle were killed by the starving miners, his claims were "jumped;" and, superstitiously credited with some mysterious power of finding gold, the unfortunate discoverer was forever tracked and dogged by men whom disappointed avarice made demons.

Again and again he sought to elude them, and would steal off in search of some unexplored gulch, where in peace he hoped to find the millions, the vision of which forever burned in his brain; but go where he would, he could work but a few hours when a stream of men poured in upon him and took up the claims above and below him, and finally disappointed, they would even drive him from the little spot he had selected.

He was always unfortunate; he never made any rich strikes, but drifted about, forever seeking, Tantalus-like, the fortune that forever eluded him, until, disappointed and imbibed by injustice and misfortune, the wretched man found only in the grave rest and refuge from the curse that pursued him.

The great State of California, with its millionaires whose lightest folly costs more than would have pensioned MARSHALL for life, abandoned the discoverer of California's wealth to poverty and wretchedness. Some years ago, the Legislature, recognizing the claim he had, appropriated \$200 a month for him; but this appropriation lasted only two years, and since then the great State and its millionaires have stood ignobly by and left to starve the man whose discovery was the origin of their wealth.

THE VOLATILIZATION OF GOLD.

Though it is popularly assumed that gold is not volatile, yet metallurgists have long known that under certain conditions it can be volatilized. Thus, gold-foil sublimes in a current of chlorine at 300 degrees C., as auric chloride, and auric chloride combines with a number of metallic chlorides, forming double salts called chloro-aurates, and it is probable that some of these little studied compounds are more volatile than the auric chloride itself. In the so-called "Miller's chlorine process" for refining gold by passing a stream of chlorine gas through molten gold, which has been for years in successful operation in the Royal Mint, Sydney, Australia, a certain loss of gold occurs by volatilization in connection with the chlorides of silver and of some of the base metals.

Though the fact of gold volatilization in roasting certain gold ores has long been known, and has been made public by KUSTEL, RIOTTE, AARON, and others, yet the extent of this loss does not appear to be generally appreciated.

In *Leaching Gold and Silver Ores*, published in 1881, Mr. CHARLES H. AARON, mining engineer, of San Francisco, says that in the chloridizing-roasting of gold ores he found that he was sustaining a heavy loss in gold—a loss which, before he discovered its cause ("being a novice in this branch of metallurgy"), had amounted to some \$3000. He then made tests in a muffle, and found that with 4 per cent of salt there was a loss of more than 50 per cent of the gold. Or, to use his words, "I weighed two half-ounces of a sample, and roasted them in a muffle side by side, under precisely the same conditions, except that to one of them I added 4 per cent of salt. The roasting was purposely pushed to an extreme as to heat and time; and when the two tests were assayed, under exactly similar conditions, that which was salted was found to contain less than half as much gold as the unsalted one."

"I then took some light, fluffy sublimate from the flue of the roasting-furnace, an assay of which gave me a value of some \$600 per ton, chiefly gold. The quantity of this material was, however, very small, and the bulk of the matter in the dust-chamber was not much richer than the average of the ore treated, a circumstance which indicates that the gold was actually to a great extent volatilized in some not easily condensable form. . . . As soon as I made the necessary change by reserving the salt until the nearly dead roasting of the ore was finished, not only did the roasted ore assay 20 per cent richer than when raw, but the yield overran my guarantee. . . . I afterward found that a very small quantity of salt—not more than three pounds to the ton—might be mixed with the crude ore without detriment to the gold, and with decided advantage to the extraction of the silver."

This subject has recently had attention directed to it by some very interesting experiments in chloridizing-roasting made by Mr. C. A. STETEFELDT, mining engineer, of this city. These experiments form, we understand, the basis of a paper to be presented at the next meeting of the American Institute of Mining Engineers; and we should have deferred our notice of the subject until that time, but that we notice Mr. STETEFELDT's experiments have been communicated from "advance-sheets" of his report to the *London Mining Journal* by a correspondent, who, with some fulsome flattery (which must be rather embarrassing to Mr. STETEFELDT), announces the discovery of the heavy loss of gold by volatilization in this case as a "remarkable result," "nowhere on record," etc.; whereas, in fact, it has for years been known among metallurgists. Mr. STETEFELDT's experiments, though conducted on a small scale, are extremely instructive, and form a marked progress in the investigation of this important practical problem.

The ore of Las Minas, Zomelehuacan, Mexico, on which Mr. STETEFELDT's experiments were made, is composed of from 40 to 60 per cent magnetite, from 3½ to 7 per cent copper pyrites, and from 3 to 22 per cent iron pyrites. The ore loses only from 1 to 3 per cent in weight by an oxidizing-roasting. It contains from 0.3 to 0.8 ounce gold per ton of 2000 pounds.

Mr. STETEFELDT's roasting experiments consisted of oxidizing and chloridizing-roasting in a small reverberatory furnace with charges of 200 pounds, the capacity of the furnace being at most 500 pounds.

As might have been expected, it was found that "a mere oxidizing-roasting leaves a large percentage of the magnetite intact," and "a direct chloridizing-roasting removes the magnetite almost completely and very rapidly," but with a heavy loss in gold. Mr. STETEFELDT says, "In determining the gold value of the ore before and after chloridizing-roasting, I found an enormous loss of this metal by volatilization;" and as did Mr. AARON, Mr. STETEFELDT repeated the experiment by roasting for one hour with 3 per cent salt in a muffle. The following were the results; 2 and 4 were partially roasted before adding the salt:

CHARGES ROASTED IN THE REVERBERATORY FURNACE.			
Number of charge.	Before chloridizing-roasting.	After chloridizing-roasting.	Present loss.
2.....	0.916 oz.	0.426 oz.	53.5
4.....	0.262 "	0.150 "	42.8
5.....	0.538 "	0.075 "	86.1
6.....	0.650 "	0.075 "	88.5
CHARGES ROASTED IN THE MUFFLE.			
1.....	0.700 oz.	0.050 oz.	93.0
2.....	0.525 "	0.075 "	85.7
3.....	0.650 "	0.065 "	90.0

"There is no doubt that the volatilization of the gold takes place with that of the cuprous chloride. It increased with the quantity of cuprous chloride formed, and then volatilized and decomposed. It is also a function of temperature. Finally, I am convinced that the magnetite, as a contact reagent, plays an important part in causing this loss, a fact that invites further investigation."

These experiments and deductions are extremely interesting and instructive, and when repeated on other classes of ores and on a large working scale may lead to important economic results. Were it not for the well-known difficulty of condensing the volatilized precious metals, Mr. STETEFELDT suggests that "we would have here a most simple and perfect method to extract not only the gold from the Las Minas ores, but gain considerable copper besides."

Mr. STETEFELDT proposes oxidizing-roasting the ore in Stetefeldt shaft-furnaces—a complete change of the magnetite to ferric oxide is not necessary—and amalgamation with dry gold or silver amalgam in an arrastra in preference to an iron pan. Liquid quicksilver was not found advantageous, a fact already remarked by other metallurgists in similar cases. Mr. STETEFELDT believes it possible to extract from 90 to 95 per cent of the gold by this method.

We shall at an early date discuss Mr. STETEFELDT's suggestions as to the influence of time in roasting on the loss of gold by volatilization.

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. All letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.]

A Natural Law Discovered.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Permit me to state that I have been so fortunate as to discover the following natural law, which, so far as I have been able to ascertain, was not hitherto known, namely:

I. The absolute caloric effect of combustion is *not* dependent on the quality (nature) of the oxygenated (or by other combustion involved) matter, but it is dependent on the quantity of oxygen (or other matter involved in combustion).

II. Equal weights of all elements or compounds, when combining with the equal weight of oxygen, evolve equal absolute caloric effect, or when combining in other proportions, they evolve such absolute caloric effect *pro rata*, all elements and all combinations and proportions thereof being subject to the same law.

III. The absolute caloric effect of oxygenation (or other combustion) resulting from the rate of oxygenated matter (or other matter involved in combustion) to the oxygen (or other element causing combustion) is in actual result modified only by the increasing or decreasing caloric (+ or -) effect resulting from condensation, (+) in the one and from expansion (-) in the other case, the later effects (+ and -) being dependent on rate of space evacuated or pre-empted in combustion in all cases (except for SiO₂, as far as established) being less (+ or -) than the direct effect of oxygenation (combustion), and being none where condensation (+) and expansion (-) (as in the case of CO₂) result in a neutral density. All results as obtained by Favre and Silbermann find their full explanation under this law. I shall utilize the first given opportunity to publish special figures and proof.

The importance of the law thus expressed on metallurgical matters, and even on such as relate to astronomy, will soon be understood.

F. M. F. CAZIN, M.E.

COPPERFIELD COPPER-WORKS (P.O. ELY, VT.), Aug. 2, 1885.

Water-Jackets.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In answer to the inquiry in the *ENGINEERING AND MINING JOURNAL* of July 13th, 1885, I beg leave to state that in August, 1872, I laid, with the director of the Phönixhütte Oberungarische Waldburger-schaft, a pipe, over the tuyeres in which water circulated. In October, I introduced this in the Cheltenham Silver-Works, at St. Louis, Mo., Mr. August Steitz being superintendent. In November, I saw and used in New York, on a single tuyere furnace, a water-box on the back, with an opening in the middle. In December, I returned to Cheltenham, and conceived, with Mr. Steitz, Edwin Harrison, and Harrison of the firm of Harrison & Sickles, the idea of a water-jacket furnace, and the latter said, "I will make you a pot." This he did, and the books of the Cheltenham Silver-Works will perhaps show the date on which it was first introduced—January or February, 1873. I. H. KLEINSCHMIDT, M.E.

SAN MIGUEL DE MESQUITAL, ZACATECAS, MEXICO, July 31, 1885.

EDITOR ENGINEERING AND MINING JOURNAL:

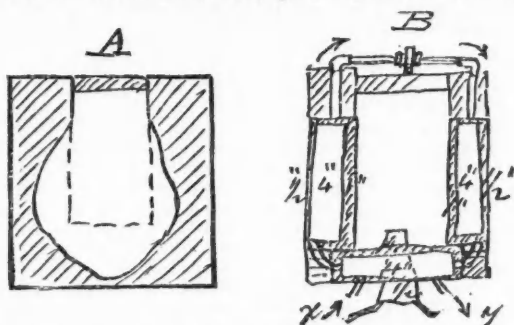
SIR: During the winter of 1872-73, while making the repairs on the small Krumm furnaces used in smelting the rich silver ore of the Silver Islet Mine, L. S., I thought over the best way to save the large cost of fire-brick used in the repairs. We had a good deal of trouble in keeping the back wall from burning out. On blowing out our furnace, they appeared as at A, and had to be repaired every ten to twenty days.

I had never heard of water-jackets, but was using water-tuyeres, and knew through my foreman, Mr. George W. Bryan, of water-doors on the iron furnaces.

The late Mr. J. R. Grant, of the Detroit Copper-Works, happened to come to the works, and I told him what I intended to do, and asked him if he thought the boxes would be safe. He then told me what he had patented for copper furnaces.

I had the back wall box made first, and found it answered perfectly.

I then had the boxes made for the sides, and all three connected together by gas-pipes, as shown at *B*, making one circuit, with inlet at *x* and outlet at *y*. These boxes were as high as the furnaces burned out, and were covered on top with boiler-plate bolted on. The side next the fire was made 1 inch thick, the others $\frac{1}{2}$ inch, space 4 inches. I think they were



about 2½ feet high, the back one having an arch for the water-tuyere. After putting these in, our furnaces never blew out, except for want of ore, running over three months without a stop. The same boxes were in use six years afterward when the works were dismantled.

Reference is made to these boxes in an article in the Transactions of the American Institute of Mining Engineers, Vol. 2, page 90, 1873.

WILLIAM M. COURTIS, M.E.

MODERN AMERICAN METHODS OF COPPER SMELTING.*

By Edward D. Peters, Jr., M.E., M.D.

CHAPTER VII.

CALCINING-FURNACES.

The heavy iron bridge plate, so indispensable in reverberatory smelting-furnaces, may be entirely omitted, the bridge being built up solid and covered on the top and sides with fire-brick, with the exception of a longitudinal opening 3 by 8 inches, which should penetrate it from one end to the other, communicating with the outside air on each side of the furnace, and with the hearth by some half-dozen 2 by 4-inch openings.

By this means, heated air free from all reducing gases is admitted into the furnace below the sheet of flame that sweeps over the top of the bridge. The oxidizing effect of this current of air is very powerful, and, as frequently determined by experiment, hastens materially the calcining process.

If wood is used as a fuel, an additional row of similar openings should be constructed in the arch, immediately over the front line of the bridge-wall, by which a much more perfect combustion of the gases is effected. With coal as a fuel, the latter openings are superfluous, provided the firing is properly managed.

Aside from the sixteen working-door frames, and the ordinary doors for fire-box and ash-pit, no castings are necessary for the entire structure, excepting a small frame to protect the charging-hole, which should be situated a little back of the center of the rear hearth, being placed, of course, in the medium longitudinal line of the furnace. It will add also materially to the durability of the fire-box to surround the portions of the same most exposed to pressure or mechanical violence, by light cast plates, held in place by the uprights.

As the portion of the hearth immediately beneath the charging-hole is exposed to excessive wear from the constant precipitation of heavy masses of wet material upon it, an area some three feet square, and in the locality designated, should be constructed of either fire-brick or slag blocks, the latter from their texture and general physical condition being peculiarly well suited to the purpose.

By referring to the sketch to be given next week, it can be plainly seen at what stage in construction the various bearing bars and other iron work must be inserted.

It will be noticed that, instead of adopting the ordinary large ash-pit, entirely open at the rear, according to the invariable English practice, preference is given to a closed ash-pit, to which air is admitted by a door at one or both ends. This effects a great saving in fuel, and brings the process of combustion more perfectly under control. Comparative tests, extending over a considerable period of time, show this saving to amount to about 50 per cent of the entire fuel consumed, in the case of coal, and about 65 per cent (in volume) when pine wood is used. The tight ash-pit becomes, of course, a matter of positive necessity where anthracite coal, with a forced blast, is used.

When available, a free-burning semi-bituminous coal forms the most economical fuel for calcining purposes, but should always be burned upon a comparatively shallow grate, instead of using the deep clinker-bed, so suitable to the smelting process. At the comparatively low temperature suited to calcination, the generated gas does not burn perfectly, and a great waste of fuel occurs. Coal should be fed at short intervals—from 30 to 45 minutes—in quantities seldom exceeding 50 pounds. When wood is cheap, nothing can excel it as a fuel for calcining purposes, its long, hot, non-reducing flame being peculiarly suited to the requirements of the process. About 1½ cords of hard or 2 cords of soft wood are commonly considered equal to 2240 pounds of good bituminous coal.

The side and end walls having been carried up to the required height, and the skewback constructed on both sides for their entire length, the carpenters take possession temporarily, usually under the supervision of the head mason, to put in the wooden center on which the arch is to be built. If a second furnace, or indeed any other work, is available for the remaining masons, it is advantageous, though not indispensable, to permit the furnace to stand uncovered for several days, thus allowing the mortar to set, and greatly increasing the strength of the mason work.

Having selected for description that pattern of calciner in which the gradual diminution of the space between arch and hearth, as it recedes from the grate, is due to successive slight elevations of the hearth level,

instead of the ordinary downward pitch of the roof, it is evident that the arch throughout its entire extent will be horizontal, while all four inclosing walls are built up to the same height at every point, with the exception of a rectangular flue-opening in the rear wall, 6 by 30 inches.

The construction of the wooden pattern or center is, therefore, extremely simple, requiring only some 20 pieces of 2-inch plank, 16 feet long and 14 inches wide; a lot of 2 by 4 scantling, to form posts about 10 inches in length, four of these being needed to support each plank on edge; and finally, a sufficient amount of 4-inch battens, from one half to one inch thick, to cover the area of the required roof, when placed about three quarters of an inch apart. The plank should be perfectly sound, and at least partially seasoned.

By the aid of a long rod, moving upon a pivot at one end, while the free extremity carries a pencil, a segment of a circle corresponding to a rise of 12 inches in the center of the length of 16 feet, should be struck on each plank, and the line followed accurately with a jig-saw.

The segments for that portion of the arch over the bridge and fire-box are shorter, of course, than those belonging to the main hearth, but should be got out in the same manner, and then shortened at each end to the required length.

The scantling should be cut into posts somewhat shorter than necessary to bring the curve on the upper edge of the segments to the proper height for the lower surface of the arch, so that each post may be wedged to an exact bearing with thin slips of wood. It is quite necessary that the weight should be evenly distributed, and each segment, when brought into correct position, is held there by driving a nail through a longitudinal line of battens in the center and at each extremity.

The segments for sloping arches should be still further strengthened by short braces toe-nailed obliquely from the upper edge of one strip to the lower edge of its neighbor, and so on throughout the entire frame.

An omission of this precaution has caused the canting of the segments and consequent destruction of a large nearly completed arch under the author's charge.

No difficulty will be experienced in removing the wooden pattern in good condition for further use, provided it is supported on small posts as just described; but if long, heavy blocks of timber are used as a foundation for the segments, great labor as well as much injurious sledging must accompany their removal, resulting usually in the complete destruction of both segments and battens. In fact, where this method of support has been practiced, it will be found best to burn out the inclosed patterns, after the tie-rods are properly tightened, closing both damper and ash-pit so as to allow only a slow smoldering and prevent any injurious rise of temperature in the still damp furnace.

Few jobs of mason work require more care and conscientiousness than the laying of a large calciner arch, as, owing to its great width and slight curvature, a very little lack of closeness in its myriad joints would be sufficient to allow it to yield to the enormous pressure brought to bear by its own weight, and become sufficiently compressed to slip down between its side walls. It is quite a simple matter to lay a good solid arch of fire-brick, owing to their great regularity and smoothness and almost perfect rectangular form; but by the employment of red brick, which vary so in size and thickness, and are so frequently warped out of all reasonable shape, the difficulty is greatly increased.

In ordinary calciners, it is customary to construct that portion of the arch from the fire end of the furnace to a point midway between the first and second working-doors of fire-brick, nine inches in thickness, the brick standing endwise. At this point, or even considerably sooner, when necessary, red brick are substituted, being placed also on end, and each brick, after being dipped into a pail of liquid clay mortar, being pressed closely against its neighbor, and finally settled into position with a few light blows of the hammer.

Moderately soft brick are, as a rule, best suited to this purpose, although they must, of course, possess ample solidity to resist the compression to which they are exposed. Hard-burned brick, though stronger, are too irregular and warped to be often used in a large arch, and in any case the brick should be all carefully selected beforehand by the attendant, and assorted in such a manner that each longitudinal row—extending the entire length of the furnace—is composed of brick of about the same thickness.

Another most important precaution is the preservation of the proper angle, as, in order to establish the required curve, each row must incline slightly from the vertical, the lower ends of the bricks being in contact, which is not the case with their upper extremities.

The establishment and preservation of the proper curvature is facilitated by the occasional interpolation of a longitudinal row of wedge-shaped or key-brick, technically called "bull-heads." These are usually only obtainable made from fire-clay, but are almost indispensable for the center row, when the final keying of the arch is effected. Otherwise, the entire row of key-brick must be cut from common brick, an arduous and imperfect task.

The keying is a matter of some delicacy, and should be performed by a single workman, who should select or cut his keys of such thickness as to produce a uniform moderate pressure throughout the entire distance, no more force being exerted to drive the key into place than can be easily effected by a light mason's hammer, using an intervening block of wood to prevent the destruction of the brick.

While the masons are thus employed, the blacksmith and his helper should have completed the buckstaves and tie-rods from measurements furnished by the foreman mason as the work progresses, it being in such cases easier to suit the length of the tie-rods to the completed mason work than to pursue the opposite course.

As soon as the arch is completed, the head mason and blacksmith should proceed to the ironing of the furnace, which, with the assistance of two laborers, should be completed in a single day.

The most convenient and easily obtained buckstaves in most cases are old iron rails of full size, say 80 pounds to the yard. Properly shaped I beams, of corresponding strength, are about 15 per cent lighter. The tie-rods may consist of inch round-iron for the bottom rods, and inch and a quarter iron for the upper rods. The lower rods are already long in place, and through each of their loops should now be slipped one of the upright buckstaves, cut to the proper length, and temporarily wedged into the loop to keep it perpendicular.

(TO BE CONTINUED.)

THE GREAT SPANISH PYRITES DEPOSITS.

By J. H. Collins, F.G.S.

(Continued from page 79.)

Character of the Ore.—As the average copper content of the ores sent to England only varies between 3 per cent and 4 per cent, I might almost say only between 3½ per cent and 3¾ per cent, from year to year, an idea has been generally entertained that the ore-deposits, as a whole, are remarkably uniform in composition. Nothing could be farther from the truth, as was shown by the series of specimens sent to the Madrid Exhibition in 1883 from Rio Tinto. These were not little fragments, but fair-sized masses averaging from 20 to 50 pounds in weight, and containing from a mere trace up to 60 per cent of copper.

The composition of pyrites from different mines, as selected for various purposes, and the freedom from siliceous veinstone, when well selected, are very well shown by the following analyses:

	Rio Tinto.				Tharsis.				San Dom.	La Majada.	
	1	2	3	4	5	6	7	8	9	10	11
Sulphur.....	48.98	50.19	47.25	50.00	45.21	47.50	43.52	48.11	49.89	49.50	37.00
Iron.....	41.91	42.26	42.35	41.65	43.50	41.92	46.20	40.20	42.80	40.60	33.00
Copper.....	3.06	2.29	4.46	2.25	2.21	4.21	3.12	3.11	2.26	3.62	4.42
Lead.....	1.47	not detd	1.36	trace	0.22	1.52	2.11	2.30	.....	.....	.....
Zinc.....	0.62	not detd	0.24	trace	.....	0.22	0.32	0.81	0.10	.....	.....
Sulphate of copper.....	0.12	0.20	trace	trace	.....	.....	.....	.....	.....	.....	.....
Oxide of copper.....	0.50	trace	trace	trace	.....	.....	.....	.....	.....	.....	.....
Arsenic.....	1.00	0.92	0.51	0.25	0.41	0.38	1.10	1.21	0.28	0.49	0.47
Silica and insol.....	0.28	trace	2.40	2.32	7.10	3.42	2.00	2.26	2.94	2.14	22.60
Moisture.....	0.85	0.20	.....	.....	1.21	0.56	1.54	1.00	0.95	.....	.....
Sulphate of iron.....	0.50	trace	.....	.....	.....	.....	.....	.....	.....	.....	trace
Antimony.....	0.06	0.10	trace	.....	.....	.....	.....	.....	.....	.....	.....
Carbonate of lime.....	.....	.....	.....	.....	.....	.....	.....	.....	0.18	.....	.....
Oxygen, loss, etc.....	0.85	3.24	1.43	3.23	0.14	0.26	0.09	1.10	0.69	3.65	2.51

100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00
 1. Export ore, Rio Tinto, 1873, analyzed by my friend the late S. F. Bawden. 2. Calcination ore, Rio Tinto, 1880, analyzed by my friend the late S. F. Bawden. 3. San Dionisio, Rio Tinto, 1881, analyzed by myself, or under my direction. 4. Filon Norte, Rio Tinto, 1881, analyzed by myself, or under my direction. 5-8. Tharsis, analyzed by Clapham. 9. San Domingos, analyzed by McCulloch. 10. Compact. 11. Banded. Analyzed by myself.

In all these ores, silver exists in small proportions varying from ½ ounce up to 1½ ounces per ton; gold, from 8 to 11 grains per ton. In the Rio Tinto ores, too, I have invariably found traces of alumina, bismuth, manganese, thallium, nickel, cobalt, lime, magnesia, and selenium.

The silver is extracted from a considerable proportion of the ores raised. The gold has hitherto resisted all efforts to recover it at a profit, except a small proportion of the ore that is treated at Widnes and other places in the north of England and in Germany. Yet it is worthy of remark that not less than 1½ tons of gold are annually raised from the pyrites mines of the Sierra Morena.

All the above are samples of well-mixed ores. I add below a series of analyses of picked specimens from Rio Tinto, none of them, however, distinctly crystallized; 12 is chalcopyrite, of a good yellow color, soft; 13 is gray ore, with a good gray color, and rather harder than usual; 14, white pyrites, very light colored, a mass of minute crystals, very hard; 15 is galena, sub-crystalline and normal in appearance; 16 lead mineral, fine-grained, gray, and granular.

	12.	13.	14.	15.	16.
Sulphur.....	33.04	24.03	52.81	15.82	40.89
Selenium.....	.....	.....	trace	.10	.13
Iron.....	34.72	12.71	46.12	2.21	36.24
Copper.....	31.68	62.50	.11	.07	4.30
Arsenic.....	.01	.03	.23	.01	.10
Lead.....	.02	.14	trace	80.41	11.37
Antimony.....	.....	trace	.....	.40	.20
Zinc.....	.10	trace	trace	.14	6.06
Bismuth.....	.....	trace	.....	.21	.04
Silica and insol.....	.15	.02	.10	.02	.21
	99.72	98.93	99.37	99.39	100.14
Silver.....	.003	.010	.005	.015	.015

As already intimated, the sulphur contained in that portion of the cuprous pyrites that is exported to England, Germany, and elsewhere is finally converted into sulphuric acid, the copper and occasionally part of the silver and gold being afterward extracted by well-known methods. At San Domingos, a considerable proportion of the copper is extracted before the ore is exported as sulphur ore. As to the extraction of the copper from the pyrites that is treated in Spain—probably three fourths of the whole—it is not the purpose of the present paper to describe in detail the modes usually adopted. It will suffice to say here that in general the ore is roasted either in heaps (telera-) or occasionally in kilns. In this way, the greater part of the sulphur is converted into sulphurous acid, and so passes off into the atmosphere.* A smaller portion remains in the ore as unchanged sulphide while still another part is converted into sulphuric acid, which, combining with the oxides of copper and iron, formed at the same time, is afterward dissolved out as sulphates. The sulphate of copper is precipitated by iron, so producing the well-known Spanish copper precipitate. At several of the mines, and notably at Rio Tinto, attempts have been made, with more or less success, to render the copper soluble without roasting it. This has been effected (a) by mixing the ore in heaps with already roasted and lixiviated ore, (b) by mixing it with salt after crushing so as to pass through a half-inch mesh, and (c) by washing the raw crushed ore with "ferric liquors" variously produced. The detailed results of these and other experiments and processes must be reserved for another paper.

The Hollway process, which, in my opinion, is admirably adapted for treating many of these ores, has not yet been applied, except by way of an experiment of a few days' duration.—*London Mining World*.

(TO BE CONTINUED.)

Nordenfeldt Powder-Making Process.—Mr. Nordenfeldt, of gun fame, has invented a safe process for manufacturing powder. Instead of grinding sulphur, charcoal, and saltpeter together in their solid state, sulphur is put in in solution as sulphate of carbon. This is mixed with cotton or cellulose fiber, ground to an impalpable powder. A saturated solution of saltpeter is added to this mixture. Then it is evaporated under disturbed crystallization. Almost a liquid gunpowder is thus obtained.

* The deleterious effects of this smoke are felt over so large an area that great complaints are constantly made to the government, and it is not likely that any great extension of open air ore-roasting will be permitted.

MINING AND MINERAL STATISTICS OF GREAT BRITAIN AND IRELAND FOR THE YEAR 1884.

(Continued from page 95.)

The magnitude of the coal and iron industries, of course, dwarfs all others. The production of coal in England and Wales was 139,448,660 tons; value, £38,504,885. In Scotland, 21,186,688 tons; value, £4,885,693. In Ireland, 122,431 tons; value, £55,605. Total, 160,757,779 tons; value, £43,446,183, or 5s. 5d. per ton. Of this, there were exported as coal 22,354,474 tons; value, £10,255,448. Coke, 476,291 tons; value, £313,047. Patent fuel, 519,465 tons; value, £282,635.

Far the largest customer for coal was France, which took 4,339,572 tons. We appear as England's sixth best customer for coke, taking 19,031 tons, of which 18,880 were shipped directly to the Pacific; but she has twenty-two better customers for coal, of which we take only 241,638 tons. Of this, 65,341 tons, chiefly gas-coal, were shipped to Atlantic ports, and 176,347 tons carried as ballast in grain ships to San Francisco.

Although the average cost of British coal was at the mine 5s. 5d. (\$1.31), whereas the average price of all United States bituminous coal at the mine was only \$1.04, and much of Pennsylvania's product sold at from 70 to 80 cents, yet, inasmuch as the English, Welsh, and Scotch mines are many of them at ocean ports, they would compete on our coast on close terms with our most accessible coal, were the latter not protected.

It is also a matter for reflection that English coke should be carried half around the world to Arizona, there to make black copper, some of which finds its way to England to be refined with the coal from the same collieries that furnished the coke.

Twenty-four of the 52 counties of England and Wales appear as contributing to her wealth of iron and coal, and all these, with the addition of Cheshire, are engaged in iron manufacture.

The steel statistics show a falling off in the production of Bessemer from the 28 works with the 102 converters; but a slight gain in steel from the 194 open-hearth furnaces, and a gain, though less than might be expected, in Thomas-Gilchrist steel. Only 15 basic converters are running, and seven old converters are altering—a figure that slightly differs from Wedding, as quoted by Mr. Maynard in his notice of Mr. Thomas.

	1883.	1884.
Bessemer steel ingots made.....	1,553,580 tons.	1,299,676 tons.
Open-hearth steel.....	455,500 "	475,250 "
Thomas-Gilchrist steel.....	120,967 "	179,900 "

The slow progress of the Thomas-Gilchrist basic process is as difficult of explanation in England as here. For the steel industry of Great Britain is more dependent on imported ore than even our Eastern steel-works. The following tables show the sources, some very remote, whence the all-penetrating trade of Great Britain draws its supply of raw material:

IMPORTS OF IRON ORE INTO THE UNITED KINGDOM FOR 1883 AND 1884.

IMPORTED TO—	1883.		1884.	
	Quantity Tons.	Value.	Quantity Tons.	Value.
England and Wales.....	2,824,693	£2,400,912	2,374,827	£1,778,149
Scotland.....	356,380	349,918	406,007	364,451
	3,181,073	£2,750,870	2,780,829	£2,142,600
Whence imported:				
Australasia.....	2,886	16,238	724	2,595
Greece.....	21,497	22,887	6,100	5,443
Algeria.....	131,264	110,423	1,620,06	104,547
Italy.....	5,676	55,535	4,005	4,486
Spain.....	2,958,76	2,466,783	2,568,088	1,9,090
Turkey.....	5,454	26,795	10,283	51,53
Other countries.....	19,536	22,269	15,423	15,167

The exports of iron ore from the United Kingdom were:

	1883.		1884.	
Whence exported:	Quantity in tons.	Value in £.	Quantity in tons.	Value in £.
United States.....	7,638	6,442	7,197	3,821
Other countries.....	1,020	1,380	1,119	1,514
	8,708	£7,822	8,316	£5,335

The exports of iron and steel for 1884 show a falling off, as compared with 1883, of 13 per cent in quantity and 14 per cent in value.

EXPORTS OF IRON AND STEEL IN THE YEARS 1883 AND 1884.

IRON AND STEEL.	1883.		1884.	
	Quantity Tons.	Value.	Quantity Tons.	Value.
Iron:				
Pig.....	1,564,048	£4,077,456	1,269,576	£3,945,223
Bar, angle, bolt, and rod.....	288,271	2,034,667	1,964,489	1,942,264
Railroad.....	971,165	6,014,264	728,540	4,142,663
Wire (except telegraph wire).....	62,620	926,797	52,968	692,607
Tin plates and sheets.....	289,375	4,705,403	268,014	4,746,973
Cast and wrought.....	355,842	4,616,660	376,367	4,560,671
Hoops, sheets, and boiler plates.....	347,742	3,899,774	348,299	3,673,001
Old, for remanufacture.....	97,475	337,995	68,141	223,422
Steel:				
Unwrought.....	73,131	1,396,556	56,934	1,127,481
Steel and iron combined.....	13,599	580,644	11,064	402,380
Totals.....	4,043,308	£28,590,216	3,496,991	£24,496,065

The table distributing exports of iron of all kinds is worthy of study, in view of the necessity of finding a market for the excess of our own production, though it seems paradoxical to speak of our own excess when

SUMMARY OF THE PRODUCTION OF PIG-IRON IN GREAT BRITAIN, AND IRON ORE AND COAL USED, INCLUDING COAL CONVERTED INTO COKE.

GENERAL SUMMARY OF IRON MILLS AND FORGES IN OPERATION IN GREAT BRITAIN.

COUNTIES.	Number of works in operation.	Number of blast-furnaces.	Furnaces in blast.	Pig-iron made. Tons.	Iron ore used. Tons.	Coal used. Tons.	Number of works.	Number of puddling-furnaces.	Number of rolling-mills.
England and Wales :									
Chester	13	55	32 1/4	845,792	1,484,437	1,546,127	2	21	11
Cumberland	1	7	1	34,486	81,664	121,827	4	30	7
Denbighshire and Flintshire	1	7	1	34,486	81,664	121,827	2	21	5
Derbyshire	10	54	32 3/4	359,338	979,270	832,161	4	76	14
Durham and Northumberland	9	63	28 1/4	779,131	2,012,767	1,495,645	17	631	65
Flintshire (furnaces and works only)	1	3	3	3	3	3	1	3	3
Glamorganshire	11	89	24	378,275	713,675	773,164	11	238	60
Gloucestershire (furnaces and works only)	1	8	1	1	1	1	1	1	1
Hampshire	1	1	1	1	1	1	1	1	1
Lancashire	9	49	29	715,328	1,326,775	1,191,696	17	328	65
Leicestershire and Lincolnshire	7	23	18	259,398	900,491	544,702	7	62	31
Monmouthshire	8	45	25	473,116	842,944	999,079	7	62	31
Northamptonshire	7	28	15 1/4	196,212	545,867	505,129	7	62	31
Northumberland (furnaces and works only)	1	7	2	184,175	223,041	184,477	1	16	2
Nottinghamshire	2	5	5	78,175	223,041	184,477	1	16	2
Shropshire	4	22	6 1/4	53,224	130,763	140,627	8	151	21
Somersetshire	1	1	1	1	1	1	1	1	1
Staffordshire, North	10	39	23 1/2	296,256	567,014	574,591	9	212	27
Staffordshire, South	19	92	26 3/4	279,737	640,000	617,636	104	1,416	277
Wiltshire and Gloucestershire	1	6	1	23,987	60,034	51,330	1	11	4
Worcestershire	6	27	8	77,136	180,000	193,300	9	212	27
Yorkshire, North Riding	20	92	71 1/2	1,725,823	5,189,074	3,521,699	27	479	122
Yorkshire, West Riding	10	48	22 3/4	248,313	689,790	613,683	14	180	47
Totals, England and Wales	150	764	377 3/4	6,823,727	16,576,606	13,906,879			
Scotland :									
Ayrshire	7	36	23	292,287	777,471	593,969	..	..	..
Fife-shire, Linlithgow, and Stirlingshire	3	19	4 1/2	41,975	95,888	107,290	..	..	..
Lanarkshire	14	86	70 1/2	653,739	1,437,540	1,463,668	22	334	82
Total, Scotland	24	144	98	988,000	2,310,899	2,170,927	259	4,577	875
Total production in Great Britain, 1883				8,529,300	21,013,275	17,775,000			
1884				7,811,727	18,887,505	16,077,800			

we import 157,010 tons of British pig, or 12 per cent of her total exports of pig. Our iron-masters should look with special interest at the figures opposite British North America and Australasia, markets in which it is worth competing, while Mexico and Chili appear to be hardly worth fighting for.

DISTRIBUTION OF THE EXPORTS OF THE FOLLOWING DESCRIPTIONS OF IRON.

PRINCIPAL COUNTRIES.	Tons.			
	Pig.	Bar, angle, bolt, and rod.	Railroad of all kinds.	Hoop, sheets, and boiler-plates.
Australasia	23,170	44,965	125,420	72,448
Belgium	56,728	165	54	202
Brazil	1,095	6,089	38,699	4,475
British East Indies	6,175	63,114	161,341	52,134
British North America	38,255	25,775	60,087	14,651
British Possessions in South				
Africa	140	2,016	11,283	7,144
Chili	1,375	9,705	16,517	7,985
Denmark	16,932	1,872	934	4,039
Egypt	430	3,349	11,648	4,076
France	107,035	702	3,468	5,394
Germany	313,352	5,805	529	12,497
Holland	197,263	4,441	27	12,426
Italy	65,335	17,662	9,414	18,749
Mexico	210	888	4,514	1,037
Peru	437	1,370	6,632	1,186
Russia	161,610	3,030	14,188	16,593
Spain and Canaries	35,130	1,256	14,919	6,046
Sweden and Norway	33,701	9,772	26,825	9,072
Turkey	1,641	15,135	1,554	4,883
United States	157,010	4,275	17,825	21,370
Other countries	52,552	75,203	202,862	71,891
Totals	1,269,576	296,489	728,540	348,298

(TO BE CONTINUED.)

THE DIRECT CONVERTER PROCESS FOR THE REDUCTION OF LEAD ORES.

This new process of lead smelting is noticed at some length in London *Engineering* of July 31st:

"The process, in its present latest development, consists in calcining the ore, taking it hot from the calcining-furnace and placing it in a 'converter,' which is 'a large foundry ladle-like vessel, suspended on trunnions in front of a cupola furnace.' The size of this converter may be such as to hold any thing from half a ton to five tons of the ore. Cast-iron is then at once tapped out from the cupola, as hot as possible, and run on to the ore in the converter, the quantity of iron taken being from 50 to 80 per cent of the weight of the ore charged. It is stated that 'the melting and complete reduction of the ore takes place instantaneously, the metallic lead sinks to the bottom, covered by the liquid iron, and the slag in a pasty condition floats on the surface.' The lead and iron are tapped off at the bottom, after which the slag is thrown out, and all is ready for a new charge. A portion of the iron used is converted into sulphide of iron by taking up the sulphur remaining in the ore, and this sulphide of iron is entangled in the slag. The iron not so consumed is cast into pigs, and is put through the cupola again to serve for working another charge.

"It is stated that raw sulphide lead ore may be used in the 'converter' without any previous calcination, but that, of course, a larger proportion of iron would be consumed in this case. As a matter of fact, we believe the process was first put forward mainly as a means of working ores directly and uncalcined, but that attempts to do this have in some cases,

if not in all, failed so completely that calcined ore is now proposed to be used."

We can not understand the importance that is attached to this "process" by *Engineering*, except on the supposition that some of its patrons have been caught by the "process crank," and have been boring the editor with the stories of the revolution the new process is going to create in metallurgy. And in self-defense the editor devotes a page of his valuable space to refuting the claims made in a pamphlet which "bears no signature and is not supported by any testimony from experts, either theoretically or practically."

NEW PUBLICATIONS.

The Manual of Statistics. Railroads, Grain, and Produce, Cotton, Petroleum, Mining Dividends, and Production, to July 1st, 1885. Issued by the Financial News Association. 8vo, paper, pages 296. Price, 75 cents.

This little book gives in small space and convenient form much statistical information. It does not, of course, take the place of Poor's Manual on Railroad Statistics, or the fuller information contained in any of the publications on these specialties; but it is nevertheless a convenient little book of reference. The statement made in its preface that "all the reports given have been specially and carefully prepared for this book, making it a collection of reliable statements from original sources, and not a reprint from other works," is singularly inaccurate; for most of the figures that we have examined are familiar, having already appeared in other publications.

To go no farther, take the important item, Production of Copper in the United States, given on page 278, which is a reprint, *without credit*, of the statistics collected by an editor of this paper, and published originally in the *ENGINEERING AND MINING JOURNAL*, February 7th, 1885, except that in the *Manual of Statistics* the figures of production (pounds) have been made dollars (\$), making the table absurd. Again, the table of "Mining Dividends," given on page 229, is taken, *without credit*, from the *ENGINEERING AND MINING JOURNAL* of January 10th, 1885, for which the information was obtained by unremitting exertions throughout the year. In these, and doubtless in many other instances, to have stated the source of the information would have added to the value that would have been placed on the statistics, and would have been only common honesty, to say nothing of courtesy, on the part of the *Manual of Statistics*.

Purification of Copper.—A German patent, taken out by W. Braun, of Hamburg, proposes to refine impure copper by passing gaseous hydrochloric acid through it in the molten state, with as little access of air as possible. It is said that the cuprous oxide contained in the copper is volatilized as chloride. Also all other impurities that may be present as oxides, or as metals that decompose vapor of hydrochloric acid at high temperature, are removed by this treatment. The result is stated to be a copper of very great purity and toughness, free from bubbles, and of high conductivity.

Drawing Platinum Wire.—According to M. Gaiffe, says the *Engineer*, a microscopic examination of fine platinum wire shows that the latter breaks in drawing at points where no sign of injury exists before going through the draw-plate. After drawing, however, spots appear on the metal, and M. Gaiffe infers that these are due to particles of dust that adhere to the metal as it is drawn, and scratch it. By carefully excluding dust particles, he has succeeded in drawing wires $\frac{1}{170}$ inch in diameter with ease, and he considers that with finer plates much finer wires can be produced. A recent note mentioned that Professor S. P. Langley had obtained wires $\frac{1}{1700}$ inch in diameter.

PROPERTIES OF MALLEABLE IRON DEDUCED FROM ITS MICROSCOPIC STRUCTURE.*

Although there can be no doubt that the chemical and physical properties of iron are closely connected, the one can not be directly deduced from a knowledge of the other. This deduction may be performed with the most certainty in the case of pig or cast-iron, which possesses but a low degree of toughness, while the difficulty increases with the decrease in the percentage of carbon, and the increase in tensile strength and ductility. In the case of malleable irons (steel and iron, ingot and weld steel and iron), previous experiences have shown that no basis exists on which the connection between chemical and physical properties may be determined with even the slightest degree of certainty. Even the attempts to determine, from their chemical composition, how rails will behave during use, have been entirely unsuccessful. Indeed, rails that are made by the same metallurgical process from the same material, and of the same chemical composition, do not present the same properties, although they are throughout apparently homogeneous. This is even more the case when any of the different varieties of iron occur together—as, for example, in the case of compound armor-plates; or when similar varieties of iron are produced by different processes—for example, soft forge pig-iron, open-hearth iron, and Bessemer iron from acid or basic converters. All these varieties of iron can have a perfectly identical chemical composition, and yet behave entirely differently on working and in use; and also, after quite similar treatment, by hammering, rolling, etc., behave in an entirely different manner from that expected when submitted to tension, pressure, and percussion.

Impossible as it is to say from the chemical composition found by analysis what the physical properties are, it is equally impossible to deduce the chemical composition from the physical properties, for example, from the tensile strength, elongation, and contraction obtained on testing. Frequently, too, the results of the tests of tensile strength, elongation, and contraction are not even sufficient to explain the behavior in use. It has frequently been observed that rails of ingot iron possess the peculiarity of unexpectedly breaking on being suddenly cooled, or on being exposed to a very low temperature; while rails of weld iron, possessing chemically the same composition, and mechanically the same tensile strength, elongation, and contraction, or even when they have given more unfavorable results, remain unaltered. The inconvenience of a sudden fracture of an apparently perfectly sound ingot iron main shaft of a screw steamer has in many cases led to the preference being given to an intrinsically inferior one made of weld iron.

In order to explain these contradictions, and to fill up the apparent gaps in the scientific metallurgy of iron, recourse must be had to the microscope, which reveals properties that can not be discovered either by analyses or by mechanical tests. The investigations conducted by me have not in any way exhausted the subject. They are but the commencement of the path into a wider field of research, and are intended to serve merely as an inducement for followers in the same path. Microscopic investigations of iron have long been made, but only systematically in a few cases. The most complete are the investigations of pig-iron, especially the researches of the present manager of the Royal Prussian Mechanical Testing Institute, Mr. A. Martens. He has devised a very satisfactory method of distinguishing the separate constituents of a piece of iron by etching and tempering. He has also, at my request, prepared for the Royal Mining Academy of Berlin a collection of 120 sections, upon which the following investigations are based. Besides these, several test pieces from the well-filled museum of that institution were also examined. The sections are prepared in the following manner. The small test pieces obtained from the main iron mass by breaking, planing, filing, or crushing are first ground in a grinding-machine with a coarse emery wheel, and are then evenly and finely ground upon cast-iron plates on which emery is spread. Coarse is first employed, and is replaced by finer and finer emery as the grinding proceeds. The pieces of iron are then fastened with a cement of resin and wax to a thick piece of looking-glass. In order to guard against the removal of the cement during the grinding, by becoming hot, water is added. The polishing is then effected by hand with polishing agents washed as carefully as possible, such as ferric oxide, putty-powder, tripoli, etc. The polished section is then etched with very dilute acid; for this purpose, platinum chloride, nitric acid, hydrochloric acid, acetic acid, or salicylic acid is employed. A mixture of tincture of galls and acetic acid is also used. After the etching, the section is carefully heated, whereupon the portions attacked acquire varying tints, mostly golden-yellow, purple-red, violet, or dark blue. A subsequent faint gilding has also been employed by Martens. It must be borne in mind that it is not the colors that are characteristic, but their differences. In each section of my paper, I give the reasons for the conclusions that I have drawn from my investigations—reasons that, with proper judgment, may be easily deduced by any observer who wishes to continue the investigations on the same basis.

Iron crystallizes in the regular system when in a pure state, as well as in combination and mixture with the amounts of amorphous carbon, silicon, phosphorus, or sulphur that occur in a wrought-iron of technical value, and with a small percentage of manganese. When it is possible for crystals to form freely in cavities, the crystals present an octahedral form, resembling a pine tree, with an embodied development of the crystal axes. In the compact iron mass, on the other hand, the individual crystals do not become complete, but press one another, and form grains that are for the most part bounded by pentagonal planes. Evidence of this is afforded by each section of a test piece of iron that has been allowed to cool quietly, and without being disturbed by external pressure, from the fluid or viscous state of aggregation, but is equally obtained in iron produced by an oxidizing process from pig-iron or by remelting. The size of these grains, which, as they belong to the regular crystal system, appear, when the piece of iron is broken, to be on all sides of the same form, and of the same size, is dependent on two circumstances—first, on the rapidity of the cooling; secondly, on the nature and amount of the other elements, either admixed or chemically combined with the pure iron. In the case of malleable irons, the presence of graphite ought, as a rule, not to be taken into account; it is

present more especially in the varieties of steel rich in carbon, but in the malleable irons in practical use it occurs only exceptionally in such amounts as to interfere with or influence the formation of grains, as always in the case of gray pig-iron. Other things being equal, the size of the grains increases in proportion to the slowness of cooling. On the other hand, the size of the grains decreases, with the same kind of cooling, with the proportion of carbon up to two per cent. Above this amount, when the percentage of carbon rises or falls, the grains increase in size. Silicon, sulphur, and small amounts of manganese, titanium, chromium, and tungsten favor the smallness of the crystals, while phosphorus increases their size. Evidence of this is best afforded by pieces of crucible cast-steel containing various amounts of carbon, or containing the same amount of carbon and varying amounts of the other substances mentioned. In this case, the microscope is hardly necessary, for even the naked eye can detect the truth. In tungsten steel, containing two per cent of carbon, an almost amorphous fracture is exhibited.

The only element that changes the regular crystal form of iron containing carbon into a rhombic or, as the end faces have not with certainty been determined as in right angles, into, at any rate, a crystal form not belonging to the regular system, is manganese in considerable quantities. It is not astonishing that inconsiderable amounts of manganese effect no change. An analogous phenomenon is frequently observed in the crystallization of salts from aqueous solutions, in which small quantities of other crystallizing substances effect either no change, or but an inconsiderable one, in the form of salt crystals. As soon as manganese occurs in large quantities, from two per cent, according to my investigations, the regular crystal form of the iron is changed. This may easily be seen in the case of pig-iron: from granular iron a radiated white iron is obtained; with a larger percentage of manganese, foliated spiegeleisen; and with a still higher percentage of manganese, columnar ferromanganese is got. Malleable iron with more than two per cent of manganese occurs only in unsuccessful Bessemer castings. Under the microscope, too, it is difficult to detect the influence of manganese, as the crystal grains, described later on, appear to acquire, only when the percentage of manganese increases, a long columnar form. At all events, these influences may be better detected, as also in the case of pig-iron, with a larger field of vision under a magnifying-glass, than with the microscope. Each individual grain in malleable iron is ductile. The malleability of the entire piece of iron depends upon the ductility of the separate grains.

(TO BE CONTINUED.)

THE DICKSON "EL CALLAO" ENGINE.

One of the most important economies introduced in mining in late years has been the adoption of a high class of machinery. It is not long since any thing in the shape of an engine and boiler was deemed good enough to put up at a mine; now the very best is ordered, and this is as it should be.

The important conditions for good mining engines are, simplicity, strength, and economy in the use of fuel. Elaborate engines, with complicated devices for securing economy in the use of fuel, though sometimes successful in places where skilled labor is readily obtained and repairs quickly and easily made, are not at all adapted to the rough work put upon them at mines. And yet in many mining districts the cost of fuel is so great that it is highly desirable to have economical steam generators and consumers.

At El Callao mine, in Venezuela, the fuel account (wood) during the last year amounted to about \$130,000. The new American management of the mine has promptly introduced economies in every direction, and the magnificent compound condensing engine, of which we give an illustration, and two large tubular boilers and other articles, were purchased from the Dickson Manufacturing Company, of Scranton, Pa., and will effect a very large economy in fuel, amounting for the mill alone, it is estimated, to fully \$36,000 a year.

The engine and boilers were specially designed for the Dickson Company by Mr. E. D. Leavitt, Jr., M.E., of Cambridgeport, Mass., and are worthy of special notice.

The cylinders of the engine are 10½ inches and 18 inches diameter by 36 inches stroke. They make 100 revolutions, and have run up to 120 revolutions; the normal piston speed is, therefore, 600 feet per minute. The engine is intended to develop 150 horse-power, though it can, if required, be worked up to 350 indicated horse-power. The bed-plate, as shown in the engraving, is of the "trunk" type, having a bored guide to receive a turned cross-head, with adjustable gibs to take up wear. The high and low pressure cylinders are in the same line, or "tandem," as it is called. The high-pressure piston-rod is coupled to the rod of the low-pressure cylinder in a manner that will allow of their being disconnected, when the engine can be run with one cylinder only, if necessary.

The engine is provided with a main slide-valve for each cylinder, worked by an eccentric, and riding cut-off valves worked by cams, the cam for the high-pressure cylinder being under the control of a high-speed governor of the Porter type. The kind of cam used on this engine gives no lost motion to its levers, works absolutely quietly at high speeds, and will run for years without wear or any special care. It also possesses the merit that the cut-off can be made as sharp as desirable, and when one movement of the cut-off valve is made, it remains quiet until the time has arrived for the next.

The cylinders are steam-jacketed, and there is an intermediate re-heating receiver through which the exhaust steam from the high-pressure cylinder circulates on its way to the low-pressure cylinder. This renders the moist steam dry and saturated and promotes the economy of the engine.

The air-pump is worked by a belt from a pulley on the main engine shaft, but can be arranged to work otherwise if desired. The condenser is of the jet type, but a surface condenser is supplied where desired.

The El Callao boilers are of the locomotive type, 58 inches diameter, and were put together at the shop and tested to 230 pounds per square inch pressure, then taken apart and shipped in halves for facility in land transportation in Venezuela, where the maximum weight allowed for a piece was 12,000 pounds. The bed-plate of the engine is also in two pieces, for this reason.

The re-heater is provided to re-evaporate any water discharged from

* A paper read before the Iron and Steel Institute by Dr. Wedding.

the high-pressure cylinder. This engine drives the new Callao stamp-mill and a mine pump, the latter by means of a rope transmission. The work is now done on 5 cords of wood a day, or say 2 pounds of coal to the horse-power per hour, where 13 cords were required by the old engine, and, as wood costs \$10 a cord, this represents a saving of \$80 a day.

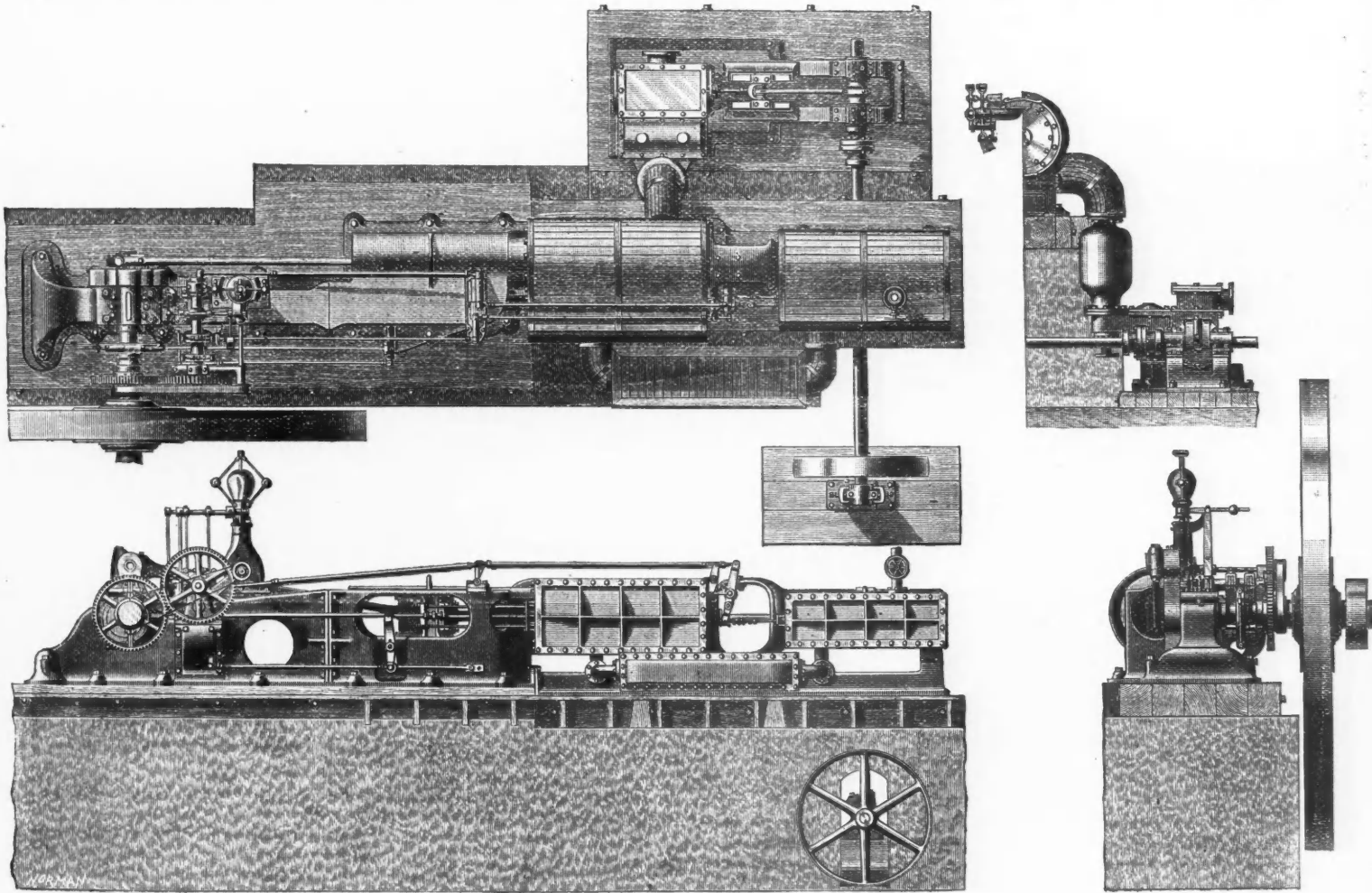
It is extremely gratifying to see American machinery so well represented abroad; and the enormous economy effected not only by the use of American machinery, but also by the employment of American experts at this the greatest gold mine in the world, is an example that will, we trust, be followed by many other mines in Chili and Peru, in Brazil and Central America, in Australia and China, and we believe it will be followed by equally satisfactory results.

Perforating Glass by Electricity.—A simple method of perforating glass has been devised by M. Fages. The apparatus employed, says the *Engineer*, consists of a rectangular plate of ebonite, about 18 by 12 centimeters in size, for an induction coil giving a spark of 12 centimeters. A brass wire passes under the plate and has its point bent up and just penetrating the plate, but no more. This wire is connected with one

- 320,321. Machine for Covering Wire with Metal. Joseph Zengerle, Ansonia, Conn.
- 320,371. Rock-Drilling Machine. Martin MacDermott and William Glover, London, England.
- 320,377. Process of Electro-Depositing Nickel. Jean A. Mathieu, Port Leyden, New York.
- 320,396. Machine for Crushing and Amalgamating Ores. Samuel T. Richardson, Baltimore, Md., Assignor to John K. Pancoast, same place.
- 320,415. Quartz-Mill. Jacob G. Titus, Elizabethtown, New Mexico.
- 320,417. Process of Extracting Arsenic and Mercury contained in the Residues obtained in the Distillation of Mercurial Ores. Alexandre Van Straaler, Polá de Lena, Asturias, Spain.
- 320,445. Journal-Bearing and Metallic Compound therefor. Arthelow M. Randolph, Brainerd, Minn., Assignor to himself and James G. Butterfield and J. S. Wheeler, both of Sioux City, Iowa.

GRANTED JUNE 23D.

- 320,456. Machine for Making Twist-Drills. Frank Buchter, New Bedford, Mass., Assignor to the Morse Twist Drill and Machine Company, same place.
- 320,461. Blow-Pipe. George D. Cowen, Taunton, Mass.
- 320,516. Glass and other Furnaces of the Regenerator Type. Edward Walsh, Jr., St. Louis, Mo.
- 320,532. Apparatus for the Combustion of Liquid Fuel. John D. Bodwell, San Francisco, Cal.
- 320,533. Device for the Combustion of Liquid Fuel. John D. Bodwell, San Francisco, Cal., Assignor to the California Perfection Fuel Manufacturing Company, same place.
- 320,539. Furnace for Boilers. Donald D. Cattnach, Providence, Rhode Island.



THE DICKSON "EL CALLAO" ENGINE.

of the poles of the coil and is pointed at the end. A few drops of olive oil are placed on the plate around the point, and the glass plate to be perforated is laid upon it, care being taken to avoid the inclosure of air-bubbles. The olive oil serves to insulate the wire; and another wire, connected with the other pole of the coil, is brought down over the glass above the lower point. The spark passes between the points and perforates the glass. By moving the glass laterally, a series of holes can in this way be pierced in a few seconds.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

GRANTED JUNE 16TH, 1885.

- 319,952. Drilling-Machine. George Burnham and Asa Goddard, Worcester, Mass.
- 319,956. Apparatus for the Recovery of Soda. Francis A. Cloudman, Cumberland Mills, Me., Assignor to Samuel D. Warren, Boston, Mass.
- 320,002. Ventilator for Gas-Mains. James J. Ricketts, Pittsburg, Pa.
- 320,051. Drilling-Machine. Wesley Dowell, Hicksville, Ohio.
- 320,124. Pulverizing-Machine. Ryerson D. Gates, Chicago, Ill.
- 320,185. Friction Drill-Brace. Richard S. Solomon, Cape Town, Cape of Good Hope.
- 320,237. Rolling-Mill for Wire Rods. William Garrett, Pittsburg, Pa.
- 320,282. Feeding Device for Roller-Mills. George W. Pierce, Springfield, Ohio, Assignor of one half to Pearl M. Cartwell, same place.
- 320,287. Miner's Lamp. Henry J. Richards, Wilkes-Barre, Pa.
- 320,293. Stone-Cutting Machine. William L. Saunders, Jersey City, New Jersey.
- 320,294. Mining-Machine. William L. Saunders, Jersey City, New Jersey.
- 320,295. Drill-Head for Channeling-Machines. William L. Saunders, Jersey City, New Jersey.
- 320,296. Feeding Mechanism for Mining-Machines. William L. Saunders, Jersey City, New Jersey.
- 320,315. Hoisting-Machine. Thomas A. Weston, Stamford, Conn., Assignor to the Yale & Towne Manufacturing Company, same place.
- 320,559. Rock-Crusher. Cornelius W. Huson, Weaverville, Cal., Assignor of one half to William F. Jenkins, same place. [Newark, New Jersey.]
- 320,560. Mold for Casting Ingots of Alternate Layers of Metal. John Illingworth, Furnace. William Kent, Jersey City, New Jersey.
- 320,565. Amalgamating Apparatus. Walter E. Koch, Soulsbyville, Cal.
- 320,583. Explosive Compound. Russel S. Penniman, Jenkintown, Pa., Assignor of one half to John C. Schrader, McClainsville, New Jersey.
- 320,586. Cupola-Furnace having Sectional Water-Jackets. Edward Probert, San Francisco, Cal.
- 320,590. Process of Purifying Hyposulphite Leaching Solutions. Edward H. Russell, Park City, Utah.
- 320,599. Balanced Slide-Valve. Frank M. Stevens, New York City, Assignor to the Stevens Locomotive and Machine Company.
- 320,604. Blast-Furnace. Peter L. Weimer, Lebanon, Pa.
- 320,605. Blast-Furnace. Peter L. Weimer, Lebanon, Pa.
- 320,627. Method of Coking Coal. Arthur M. Chambers and Thomas Smith, Sheffield, County of York, England.
- 320,653. Sheet-Metal Bending-Machine. Christopher C. Hare, Kansas City, Mo.
- 320,655. Machine for Extracting from Pulverized Ores Gold and Silver. Jacob L. Hayward, Framingham, Mass.
- 320,683. Pipe-Coupling. Clarence Phillips, Pittsburg, Pa., Assignor of one half to J. B. Phillips, same place.
- 320,738. Pipe-Coupling. Edward W. Wolfe, Reading, Pa., Assignor to Reading Iron-Works, same place.
- 320,756. Ore-Separator. William L. Card, La Crosse, Wis.
- 320,764. Valve-Gear for Direct-Acting Steam-Pumps. John C. Dean, Indianapolis, Ind., Assignor to Dean Brothers, Steam Pump-Works, same place.
- 320,771. Pipe-Joint Protector. Benjamin Ford, Pittsburg, Pa., Assignor of one half to John D. Ford, same place.
- 320,779. Apparatus for Treating Metal Ingots. John Gjers, Middlesborough-on-Tees, North Riding, County of York, England.
- 320,780. Method of Treating Steel Ingots. John Gjers, Middlesborough-on-Tees, North Riding, County of York, England.
- 320,819. Process of Making Refined Cast-Steel and of Steel Coating Wrought-Iron. Thomas Sheehan, Dunkirk, New York.
- 320,829. Piston-Head Packing for Rock-Drills. Leander S. Woodbury, Calumet, Mich.
- 320,873. Gas-Producer. James Henderson, Bellefonte, Pa.

FURNACE, MILL, AND FACTORY.

A company has been organized to build a pipe foundry on the ground of the Charlotte Furnace Company at Scottsdale.

Improvements are making at the blast-furnace of the Edgar Thomson Steel Company at Braddock, Pa. The D furnace is relining and a new Whitwell stove added. The furnace is one of the largest. After an eighteen months' run with one month's banking, it showed a product of 94,000 tons. They are also putting in a new cast-steel bell and hopper. It is said to be the only bell purely of steel in the country.

Emmens & Roach, Nos. 130 and 134 Cedar street, New York City, have made an assignment. The failure is stated to be due to the general depreciation in the iron trade.

The Greenwood Iron-Works, operated by the Parrott Iron Company, at Greenwood, New York, shut down on the 11th. It is stated that the company is financially embarrassed, but no assignment has been made. The works were established in 1854. It is thought that the company will be able to tide over its difficulties.

Wilson, Walker & Co., Limited, of Pittsburg, Pa., have added a new department to their mills for the manufacture of mining appliances and machinery, including pit cars.

The Vulcan Iron-Works, Pennsylvania, have been sold to William Foulds, of Manchester, and Gordon Brothers, of Hazardville, who have assumed the indebtedness of the company and resumed work after four weeks of idleness.

Reports from Pittsburg state that Moorhead's new open-hearth process has been satisfactorily tested, and will be in working order in two weeks, turning out 50 tons a day from two furnaces.

A receiver has been appointed for the firm of Zschesch & Co., manufacturers of machinery at Indianapolis, Ind. The liabilities are estimated at \$450,000.

The plant of the Merrill & Houston Iron-Works at Beloit, Wis., which has been shut down for some months, has been secured by the Beloit Iron-Works Company, a new corporation, with Frederick Messer, President; A. Aldrich, Secretary; and N. J. Ross, Superintendent.

A company has been organized at Rochester, New Hampshire, with a capital stock of \$80,000, for the manufacture of steel and iron cutting machines, a new invention. The following officers were elected: Directors, John D. Fogg, Charles E. Manson, Isaac Drivers, James Walker, John J. Hoey, A. E. Herson, Nat Wimsheimer; President, John D. Fogg; Treasurer, Charles Blazo; Clerk, Simon Wolf.

The two blast-furnaces that Messrs. J. P. Witherow & Co., of Pittsburg, Pa., are erecting at Dayton, Tenn., for an English company, are almost completed.

The Clapp-Griffiths steel plant of Oliver Brothers & Phillips, at Pittsburg, Pa., consisting of two two-ton converters, made an extraordinary record on the 6th inst. It made forty-five blows in eleven hours with a waste from pig-iron to ingot of 11.12 per cent. Isabella Forge pig was the metal used, producing an excellent quality of soft steel.

Messrs. Cooper, Hewitt & Co., New York, it is stated, have just put into blast their Durham furnace, in Bucks County, Pa., to make iron for the Bessemer and open-hearth processes, and for this purpose they have bought a quantity of foreign ores—principally Elba—to put in with American ores.

Messrs. Moorhead & Co., of Pittsburg, Pa., are ready to ship from their mill the last consignment of their large order of plate iron to Huntington, Hopkins & Co., who are building the San Francisco water-works. They have now on hand about eighty tons of this plate iron.

The National Tube-Works, of McKeesport, Pa., it is stated, have consigned to Jamestown, New York, over 1000 tons of their piping, to be used by several contractors at that place. They will follow it immediately with another shipment of 200 tons to Wells-ville.

The National Barbed Wire Company held a meeting at Chicago, Ill., on the 6th inst., and appointed a committee of five to arrange a new price-list, the same to be not less than 15 per cent higher than is the present schedule. All manufacturers will be requested to close their factories until the new organization is completed and every thing in working order. The amount of cash stock to be issued outside of that held by manufacturers in the association is not to exceed \$250,000

Another meeting will be held soon to receive the report of the committee on prices.

J. H. Boone, proprietor of the Stony Creek rolling-mills, Norristown, Pa., has made an assignment. The collapse is attributed to the general business depression.

The Clearfield Fire-Brick Works, at Clearfield, Pa., are in full blast, running double turn. This factory has capacity for manufacturing 12,000 brick daily, but at the present time is only making from 9000 to 10,000 a day. This brick is used in many of the Pittsburg steel-works.

The city of Boston, Mass., has awarded the contract for 70,000 granite paving blocks to Lombard Brothers, whose bid was \$37 a thousand. The next lowest bid was from the Cape Ann Granite Company, which bid \$37.90, the Rockport Granite Company bidding \$37.94. There were proposals from nine other firms and individuals. The contracts for supplying 3383 feet of curbing of Class 1, and 750 feet of Class 2, were awarded to the Cape Ann Granite Company, which bid \$1.39 for Class 1, and \$2.59 for Class 2, making a total of \$6663.

The Solar Carbon and Manufacturing Company of Philadelphia, Pa., has been chartered. The capital stock is \$300,000. The company is organized for the purpose of manufacturing, purchasing, using, and selling carbon in its various forms, including electric light carbon, and manufacturing, using, and selling any and all machinery needful for its purposes, and all appliances connected therewith. The directors are James McC. Creighton, B. K. Jamison, James B. Young, Joseph F. Tobias, M. E. McDowell, and Harry L. Frank, of Philadelphia, and John W. Patterson, of Pittsburg.

The Griffin Pulverizer Company has been organized with a capital stock of \$50,000, with head-quarters at Montreal, Canada. It is intended to manufacture machinery for the pulverizing of phosphates and ores generally. The incorporators are Messrs. Alexander W. Morris, R. C. Adams, and Charles B. Morris, of Montreal, and Edwin Packard and J. R. Griffin, of Brooklyn.

The new Owens continuous regenerative gas furnace at Wilson, Walker & Co.'s, Pittsburg, Pa., which was put in operation on the 30th ult., works satisfactorily.

The Board of Water Commissioners, at Philadelphia, on the 11th inst. received and opened twenty-five bids for a pump to throw 10,000,000 gallons of water a day. There were twelve bidders, and the prices ranged from \$21,500 to \$45,000.

The Katahdin Charcoal Iron Company has been organized at Bangor, Me., with a capital of \$60,000. The following officers have been elected: President, Charles V. Lord, Bangor; Secretary and Treasurer, Henry McLaughlin, Bangor; Directors, Charles V. Lord, F. A. Wilson, C. A. Gibson, and E. M. Hersey, of Bangor, and A. P. Gould, of Thomaston; General Manager, O. W. Davis, Jr., of Bangor; Ernest Sjöstedt, Superintendent. Good progress is made toward rebuilding the works destroyed by fire, and the fires in the furnace are expected to be in blast October 1st.

The sheet rolling-mill of the St. Louis Stamping Company, Ill., which has been idle since May 1st, was started up on the 5th inst.

LABOR AND WAGES.

The recent law prohibiting the employment of boys under the age of fourteen years inside the coal mines in Pennsylvania may create a complication of troubles. The aggregate number of boys in Luzerne, Schuylkill, Carbon, and Northumberland counties that the new law affects will reach several thousand. Its enforcement began August 1st, and as rapidly as Slavs and Polanders could be supplied to fill their places, boys under fourteen employed in various ways inside the mines and those under twelve years employed as slate-pickers in the breakers were discharged. The remuneration for such services ranged from 65 cents to \$1 a day. The foreigners are willing and anxious to work, it is said, for even less compensation.

The Amalgamated Association of Iron and Steel Workers that was in convention at Wheeling, West Va., last week, has established a bureau of labor statistics, for the purpose of gathering reliable information of the trade from all parts of the country. The Association decided to exclude nailers and other workers in nail factories from the Association.

The miners of the Pittsburg District, Ohio, and

Kanawha region are said to be preparing for a big strike. The miners appreciate the fact that there is to be a sweeping reduction in the price of digging coal this fall, and they are preparing, it is stated, for concerted action.

For the first time in its history, the Western Nail Association met in Chicago, on the 12th inst. The conference has decided that the feeders who took the places of the striking nailers should be given preference, but that the nailers would be taken back when they acceded to the Association's terms.

The great strike that was inaugurated at Saginaw, Mich., five weeks ago, is practically ended. The action of the employes on the 12th inst. in offering to accept the same conditions the mill-owners were willing at first to concede—namely, ten hours and a proportionate reduction in wages—shows they are tired of idleness and willing to throw up the sponge.

TRANSPORTATION NOTES.

The Lehigh Valley Railroad Company has begun the active shipment of bituminous coal from the lands it recently purchased in the Snowshoe region of Pennsylvania. The shipments this year will reach, it is stated, 350,000 tons. The coal is also coked to a considerable extent, and both the coke and coal are disposed of along the line of the Lehigh Valley Railroad Company.

The manager of the Cairo, Vincennes & Chicago Railroad was granted an order by the court on the 13th inst. allowing him to issue \$300,000 worth of receiver's certificates for the purpose of relaying the track with steel rails and equipping the road. This is a branch recently lopped off the Wabash system.

COAL TRADE NOTES.

ALABAMA.

The Broken Arrow mines, near Coosa River, are operating 62 coke-ovens, and are building more.

KENTUCKY.

Messrs. D. M. Youmans and E. P. Rathbone, of London; William Thomas, of Aberdeen, Scotland; Thomas Morgan, of Cardiff, Wales, and Thomas Corey, of Swansea, Wales, interested in the English canal coal and gas company, owning a large tract of coal land in the northern part of the State, about 100 miles from Cannelton, are now visiting the property to examine it preparatory to developing it at once. It is asserted that they can make gas cheaper and better from it than from any other kind. The coal they will ship to England and use in the manufacture of gas.

MISSOURI.

Prospecting for coal is going on at various points throughout Southwest Missouri with good results.

MONTANA.

The operations near Great Falls, Choteau County, show that the coal recently discovered is of a fine quality. A shaft is sinking some distance back from the river, and has reached a depth of about forty feet. The vein worked is estimated to be fully 800 feet lower than the Sand Coulee coal-veins. The quality of coal closely resembles anthracite, being very hard.

PENNSYLVANIA.

ANTHRACITE.

A boiler exploded on the 11th inst. at the Shenandoah City colliery, the property of the Philadelphia & Reading Coal and Iron Company, causing a loss of about \$6000. One man was injured.

One of the boilers that supplied steam to an engine used for hauling cars up the slope at the Hillman Vein colliery, at Wilkes-Barre, exploded on the 12th inst. The foreman was badly scalded and so much injured that he can not recover.

All the widows of the victims of the disaster at the Cuyler colliery at Raven Run, have settled with Heaton & Co. and Mr. and Mrs. Smith have settled their suits for damages, for the loss of their son Bernard. The amount paid each of the widows was \$1000. A less sum was paid to those who were not widows. Of these there are two who have not settled.

The fire in the North Ashland mines was extinguished on the 8th inst.

An explosion occurred in the colliery of Haddock & Steel, at Luzerne Borough, near Wilkes-Barre, on the 7th inst., by which the colliery was greatly damaged, one man killed, and another fatally wounded. The explosion took place at the head of the new plane,

which has just been driven from the lower to the upper vein inside the mine. The latter is very gaseous, and the ventilators not having been completed, the gas accumulated, and shortly after noon ignited from the naked light on the hat of one of the miners. The damage to the colliery is extensive, but only affects that part in the immediate vicinity of the plane. Work in the other parts of the colliery has been resumed.

At the mine of the West End Coal Company, operated by Conyngham, Teasdale & Co., at Mocanaqua, twelve miners lost their lives by suffocation on the 11th inst. The stoppage of the fan and the consequent accumulation in the mine of fumes from the boiler-fires and foul gas caused the accident. As the responsibility for the accident rests somewhere, the coroner, in order to determine who is at fault, impaneled a jury on the 12th, who, after visiting the mines and viewing the remains of the dead miners, adjourned, to meet at Shickshinny on the 15th.

BITUMINOUS.

Governor Pattison has appointed the following bituminous coal Mine Inspectors: First District, Henry Louttit, Monongahela City; Second District, William Jenkins, Irvin Station; Third District, Thomas Adams, Wheeler, Mercer County; Fourth District, Roger Hampson, Towanda, Bradford County; Fifth District, J. J. Davis, Pittsburg; Sixth District, Josiah Evans, Johnstown; Seventh District, James Blyck, Grove City, Mercer County; Eighth District, John Watt, Tarentum, Alleghany County.

WASHINGTON TERRITORY.

Tests made with the coal of the Tacoma Coal Company show that the coal is of a good quality and suitable for smelting.

WEST VIRGINIA.

The Beury Coal and Coke Company has been formed for the purpose of mining, selling, and shipping coal; manufacturing, selling, and shipping coke, and purchasing and leasing coal, mineral, and timber lands, and transacting any and all other business connected with the carrying out of the purposes of this corporation. The principal place of business is to be at Stone Cliff, Fayette County.

GAS AND PETROLEUM NOTES.

Exports of refined, crude, and naphtha from the following ports, January 1st to August 8th:

	1885.	1884.
	Gallons.	Gallons.
From Boston	5,878,482	3,297,990
Philadelphia	85,933,306	45,371,883
Baltimore	6,304,572	7,351,997
New York	216,199,854	224,551,112
Total exports	313,470,214	280,574,982

ALABAMA.

The Pratt Coal and Iron Company has a diamond drill testing and working natural gas on its property.

CANADA.

PROVINCE OF ONTARIO.

Natural gas is said to have been struck at Port Colborne at a depth of 420 feet.

NEW YORK.

The Buffalo Lubricating Oil Company has instituted a suit in the Supreme Court at Buffalo, against the Atlas Refining Company for \$25,000 damages, alleged to have been sustained by the delivery of an inferior article of oil product, which was represented as crude petroleum. The case is creating considerable interest in legal circles, as it involves many questions of law not yet decided by the higher courts.

PENNSYLVANIA.

The Alleghany Poor Board has accepted the proposition of the Philadelphia Natural Gas Company to supply the buildings on the City Farm with natural gas during the ensuing year for \$1800. The cost of coal at the farm last year was \$1800.

The Shenango Natural Gas Company has struck another gas-well near Centerville, Butler County, about six miles from its first well. The company will probably start to lay pipes for the purpose of bringing it to New Castle.

Zug & Co., of the Sable rolling-mill and nail-works at Pittsburg, will introduce natural gas in all departments as soon as experiments they are now making demonstrate the best methods of using it.

Advices from Pittsburg state that much attention is paid to the utilization of natural gas. Carnegie Brothers & Co. already may be said to have perfected their plant in this direction, both as to capacity and reduced cost.

GENERAL MINING NEWS.

ARIZONA.

PIMA COUNTY—QUIJOTOA DISTRICT.

The superintendent of the Peer, Peerless, and Crocker mining companies reports: We have 59 feet to run yet in order to connect the north drift with tunnel No. 2 and the south drift from the winze. When these connections are made, we shall have an outlet for all the ore on the north end of the Peerless ground at a depth of 150 feet. A winze is sinking near the north end of the Peerless ground as an ore-chute for all that level. The various stopes and cuts on the hill are looking well. Good progress has been made on the mill, and it will be ready to start up on or before the 1st of September. The tramway connecting the mine and the mill, as well as the cars and dumps, are in complete order. Work at the shaft in the valley, which is sinking deeper for the purpose of making a sump, has been stopped on account of the abundant flow of water. A large flow of water could be obtained by sinking deeper, but there is a sufficient quantity at the present time to supply a forty-stamp mill. The surface pump has been started up, and water has been forced through the main line to the mill, where three tanks holding 25,000 gallons each have been erected. A tank of the same capacity has been erected at the well to receive the water from the pumps in the shaft. Every thing is working very satisfactorily.

YAVAPAI COUNTY.

HARTFORD COPPER COMPANY.—This company has made contracts for opening up some of its claims near Copper Mountain, with the view of starting its smelter.

CALIFORNIA.

Mr. J. B. Randol has furnished us with the following statement of the production of quicksilver during July:

Mines.	1884.	1885.
	Flasks.	Flasks.
Etna	374	45
Napa Consolidated	101	191
Great Western	258	321
Guadalupe	200	...
New Idria	29	75
Sulphur Bank	52	209
Redington	71	43
Great Eastern	0	50
Various	0	10
New Almaden	1,543	1,750
	2,628	2,694

PNEUMATIC TUBE AND SUBMARINE MINING COMPANY.—The company has been organized to buy, bond, sell, or work submerged mining claims in California; capital stock, \$500,000, in shares of \$2 each.

AMADOR COUNTY.

AMADOR QUEEN MILL.—The three Duncan concentrators first put in this mill have given such perfect satisfaction in the saving of the gold sulphurets that eight additional Duncan concentrators have been ordered for the new 20-stamp mill now nearly completed. The uncertainty about the feasibility of concentrating these ores, which are very base, it is said, has now been overcome.

EL DORADO COUNTY.

A dispatch, dated Boston, August 11th, says that Judge William Allen, in the Supreme Court of Massachusetts etc., has made his decision in a case that has attracted wide-spread attention. The suit was that of Frank B. Dole and others vs. John Woodridge, of Lynn, and H. L. Robinson, of Placerville, Colo. This was a suit brought to recover some \$75,000 on account of alleged false and fraudulent representations made by Woodridge, in the joint purchase of a gold mine of Robinson, in March, 1880, the defendant Woodridge conducting the negotiations of purchase and sale. The plaintiffs claimed that Woodridge paid only \$100,000 for the mine, but represented to them that he paid \$195,000 for it. Judge Allen found as matter of fact that the defendant Woodridge paid only \$100,000 for the mine, and held that the plaintiffs could recover from defendant the money obtained from them by fraud, amounting to \$72,250, with interest from March 1st, 1880, and costs, the total amount being about \$100,000.

MONO COUNTY—BODIE DISTRICT.

BULWER CONSOLIDATED.—The usual progress in the work has been made. The main north drift shows two feet of fair milling ore, and improves as it advances. Uprise No. 2 carries 10 inches of good ore.

STANDARD CONSOLIDATED.—During the week ended August 1st, the ore-body in both 400 north drift and uprise has widened and now averages four feet. This development, being in ground that apparently has not

heretofore been worked, promises a future that may be of advantage to the property. Ore sent to mill by six days' run, 418 tons. Mill was closed July 31st to clean boilers; started again at six o'clock A.M. on August 1st. Bullion valued at \$10,941.23 was shipped on the 29th ult.

SAN FRANCISCO COUNTY.

SELBY SMELTING AND REFINING COMPANY.—The original works of this company were erected in 1867 at the foot of Hyde street, North Beach, San Francisco, to furnish the shot and lead-works with pig-lead for use in their various manufactures. Since that time, the business has been extended and now embraces the smelting of gold, silver, and lead-ores, and sulphurets, refining lead bullion, manufacturing bluestone and copperas, and parting and refining gold and silver. More room and better railroad facilities being necessitated by the increased business, the company last fall secured its desirable property on San Pablo Bay, near Vallejo junction, where extensive works are now erecting, and which will be in operation soon. The works will have the latest and most approved facilities for quickly and economically handling ores and bullion in large quantities; and as the railroad passes on one side, and the company owns deep-water frontage on the other, coal can be received directly from ships' side, and ores directly from the cars without the expense of respinning or hauling. There is also sufficient land to greatly extend the works when increased business demands it. In addition to the smelting and refining business, and in connection with the shot-tower, the company is erecting in the vicinity of the smelting-works a factory for the manufacture of shot-gun cartridges under the Chamberlain patents, having secured the sole right to the use of these machines on the Pacific coast.

CANADA.

PROVINCE OF QUEBEC.

The discovery of a rich gold mine in Megantic is reported.

COLORADO.

ARAPAHOE COUNTY.

Smelting-works are building near the Exhibition grounds, at Denver, says the Idaho Springs News. The works contain two improved water-jacket furnaces, forty tons each, with engines, boilers, roasters, and every thing complete. It is stated that a number of Leadville gentlemen are interested in these works. The roasting of the ores is an improvement over any thing ever introduced in this country. A Bailey gold mill will be erected in connection with the smelter. Parties can send their ore down in car-loads and go down and see the tests themselves. Bids for ores will soon be made.

BOSTON & COLORADO SMELTING COMPANY.—Mr. H. R. Wolcott states that this company intends to make a thorough examination of the Pacific slope with the view of establishing smelting-works at some point.

CHAFFEE COUNTY.

The case of F. P. Davis and others vs. Alexander Hogue and others is trying in the District Court at Buena Vista. The case involves the right to the possession of the Little Hope mining claim, situated in Monarch Mining District, in this county.

CLEAR CREEK COUNTY.

Sixty-five cars, containing 785 tons of ore, valued at about \$110,000, were shipped during July from the Georgetown depot to the following places: Denver, 27; Argo, 19; Golden, 9; Idaho, 2; Lawson, 8.

ANTELOPE.—The temporary injunction upon this lode, Republican Mountain, has been lifted, and work has been resumed.

DOLORES COUNTY.

RICO SILVER MINING COMPANY.—A contract has been let to continue the northwest tunnel on the Puzzler lode. This tunnel is in 185 feet, and shows a very fine vein of decomposed ore and gouge matter.

LAKE COUNTY.

The Leadville Herald reports the following: A new and important mining enterprise has just been inaugurated, which has for its object the development of the large area of ground covering the north slope of Printer Boy Hill, opposite Oro City. The gentleman providing the funds for this work is Mr. D. T. Littler, of Springfield, Illinois. The enterprise was begun by securing leases or bonds on about sixty acres of promising territory, embracing the following lode and placer claims; Lower Printer Boy, Upper Printer Boy, Miner's Hope, Maria, Pilot, Reveille, Bradshaw, and Lincoln lodes, and the Alexander and Wells placer claims. The leases and bonds

run for eighteen months from August 15th, and should the properties eventually be taken by Mr. Litter under the bonds, it will involve a transaction of over \$200,000. Considerable water will unquestionably be encountered, and a 10-inch Cornish plunger pump has already been ordered.

CROWN POINT.—The Excelsior Iron-Works have received an order for a fifty horse-power Hendy & Meyer hoister, double engine and patent Frisby clutch. Also a sixty horse-power Otis steel boiler, a cage for the shaft, and other machinery to be placed on this property.

DUNKIN.—Nearly ten tons a day of ore are produced that will run from forty dollars a ton upward. The richer ore occurs as boulders or lumps of hard carbonates.

FOREPAUGH.—Since the suspension of work, the water has risen in the shaft to a height of 130 to 150 feet. The manager says that work will not probably be resumed until some of the neighboring shafts attain the water-level and assist in draining the hill, as the quantity of water encountered and the expense incurred in lifting it to the surface are too great for a single company.

HENRIETT.—The ore product for the next six months has been contracted to the Harrison Reduction-Works. At present, the output is not very large, but consists of desirable smelting ore. Should the water be taken from the main incline, vast bodies of fine galena ore would become available for shipment.

LITTLE CORINNE.—This mine, on Mosquito Pass, has begun shipping some very rich gold ore to the American Smelter. The property was worked during the past winter; the ore extracted then is now sent to the smelters. The first-class ore taken out is reported to contain from ten to twelve ounces in gold to the ton.

O'DONOVAN ROSSA.—Collier & Cleveland, of Denver, have redeemed the property of this company, sold under execution in 1884.

ROBERT E. LEE.—A contract has been made for a Hooker & Colville sinking-pump. The pump will have a 20-inch steam-cylinder and 9-inch plunger, and will be the largest vertical sinking-pump in the district. It is calculated to lift 350 gallons a minute 500 feet.

SILVER CORD.—The working force has been increased. The output of the mine this month will probably reach 2000 tons of smelting ore. The large stope opened to the south of the Ruby shaft continues showing magnificent ore-faces. The water has all been pumped from the Ruby shaft, so that now the stope can be increased both to the eastward and westward. In working to the southward, in this stope, a mass of sulphide ore has been encountered from eight inches to three feet in thickness. This ore carries about thirty-two per cent in lead and twelve ounces in silver to the ton.

ST. KEVIN.—The mine has been sold for \$25,000 cash to New York parties. The property supplies the foundation for the St. Kevin Mining Company, organized by Messrs. D. Knowlton, W. E. Sheffield, and G. L. Hassell, and is capitalized at the remarkably reasonable sum of \$100,000. Before purchasing the property, the buyers worked it for a time under a bond, and finding that it would be a good mine, they paid the stipulated price and secured their title to the lode, which is patented. At present, the main shaft is sinking to greater depth, preparatory to driving new levels at 150 feet from the surface. The shaft is penetrating strong ore-bodies, running from 53 to 72 ounces in silver to the ton.

ST. LOUIS.—This mine, formerly known as the Miner Boy, has recently been leased to Mr. James Fletcher. During the past few months, the mine was worked by Mr. Zoebel, one of the owners, with considerable success. The value of the ore is mostly in the gold it carries.

WOLFE TONE.—The new concentrating mill has been put in motion, and the machinery of the establishment is rapidly adjusting to the ore to be treated. The mill, to all appearance, is well appointed. Its equipment consists of three Dodge rock-breakers, three centrifugal pulverizers, and nine Triumph concentrating tables. The arrangement of the mill is economical and calculated to save labor in every department, so that it can be operated at a minimum expense.

PARK COUNTY.

SOVEREIGN.—Ore is now shipped to the new mill. It is stacked up in convenient proximity to the mill, so as to be in readiness for a start. The moving of the

ore costs only \$1.25 a ton from all parts of the mine, and the intention is to accumulate 3000 tons before the start is made.

PITKIN COUNTY.

It is stated that upward of forty tons of ore a day are shipped from Aspen to Leadville, Pueblo, and Denver. The mineral will average as high as 150 ounces of silver a ton. Besides this, the smelter is using up from forty to seventy tons a day.

The ore treated at the Aspen smelter is running higher in copper than usual, and one of the furnaces has been blown out to fix a lead tap at a lower point in the crucible so that the lead can be extracted more easily.

An order was issued in the United States Circuit Court at Denver, on the 3d inst., in the famous Durant-Aspen mining suit, modifying the original order made by this court some time ago. The order first recites that a portion, the north end of the Aspen mine, is not in dispute. This portion, it is ordered, shall be surveyed off, and the line between it and the disputed portion definitely established. It may then be worked by defendant without interference on the part of complainant or others. The disputed portion is to be worked by the defendant at his own risk, the limit of men to be employed being ten. The complainant shall have the privilege of having two men to watch such workings. It is provided that, if this work shall be conducted at a loss, such loss shall be borne by the defendant; but all proceeds of such work over and above the expenses of conducting the workings of the mine, shall be deposited in the Denver National Bank, subject to the order of the court, pending the settlement of the suit now before the court to decide the title to the property.

ASPEN.—Forty men are working on the undisputed territory, and the force will be increased if the ground proves as valuable as it did in the better prospected portion of the claim.

DURANT.—Four shifts of six hours each are worked, not in taking out ore, but in driving the incline as fast as possible into the Emma and Aspen ground. The men have instructions to pay no attention to mineral if found, but only to shove ahead and reach the workings of the other mines.

PUEBLO COUNTY.

The Rio Grande Railroad has used over 300 car-loads of slag during the past month in repairing the breaks along its line. All this was purchased of the Pueblo smelter.

DAKOTA.

LAWRENCE COUNTY.

FATHER DE SMET.—The official report for the week ended August 1st states that the ore extracted and milled was 2975 tons. Fourth level uprise advanced 13 feet on company account. The rise is up 67 feet.

IDAHO.

IDAHOAN.—The mine shows steady improvement as depth is attained. At the bottom of the shaft, which is 415 feet from the surface, the ore vein is 6½ feet thick, 20 inches of which is solid galena, the balance being jiggling ore.

QUEEN OF THE HILLS.—Reports are, that a strike has been made.

ILLINOIS.

JENNIE PARKER.—This company has been organized at Chicago for the purpose of doing a general mining business. The capital stock is \$100,000; incorporators, Philander Hickox, Sylvester D. Foss, and Abner H. Wright.

SANTA FELICITA SYNDICATE.—Licenses to incorporate have been issued by the Secretary of State to the Santa Felicita Syndicate, of Chicago, to buy, sell, and lease mines and mining property, and to operate mills and smelting-works; capital stock, \$5,000,000; incorporators, Russell Alden, D. W. Albaugh, and James R. McPherson.

MEXICO.

The Mexican *Financier* reports the following: The Wiswell Electric Mining Machinery Company is putting up a mill at Fresnillo on the mine managed by Thomas L. Darlow. A new pump is to be placed on the same property.

MEXICAN SILVER.—A petition for the winding up of the affairs of the Mexican Silver Syndicate, Limited, which had charge of the Las Nieves property, was recently heard in London.

SANTA EDUVIGES.—At this mine, in the district of Jesus Maria, State of Chihuahua, work will soon start up with a ten-stamp mill. Mr. A. S. Weston, of Colorado, is at the mine to superintend the work.

The machinery has been received recently for a twenty-five stamp mill. The price paid for the property was \$85,000, Mexican money, the purchase of the property having been effected two years ago. Since that time, the American and Mexican owners got into legal difficulties, which have recently been settled by the decision of a Chihuahua State court to the entire satisfaction of the American owners. The company has already spent on the property, including the cost of machinery, it is stated, some \$400,000 in Mexican money. The ore produced is free milling, carrying a great deal of silver with some gold.

MICHIGAN.

COPPER MINES.

The July outputs of the reporting mines of the Lake Superior copper mining district are herewith given, together with comparisons of the same with the outputs of these mines in July, 1884, and July, 1883; mineral = 75 per cent fine copper:

Mines.	July, 1885. Tons.	July, 1884. Tons.	July, 1883. Tons.
Calumet & Hecla.....	2,580	2,340	1,736
Quincy.....	300	301	300
Atlantic.....	215	185	158
Franklin.....	193	175	180
Huron.....	101	116	18
Copper Falls.....	68	50	41

For the first seven months of the calendar year, the aggregate outputs of four of these mines compare as follows:

Mines.	From Jan. 1, 1885. Tons.	From Jan. 1, 1884. Tons.	From Jan. 1, 1883. Tons.
Calumet & Hecla.....	16,875	14,640	11,783
Quincy.....	1,592	1,662	1,650
Franklin.....	1,304	1,227	1,142
Huron.....	776	682	.....

IRON MINES.

The following statement, published by the *Marquette Mining Journal*, shows the amount of iron ore and pig-iron shipped from the lake ports of that district for the season, up to and including Wednesday, August, 5th:

	Gross tons.
Marquette.....	337,063
Pig-iron.....	1,490
L'Anse.....	19,136
St. Ignace.....	44,559
Pig-iron.....	2,249
Escanaba, Marquette District.....	283,329
Menominee District.....	389,974

The shipments by lake from all ports of the district up to date amount to 1,074,061 gross tons, the falling off, compared with last season, being 381,189 tons.

METROPOLITAN IRON AND LAND COMPANY.—The Norrie mine, Gogebic range, is developing. The first shaft down showed a 10-foot vein. West of this some distance, the vein is 20 feet wide. A shaft down 40 feet struck an immense flow of water, and a steam-pump is now going in to overcome the difficulty.

MINNESOTA.

The shipments of iron ore from the port of Two Harbors were as follows for the week ended August 5th:

	Gross tons.
Minnesota Iron Company.....	12,109
Previously reported.....	100,913
Total.....	113,022

MONTANA.

DEER LODGE COUNTY.

PYRENEES.—It is the intention of the new company to develop the property, and in order to treat the increased amount of ore, it is proposed to work the old five-stamp mill, which will be enlarged and the batteries increased to twenty stamps, with which possibly 40 tons of ore a day can be crushed.

LEWIS & CLARKE COUNTY.

ESLER CONCENTRATING-WORKS.—These works, at Helena, will be in operation, it is thought, by the first of September. Ore is now bought from various mines.

NELLIE GRANT.—According to a rumor, this company, at Helena, which dropped out of sight a couple of years ago, now talks of making some extensive improvements on its silver-lead property in the Ten-Mile District.

MISSOULA COUNTY.

J. B. GOLD MINING COMPANY.—This company has been organized at Missoula, with a capital of \$100,000. The principal objects of the company are to purchase the J. B. gold mine, on Quartz Creek, forty miles from Frenchtown, the erection of a mill for reducing the ore, and the development of the mine.

SILVER BOW COUNTY.

A special correspondent has sent us the following letter from Butte: Since the failure of the Bell copper mine and smelter,

interest in copper properties has lessened. It is generally conceded that the Bell mine could not operate except with losses at the present price of copper. Great credit is given to your JOURNAL for exposing (even as much as a year ago) the condition of the Bell mine and the copper properties in general.

The Anaconda has only from 14 to 16 furnaces running out of 26. Nevertheless it reduces the same tonnage of ore as before. Evidently the ore on an average is poorer, and does not contain more than 10 per cent of copper. In order to work all furnaces, they have lately erected an additional number of calciners, and at present have started to build an additional concentration mill, which will enable the Anaconda Company to run full blast. In the mine, developments reach a depth of 1000 feet; but it ought not to be overlooked that the ore is getting poorer in depth.

The Parrot Company runs full blast. It is sinking to the 430-foot level. The ore body above the 330-foot level is pretty well taken out.

The Montana Copper Company runs as usual. In the West Colusa, developments show a splendid ore-body. In the East Colusa, the company is sinking another 100 or 200 feet down from the 600-foot level. Mostly development-work is doing, in order to have large ore reserves on hand. In the Parrot mines, work goes on as usual.

The Mountain View mine has shown some very rich ore lately. The owner is developing this property with the intention of selling out to one of the big mining companies adjoining.

The Liquidator mine is repairing its shaft, and no ore is hoisted.

The Clark's Colusa Fraction has ore yet in sight for a few months, and will have to sink and look for new ore-bodies, which certainly will be found.

The Wild Bill is taking out a fair amount of ore. Other copper properties, as the Amazon mine, etc., are not worked at present.

All the Butte copper producers have to struggle hard to run without losses at a price of 10½ cents for fine copper in New York. This fact can not be disguised.

The new custom ore smelter will hardly be a success. Not having capital enough to buy ores or to make advances to miners, it will work only on tolls and return the product to the miners. There will be no money in it, either for the smelter or for the mine owners. As far as the technical arrangement of the works is concerned, I shall give you some information in my next. It is certainly not a model.

Several small copper properties are for sale, but investors are scared, for the reason that they fear annoyances from adjoining mine-owners, or from mining sharks ready to create trouble whenever the real investor has improved his property sufficiently to promise profits. This has been the curse of every prosperous mining camp, and Butte will not be spared, though so far, but very few cases have come up, and the courts have always acted very fairly, protecting legitimate interests.

In silver properties, there is no change. The Alice, Lexington, Moulton, and others are all doing well.

ALICE.—The report for the second quarter of 1885 shows the following:

RECEIPTS.	
From bullion yield, assay value.....	\$285,930.58
From supplies sold.....	3,330.54
From railroad freight collected.....	406.52
From railroad reclamations collected.....	14.51
From cash discounts on supplies purchased.....	100.90
Total receipts.....	\$289,849.05
Cash in hands treasurer and superintendent, April 1st, 1885.....	1,179.44
Value of cordwood on hand, April 1st, 1885.....	11,283.00
Total.....	\$302,311.49
Balance, cash in hands treasurer and superintendent.....	2,985.47
NOTE. —The assay value of the bullion is based on the old standard value of \$1.29¼ per fine ounce.	
DISBURSEMENTS.	
Discount on silver.....	\$50,028.13
Expressage on bullion.....	4,075.65
Permanent improvements.....	27,610.20
Prospecting and dead-work.....	24,335.03
Ore extraction.....	59,271.49
ORE REDUCTION.	
Labor, per pay-rolls.....	\$25,107.59
Supplies.....	1,450.51
Salt.....	3,734.63
Freight on salt.....	23,398.95
Fuel.....	17,103.80
Assay materials.....	527.28
Quicksilver.....	1,454.37
Total.....	\$73,377.13

GENERAL SUPPLIES.	
For store-house, and freight on same.....	3,421.66
Lode claims.....	5,154.53
EXPENSE ACCOUNTS.	
Salaries.....	\$2,175.00
General expense.....	280.37
Legal expense.....	828.25
Office expense.....	138.87
Stable and ore hauling.....	327.68
Insurance.....	615.00
Interest paid on company's notes.....	1,820.07
Stationery and printing.....	114.10
Postage and telegrams.....	75.73
Advertising.....	37.10
Traveling expenses.....	5.00
Exchange on drafts.....	313.84
Total.....	\$6,731.01
Bullion reclamations.....	1,991.44
Total.....	\$255,996.27
Bills payable—three monthly payments of \$4166½ account company's notes.....	12,500.00
Dividend No. 15.....	25,000.00
Cordwood on hand.....	5,829.75
Balance, cash in hands treasurer and superintendent.....	2,985.47
Total.....	\$46,315.22
Grand total.....	\$302,311.49

It is to be regretted that this report does not give the quantity of ore mined or milled, and therefore no basis for estimating the cost of the work done.

Since the date of the last report, the Alice shaft has reached the 800-foot level; the station has been cut, and a cross-cut run toward the vein a distance of 75 feet. The new hoisting-rig, double direct-acting engines, has been placed on this shaft and will begin running in a few days. The main shaft at the Magna Charta end of the property will be down to the 700-foot level within sixty days from this date. Superintendent W. E. Hall reports that all of the property is in good condition, and the outlook for the coming quarter very satisfactory.

BELL.—A fire occurred at this mine on the 1st inst., which destroyed the shaft, with all the interior workings of the shaft, and the engine-house. The cause of the fire is not known, though it is presumed to be the work of an incendiary, as no fire had been kept around the premises for some days. So far, the damage is estimated at about \$15,000. The property of this company will be sold at public auction on September 2d, at the office of T. H. Tyndale, No. 42 Court street, Boston, Mass.; \$5000 to be paid in cash at the time and place of sale; the balance in ten days thereafter, upon delivery of the deed.

NEVADA.

EUREKA COUNTY.

EUREKA CONSOLIDATED.—The superintendent reports officially for the week ended August 1st as follows: During the week, there were hoisted 215 carloads of ore from tributaries. The general output of ore from other places than the Williams pitch has fallen off. Williams's pitch turns out very well; but we shall be obliged to draw heavily from it for more ore. We are prospecting in over twenty places in the mine, and have some very good indications for ore. During the same period, the furnace produced 880 bars of bullion (over 45 tons), of an average value of nearly \$260 a ton.

STOREY COUNTY—COMSTOCK LODGE.

CONSOLIDATED CALIFORNIA & VIRGINIA.—For the week ended August 1st, the daily average of the ore taken out under the Jones lease has been slightly increased; the amount shipped amounted to 426 tons, exceeding that of the week ended July 25th by about 100 tons. The assay value of the ore is given at \$17.75 a ton. Some surface work is done at the shaft, consisting of building bins for the new ore-dumps and bringing the old platform up level with the new one by filling in with the waste taken out in easing timbers in the shaft and opening up the 1300 level.

HALE & NORCROSS.—The machinery for the new hydraulic pump has arrived, and is getting into position on the 3000 level. The usual progress is made in sinking the combination shaft, and no trouble is experienced in handling the water.

NORTH SAN FRANCISCO.—This mine, adjoining the Keystone, has recently been sold to San Francisco parties, who are having an abstract of title prepared preliminary to applying for a United States patent on the ground. After the patent has been secured, they will erect hoisting-works over the shaft, which is down about 50 feet below the surface, and in which there is said to be a vein of silver-bearing quartz above the milling grade.

WHITE PINE COUNTY.

MARTIN WHITE.—The old mining suit of Martin White vs. Annis Merrill, John A. Hooper, F. P. Hooper

E. D. Sawyer, George C. Hickox, and Benjamin Wiggin came up at San Francisco, Cal., on the 3d inst. The action was originally brought in the Ninth District Court to secure a decree compelling the delivery to plaintiff of 30,000 shares of the so-called syndicate stock of the Martin White Mining Company, 15,000 shares of the Governor Consolidated Mining Company, due as dividends thereon, also \$62,250 wrongfully exacted as assessments, and to compel the delivery of 15,000 shares of the Martin White stock sold to Wiggin. On September 27th, 1883, before Judge Maguire, a verdict was given for plaintiff for \$146,512, but the Supreme Court subsequently granted a new trial.

OSCEOLA GOLD GRAVEL MINING COMPANY.—A general clean-up has not yet been made since the fluming began. The only drawback now is a decrease in the volume of water that was brought from four small creeks south of the gravel deposits, the ditch that conveys the water being about seventeen miles in length. The company owns 450 acres of patented ground and as much more for which it has applied for a patent.

NEW JERSEY.

DICKERSON.—Very extensive caves occurred at the mine last week, carrying down the whole surface of the ground from the tunnel opening to the old workings on the top of the hill. The principal damage was in the loss of ore and the breaking of steam-pipes by a large piece that went down the mine. The caves were not unexpected, and the heavy rains precipitated them. The cause of all the recent caves there is attributed to the robbing of a pillar of ore in the mine some time ago. It is expected that the new method of working the mine will be in operation about November 1st.

NEW MEXICO.

SAN PEDRO & CAÑON DEL AGUA.—Notice is given that holders of the stock or bonds of this company who desire to participate in the reorganization thereof under the plan and agreements heretofore adopted, must deposit their bonds and stock, and pay the assessment thereon, on or before the 15th day of September, 1885. Otherwise, their right to participate will be cut off. Deposits must be made, and the assessment fixed by the plan of reorganization must be paid, at the office of George W. Morse, No. 28 State street, Boston, Mass., or at the office of George William Ballou & Co., No. 73 Devonshire street, Boston, or No. 5 Wall street, New York.

PENNSYLVANIA.

KEYSTONE MINERAL COMPANY.—At the recent meeting, the following directors were elected: C. B. Wick and Mason Evans, Youngstown; Simon Perkins, Sharon; James P. Scott, Philadelphia; Benjamin Bradan, Franklin, Pa. The directors elected C. B. Wick, President; Mason Evans, Secretary; and Paul Wick, Treasurer. The company owns about 25,000 acres of coal and oil lands in Butler and Lawrence counties.

BEDFORD COUNTY.

KEMBLE.—These mines, at Riddlesburg, which supply the Kemble furnaces at that place, have shut down, owing to dullness of trade.

UTAH.

SALT LAKE COUNTY.

HANAUER.—The smelter was shut down on the 4th for renovation and to connect the furnaces with the new stacks. It will be blown in again on the 15th.

SUMMIT COUNTY.

CRESCENT.—The announcement of a five cent dividend advanced the price of the stock on the 2d inst. to \$1.20.

WYOMING.

FREMONT COUNTY.

BOSTON HILL GOLD MINING COMPANY.—It is rumored that this company, of Miners' Delight, so long idle, is about to resume operations. This company has a plant worth some \$100,000 at the Young America mine.

FREIGHTS.

A press report from Cleveland, Ohio, August 7th, says that the ore rates from Escanaba to Ohio ports have advanced from 55 to 60 cents. On the 7th inst., ore-shippers yielded freely, and engagements were made at the 60-cent rate. Vessel-owners and agents, however, are not quite satisfied, and talk strongly of a still further advance to 65 cents. Rates from Marquette remain unchanged at 80 cents, though a great many charters have been made at 75 cents by vessels caught in that region without cargoes. So far as can be learned, however, no vessel has made a second char-

ter at that rate. One was enough. Under a fair demand for vessels, coal rates remain firm at former figures, with no immediate prospect of any change. Prevailing prices are 60 cents to Chicago, and 50 cents to Milwaukee. The schooner N. S. Austin takes coal from Cleveland to Sheboygan at 60 cents. The Waldo, Avery, and consort H. A. Kent take coal from Ash-tabula to Duluth, at 50 cents. The Three Brothers brings ore from Escanaba to Cleveland at 60 cents.

MARKETS.

NEW YORK, Friday Evening, August 14.

The first signs of improvement in business that became noticeable, and were noticed editorially in this journal a few weeks ago, have steadily assumed consistency, or "materialized" into actual business. The improvement in business is now noticed in nearly every part of the country, and we believe that the "dead-point" has been passed, and that we have begun to move on the upward road again after so many years of depression. We do not desire to see any "boom," but we look for a steadily improving and, possibly, a very active business before the close of the year.

The fact that consumers and dealers in every branch of industry are carrying very light stocks—are, in fact, living from hand to mouth—will probably bring a sudden and perhaps heavy demand. This is undesirable, but prudent business men, gauging the condition of trade, can make provision accordingly.

Silver.

DATE.	London.	N. Y.	DATE.	London.	N. Y.
	Pence.	Cents.		Pence.	Cts.
Aug. 8	49 3-16	167	Aug. 12	49 1-16	106 3/4
10	49 3-16	106 3/4	13	49 1-16	106 3/4
11	49 3/4	*	14	49	†

* 100 3/4 @ 106 3/4. † 136 3/4 @ 106 3/4

The Indian Exchanges being weaker, the price of silver is lower than last week in London and in this market, and the market is without in of improvement.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains at 2 per cent. During the week, the bank gained £662,103 bullion; and the proportion of its reserve to its liabilities was raised from 42 1/2 to 44 1/2, against 41 1/2 per cent at this date last year. The weekly statement of the Bank of France shows gains of 697,000 francs gold and of 5,724,000 francs silver.

Copper.—There is great quietness in the copper market. Autumn contracts with consumers are generally made about September 1st, and no price has yet been named by the Lake companies. There is a very general disinclination to make contracts at present prices, and the probability certainly is, that a considerably higher price will be obtained later in the year. At present, there is a steady consumption, absorbing all the copper that comes forward, but not asking for more than this. Prices may be quoted as follows: Lake, 11 1/2 @ 11 1/4 c. for best brands; Orford, 10 1/4 @ 10 1/2 c.; Baltimore, 10 1/4 @ 10 3/8 c.

The English market has been drooping, and Chili Bars are quoted to-day £43, being a decline of 10s. during the week.

Best Selected has declined to £45.

The following are Merton & Co.'s statistics of stocks, etc., in England.

	July 31.	1885.	1884.	1883.
		Tons.	Tons.	Tons.
Stocks in England and France, and afloat thereto:				
Stock in Liverpool and Swansea, Chili Bars	30,584	22,934	23,997	
Stock in Liverpool and Swansea, Chili ingots	20	310	436	
Stock in Liverpool and Swansea, Chili ores and regulus (fine)	1,636	1,144	1,812	
Stock in Liverpool and Swansea, other stuff (fine)	4,352	4,212	4,014	
Stock in London, foreign copper (chiefly Australian), and landing	5,302	3,512	4,531	
Stock in Havre and Bordeaux, Chilean and other bars	530	1,260	2,094	
Stock in Havre and Bordeaux, other copper	1,547	460	575	
	43,971	33,832	37,459	
Advised from Chili by mail and cable, ores and regulus (fine)	189	2,512	1,059	
Advised from Chili by mail and cable, bars and ingots	8,086	5,875	9,764	
Advised from Australia, by mail and cable, fine copper	1,477	1,033	1,040	
Visible supply	53,728	43,052	49,322	
James Lewis & Sons make the total visible supply	56,061	44,273	51,579	

The following figures of Calumet & Hecla production are of interest:

The Houghton Gazette gives the following table: The annexed statement for the product of the Calumet & Hecla mine for four official years, given in monthly figures, as actually smelted, shows clearly the magnitude of the property and its resources, being more than an average of 1773 tons of ingot per month in 1884-85:

	1881-82.		1882-83.		1883-84.		1884-85.	
	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
May	1,764	1,019	1,906	1,610	1,915	1,977	2,229	1,443
June	1,763	868	1,679	1,341	1,826	1,449	2,176	1,791
July	1,555	1,817	1,482	455	1,723	1,68	2,334	1,967
August	1,818	339	1,711	174	1,955	1,014	2,360	1,213
September	1,612	1,487	1,701	748	1,747	1,651	2,424	1,426
October	1,709	959	1,724	1,651	1,881	1,963	1,496	1,295
Six months	10,394	460	10,829	478	11,005	1,822	13,159	1,435
November	1,652	173	1,708	1,349	1,823	1,856	2,126	1,80
December	1,734	252	1,530	1,821	1,948	98	2,449	1,114
January	1,621	1,432	1,655	1,195	1,918	1,531	2,480	811
February	1,713	1,799	1,518	1,669	1,349	404	2,080	1,630
March	1,908	707	1,935	1,308	2,150	1,747	2,408	1,534
April	1,901	355	1,713	1,067	2,321	634	2,489	259
Total	24,905	1,187	20,392	1,480	22,976	155	7,290	1,609
Per cent	76 1/2		77 9/16		77 1/8		77 9/16	
Ingot, tons	16,494	1,985	15,714	238	17,707	7	21,278	154
Ingot, pounds	32,180,085		31,428,298		35,414,007		42,636,164	

* Decrease owing to fire in mine.

The above figures are given in a manner to conform to the fiscal year of the company, which ends April 30th. Annexed are the figures for the six months of each calendar year from 1880. The figures given are official smelting returns, which run about 4 per cent ahead of the product as published each month:

	1882.		1883.		1884.		1885.	
	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
January	1,611	1,431	1,655	1,195	1,918	1,534	2,480	811
February	1,713	1,799	1,518	1,669	1,349	404	2,080	1,630
March	1,908	707	1,935	1,308	2,150	1,747	2,408	1,534
April	1,901	355	1,713	1,067	2,321	634	2,489	259
May	1,906	1,010	1,915	1,977	2,255	143	2,424	1,426
June	1,579	1,840	1,883	1,823	2,175	391	2,671	468
Min't 6 mos.	10,801	1,742	10,843	1,672	12,315	1,903	14,870	427

* Estimated.

Tin.—This metal has had a tumble in the London market, the price having receded from £93 12s. 6d. a week ago to £90 5s. to-day, as cabled to the Metal Exchange. Three months is quoted at £89 15s.

In this market, the price has gone off to \$20.25 @ \$20.50 for spot and \$19.95 @ \$20.15 for September.

Lead.—The Cawith Combination still holds the market firmly at 4 1/4 @ 4 3/8 c., but the chief attention appears to be devoted to squeezing up Chicago and St. Louis, where the price, as quoted below by our correspondents; is 4 1/2 @ 4 1/8 c., which would be above 4 3/8 c. here.

The statistical position is unchanged. Consumers hold off and buy as little as possible, and that little from outsiders rather than from the Cawith Combination. As we have already stated, the question is simply, Are we producing as much as we are consuming? If so, manufacturers can get along without helping the combination out; but if, as is claimed, the consumption actually exceeds our production, then, since the Cawith Combination holds all the stocks, it will be able to exact its price. There is a natural aversion on the part of consumers to help the combination in any way, and thus far, arrivals have supplied the demand without taking lead from the combination.

In London, Soft Spanish lead jumped to-day from £12 5s. to £12 17s. 6d., probably affected by the cholera.

Messrs. Everett & Post, of Chicago, telegraph to us as follows to-day:

Market quiet and dull; prices unchanged. Since our last report, sales of both soft and hard lead have been more free, and several hundred tons have been purchased at 4 1/10 c. @ 4 1/2 1/2 c. Consumers are buying moderately, and lead is arriving more freely.

Messrs. John Wahl & Co., of St. Louis, telegraph to us as follows to-day:

Market very firm at 4 1/2 1/2 c. @ 4 1/8 c. St. Louis offerings are very light.

Spelter and Zinc.—Spelter is steady at 4 3/5 @ 4 5/10 c., according to brand, for Domestic. We have recently called attention to the strong statistical position of this metal. Stocks and production are light and the price is low, though it has advanced somewhat. Foreign is worth 4 7/10 @ 4 7/5 c., and in London the price remains steady at £13 15s.

Sheet-Zinc is worth 5 @ 5 1/4 c. for Domestic.

Antimony.—This metal is dull and unchanged at 9 c. for Hallett's and 9 1/2 c. for Cookson's.

Bismuth.—Worth from \$2 @ \$2.25 a pound.

Aluminium.—\$8 @ \$9 a pound; 10 per cent Cowles Aluminium Bronze Ingots, \$1 a pound; 7 per cent Aluminium Bronze, 78c. a pound; 5 per cent Aluminium Bronze, 56c. a pound; 2 1/2 per cent Aluminium Bronze, 34c. a pound; Aluminium Silver, 75c. an ounce.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, August 14.

American Pig.—Though our correspondents from various parts of the country report a more active business in pig-iron, the improvement has not been felt in this market as yet.

We continue to quote standard brands of Lehigh iron, tide water delivery, as follows: No. 1 X, \$17.50 @ \$18; No. 2, \$15.50 @ \$16; Gray Forge, \$15 @ \$15.50; outside brands selling down to 50 cents below these figures, and Southern and some Western irons that have come here sell "at what they will bring," which, if indefinite in range, is always low.

Scotch Pig.—There is nothing worthy of note in this article. Prices here remain nominally unchanged at \$19.50 @ \$20 for Coltness; \$18.50 @ \$19 for Summerlee; and \$17.50 for Eglinton; but these prices are shaded when occasion requires.

From Glasgow, cables to the Metal Exchange quote Coltness at 48s., and Eglinton at Ardrossan, at 40s. 9d. These figures show a still further decline of about 3 pence a ton within a few days.

Steel Rails.—The events of the week have been large contracts referred to in our last issue as pending, which were given in anticipation of an advance and the meeting of the steel makers at Long Branch on the 11th and 12th inst.

The following companies were represented: Carnegie Brothers; Pennsylvania Steel Company; Bethlehem Iron Company; North Chicago Rolling-Mill Company; the Cambria Iron Company; Lackawanna Coal and Iron Company; Joliet Iron and Steel Union Iron Company; the Scranton Steel Company; the Albany & Rensselaer Iron Company; and the Worcester Steel-Works.

The meeting is said to have been harmonious and to have resulted in a renewal of the combination by which the make of steel rails is to be limited to the requirements of the market. The combination is somewhat similar to the anthracite coal combination, a certain quota of a basis amount (750,000 tons) being allotted to each company. Each company is free to produce its quota whenever it desires, and may sell at its own price, but it may not exceed the proportion of the whole allotted to it. Should the market call for a greater amount than the basis, the companies at a meeting can increase the basis, allowing each its proportion of the increase according to its established quota.

Though no agreement is said to have been made as to prices, the object of the meeting was to bring about an advance. Sales were made a few days before the meeting at between \$26 and \$27 at the mills, and we are reported by one of the companies a sale yesterday of 11,000 tons at \$28 at the mill. This may be considered the first fruit of the meeting.

There are inquiries in the market for a considerable amount of rails, and the improving business of the country will, with the combination, tend to greatly improve this department of trade.

Bessemer Pig and Spiegeleisen.—There is but little movement in this article and prices remain, nominally, for Foreign Bessemer Pig, \$18; Domestic, \$16; 20 per cent Spiegel, \$25; but these prices are shaded for some brands, and we hear a little more asked for some makes of Bessemer.

Structural Iron.—This remains unchanged. Beams and Channels are quoted 3c.; Angles, 2c.; Shell, 2 1/2 @ 2 1/2 c.; Tank Iron, 2c.; Steel Boiler Plate, 3 @ 3 1/4 c.

A telegram this evening (August 14th), to the Metal Exchange from Pittsburg, Pa., is as follows: The market is steady and local demand is fair. Prices are fully maintained.

	SALES.
1000 tons Gray Forge, Lake ore	\$15.50 4 mos.
150 " " "	14.75
100 " " "	14.50
100 " " "	14.50
300 " " " native ore	14.50
150 " " "	14.20 60 d'y.
100 " Close Gray	14.55 4 mos.
50 " Gray Forge	14.00 4 mos.
50 " Foundry	15.50 cash.
100 " Charcoal	21.00

Philadelphia. Aug. 13.

[From our Special Correspondent.]

The pig-iron demand has been restricted this week to forge, and only moderate quantities of that, in standard and special brands, which went at \$15@16. Brokers are arguing that at last a better market condition has come. The only grounds for confidence are in the scarcity of stock at mills here and throughout the State. Agents of furnaces who returned yesterday from a tour of all mills East say the mills have very little iron, and have not yet made their contracts for the rest of the year. From 50 to 200-ton lots of Forge are selling at \$15@15.50. One 500-ton lot sold at \$15. No. 2 is more active.

Foreign Material.—Several inquiries have been made during the past forty-eight hours for Bessemer of certain quality at \$18.50. Spiegeleisen inquiries have been made.

Muck-Bar.—Sales for the week foot up 700 tons. The lowest price heard of was \$26.

Merchant Iron.—Medium bars are selling at 1'60c. this week, but the demand is not deserving of special comment. The mills are running more regularly than in July, though not full. Yesterday, refined bar lots, footing up nearly 200 tons, were taken at 1'70@1'75c.

Nails.—Nails continue active and somewhat firmer, especially in small lots. Manufacturers are anxious to clear out all stocks. The impression is, that the Western demand here will amount to very little. Carpenters are getting nails at \$2.05@2.10. Country buyers are taking liberally.

Sheet-Iron.—One manufacturer has closed for a two weeks' run on heavy sheets and galvanized, but at nothing better than cost prices. Small lots are firmer, but the market is still decidedly in favor of buyers, who manifest no special interest, taking, as usual, what they want from week to week.

Plate Iron.—Ordinary plates are going in small lots at 1'90c. No particular transactions can be heard of. Manufacturers, however, say they have some specifications to figure on, but that there is nothing in plate iron.

Structural Iron.—Prices are firm for the ordinary business done. A short time ago, it was expected a good deal of business would be done by this time. For some reasons unknown to sellers, nothing has been done beyond the usual run of business at 1'75@1'80c. for Angles, with beams and channels at combination prices.

Steel Rails.—The brokers expect to have a better understanding soon in regard to production. The fall run of orders has, so far, not come up to expectations, though rumor states there are two or three certain companies who may decide to place large requirements suddenly. Rails are \$26.50@27.50.

Old Rails.—Several inquiries from the interior have been received since Monday, but brokers are unable to do any better than \$17@17.25, at which four or five lots changed hands.

Scrap.—Scrap is moving a little better.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, August 14.

Statistics.

Production Anthracite Coal for week ended August 8th, and year from January 1st:

Tons of 2240 LBS.	1885.		1884.	
	Week.	Year.	Week.	Year.
P. & Fead. RR. Co.	264,767	6,070,566	301,009	6,199,724
L. V. RR. Co.	98,118	3,092,483	159,961	3,371,608
D. L. & W. RR. Co.	93,921	2,471,432	152,563	2,884,698
D. & H. Canal Co.	60,748	2,027,197	111,536	2,107,682
Penna. RR.:				
N. & West Br. RR.	20,707	670,874	19,271	500,069
P. & N. Y. RR.	3,835	1,567,84	3,694	133,626
P. & N. Y. RR.	5,378	227,401	14,419	236,442
Penna. Canal Co.	24,644	711,470	38,542	727,710
Shamokin Div., N. C. RR.	11,907	191,508	12,474	214,440
C. RR.	18,106	544,702	23,411	536,286
Lyons Valley.	*10,000	297,351	10,958	322,461
N.Y. L. E. & W. RR.	.....	1,259,802	.....	1,164,871
Total.....	612,131	16,724,500	847,838	17,450,917
Increase.....	.....	.....	.....	.....
Decrease.....	235,707	735,257	.....	.....

* Estimated. † Shipments to June 1st.
The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.
Production for corresponding period:
1880.....12,766,801 | 1882.....16,621,691
1881.....16,194,885 | 1883.....17,521,048
Chesapeake & Ohio Railroad Company's report of total output and distribution of coal and coke received from mines on line of Chesapeake & Ohio Railroad (including

mines on Lexington Division) for the week ended August 7th and year from January 1st. Tons of 2000 pounds:

Kind of coal.	1885.		1884.	
	Week.	Year.	Week.	Year.
Canal.....	112	559	13,848	10,335
Gas.....	2,555	6,397	221,555	188,425
Spint and block	3,531	1,940	89,877	48,541
New River, etc.	12,090	6,408	333,303	291,506
Coke.....	1,847	1,796	70,816	36,245
Total.....	20,135	17,038	729,772	545,142

Production Bituminous Coal for week ended August 8th, and year from January 1st:
Tons of 2000 pounds, unless otherwise designated.

	1885.		1884.	
	Week.	Year.	Week.	Year.
EASTERN AND NORTHERN SHIPMENTS.				
Philadelphia & Erie RR.....	.....	18,674	.....	.....
*Cumberland Region, Md.....	**	1,490,417	55,994	1,638,887
*Barclay Region, Pa.				
Barclay RR.....	3,530	142,072	3,741	187,039
*Broad Top Region, Pa.				
Huntington & Broad Top RR.....	**	94,042	4,396	115,064
*Clearfield Region, Pa.				
Snow Shoe.....	1,940	91,173	3,451	110,875
Karthauss (Keating)	1,481	76,291	1,418	21,448
Tyrons & Clearfield	41,219	1,773,985	61,963	1,861,531
*Allegheny Region, Pa.				
Gallitzin & Mountain.....	11,796	307,669	685	223,154
Total.....	59,966	3,994,243	131,648	4,158,988
*Tons of 2240 lbs.				
WESTERN SHIPMENTS.†				
Pittsburg Region, Pa.				
West Penn RR.....	2,148	143,448	5,528	169,518
Southwest Penn. RR.	580	59,113	1,009	84,319
Pennsylvania RR.....	8,536	129,155	4,976	169,780
*Westmoreland Region, Pa.				
Pennsylvania RR.....	23,005	669,186	33,052	778,860
*Monongahela Region, Pa.				
Pennsylvania RR.....	5,641	156,800	3,039	91,335
Total.....	39,910	1,157,702	47,804	1,293,912
Grand total.....	99,876	5,151,945	179,452	5,452,910
† Considerable gas-coal shipped East, of which no division is made in report.				
** Report not received.				

Production of Coke on line of Pennsylvania RR. for week ended August 8th, and year from January 1st: Tons of 2,000 pounds.

	1885.		1884.	
	Week.	Year.	Week.	Year.
Allegheny Region.....	4,175	114,084	2,477	80,304
West Penn. RR.....	1,553	29,153	59	21,785
Southwest Penn. RR.	36,338	1,164,186	44,592	1,340,214
Penn. & W. Region	7,808	145,281	3,849	114,439
Monongahela.....	2,601	61,414	1,022	47,823
Pittsburg Region.....	.....	.....	.....	1,186
Snow Shoe.....	407	9,663	439	13,963
Total.....	52,892	1,523,691	52,487	1,621,664
Decrease.....	.....	.....	.....	97,983

Anthracite.

The improvement in general business that we noticed when it commenced three weeks ago, and which continues and assumes week by week a more definite shape, appears to extend to the coal trade. There is a slightly better demand for coal than there was a week ago, but since the production is greatly in excess of the demand, and stocks are large, prices are more irregular than they were. Though nominally unchanged, they are probably in fact lower all around than they have been.

We hear of chestnut coal sold at prices equal to \$2.55@2.60 f. o. b., and of more than one case where stove of very fair quality has been sold at prices equivalent to \$3@3.10 f. o. b. Buckwheat is practically "given away." Notwithstanding these exceptionally low prices, and some embarrassment from excessive supply, the indications for improving trade are somewhat more favorable than they have been. September will probably see a considerable increase in demand, though prices are not likely to advance in fact, and it would be a blunder to advance them in name only.

The average selling prices as quoted above are fair living rates, quite as high as the present condition of other industries can afford to pay. Should the full quota, 3,250,000 tons, be produced this month, actual selling prices will probably go lower than they are. There seems to be a growing impression in the trade that the refusal to curtail production is due to Wall Street influences rather than to the demands of the trade. How long these influences will outweigh the interests of the trade is one of those things that "no fellow," unless it be a deacon, can be supposed to find out.

From Toronto, we learn that the dealers who control the wholesale coal trade propose binding retailers to adhere to the price fixed by the combination under a penalty of \$200, that amount having to be posted by each with the syndicate as a guarantee that they will live up to the arrangement. The retailers are "kicking," as they are unwilling to be compelled to sell at the prices fixed by the syndicate, and consider it unfair that their \$200 should rest bearing no interest in the hands of the syndicate until the agreement expires.

The retail and wholesale men meet again to discuss the matter.

Who will make the members of the combination live up to their agreements?

Perhaps the Lackawanna & Western sees no good reason why it should restrict the quota only to allow the Pennsylvania Railroad to increase its output. The combination is not in a very robust condition, and unless cuddled and nursed with extreme care, it may come to an untimely end.

Bituminous.

There is nothing worthy of note in this market. Business is very dull, and prices remain from \$2.75@2.83 per ton, f. o. b., with \$3.25 a nominal asking price for small lots to country buyers.

The Pennsylvania-Vanderbilt-Southwest Pennsylvania has had no effect on prices, but the shadow of the Pennsylvania Railroad is extending farther and farther over both the anthracite and bituminous trade.

Freights are lower than ever before, and yet little new business can be worked up.

Boston.

Aug. 12.

[From our Special Correspondent.]

There has been very little doing in anthracite coal this week, so far as this port is concerned. It is rare that retailers and buyers of anthracite generally are so very cautious. Receipts continue fairly large, but they almost entirely represent old orders. Freight are so very low that there would certainly be a good movement now, if it were not for the fear that the neglect to restrict production this month is likely to force prices lower. All elements that have been considered unfavorable to an improved market still hold their force, and it is only natural in such a state of affairs that retailers should keep out of the market as long as they can. Prices continue unsettled at low quotations.

There is but little doing in bituminous coal. We quote as low as \$3.15 delivered for the new coals coming into this market, with \$3.35 as an outside figure for the best coal in the market. There is a small movement in culm of coal at \$2.25@2.35 delivered.

Extremely low quotations of freight prevail. Some charters have been made from New York to this port at 70 cents. It appears that the Coastwise Commission does not intend to do any thing toward regulating prices this year. The work of securing the signatures of vessel-owners to the compact of the commission goes on slowly. It gives as one reason for not endeavoring to do any thing in the way of fixing rates now, that it can not interfere with season charters, and further, that it will take quite a long while to get the signatures of as many as it must obtain to make the agreement operative. Therefore it is not expected that it will do any thing before January 1st, 1886. Inasmuch as the coal trade has taken very little stock in its ability to effect any improvement, the announcement will not cause much interest. We quote:

New York, 70@90c.; Philadelphia, \$1@1.05; Baltimore, \$1.10@1.15; Newport News, \$1@1.05; Richmond, \$1.0@1.15; Cape Breton, \$1.40@1.50; Bay of Fundy, \$1.25.

A very dull state of affairs is reported by the retailers. There is nominally no change in prices. We quote:

White ash, furnace and egg.....	\$4.75@5.00
" " stove and nut.....	5.25@ 5.50
Shamokin, egg.....	6.00
" " stove.....	6.25
Lorberry, egg and stove.....	6.50@ 7.00
Franklin, egg and stove.....	7.25@ 7.75
Lehigh, furnace, egg, and stove.....	5.25@ 5.50
" " nut.....	5.50@ 5.75

We quote wharf prices as follows: Stove, \$4.50@ \$4.75; Broken and Egg, \$4@4.50.

The statement of receipts of domestic coal at this port for the seven months ended July 31st, 1885, shows that 1,154,721 tons have been received, which is an increase of 29,884 tons over the receipts for the same period of 1884. The increase has been largest in receipts from Newport News, Richmond, Norfolk, and such smaller soft coal ports, which have altogether sent Boston 107,721 tons, against 56,303 tons in the seven months of 1884. The shipments from Baltimore have fallen off 30,000 tons. Philadelphia shipments to Boston have fallen off nearly 30,000 tons, while the receipts from New York have increased 35,000 tons. The total receipts for the month of July were 251,368 tons, or an increase of 14,220 tons as compared with July receipts of 1884.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS, DIVIDENDS, NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS. Lists 131 dividend-paying mines and 131 non-dividend-paying mines.

G. Gold. S. Silver. L. Lead. C. Copper. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood has previously paid \$275,000 in eleven dividends, and the Terra \$75,000. | Total number of shares, 5,300,000; 50,000 shares have never been issued, and are still held by the company.

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	Quotations of New York stocks are based on the equivalent of \$100. Philadelphia prices are quoted so much per share.												Sales from Aug. 8th to Aug. 14th, inclusive.		
		Aug. 8.		Aug. 10.		Aug. 11.		Aug. 12.		Aug. 13.		Aug. 14.				
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.			
Barclay Coal	50															
Cameron Coal	10															
Col. C & I	100			14 1/2	14	14 1/2	14	14 1/2	14 1/2	14 1/2	14 1/2	14 1/2	14 1/2	14 1/2	14 1/2	7.550
Ches & O. RR.	100			6 1/2		6 1/2		6 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	2,452
Consol. Coal	100															
Cumb. C. & L.	100															
Del. & H. C.	100			81 1/2	80 1/2	81 1/2	80 1/2	82	81 1/2	82 1/2	82 1/2	82 1/2	82 1/2	82 1/2	82 1/2	3,866
D., L. & W. RR.	50			99 1/2	98 1/2	99	98	98 1/2	100	98 1/2	100	98 1/2	98 1/2	98 1/2	98 1/2	162,128
Elk Lick Coal Co.	50															
Lehigh C. & N.†	50			43 1/2	43	43 1/2	43	43 1/2	43 1/2	43 1/2	43 1/2	43 1/2	43 1/2	43 1/2	43 1/2	617
Lehigh Valley RR.†	50			58		58		57 1/2	57 1/2	57 1/2	57 1/2	57 1/2	57 1/2	57 1/2	57 1/2	421
L. & W. C. & I Co.	100															
Maryland Coal	100															
Montauk Coal	100															
Morris & Essex	50															
New Central Coal	100															10
N. J. C. RR.	100			48 1/2	47 1/2	50	47 1/2	51 1/2	48 1/2	52	49 1/2	51 1/2	50 1/2	50 1/2	50 1/2	88,485
N. Y. & S. Coal	50															
Penn. Coal	50															
Penn. RR.†	50			51 1/2	51 1/2	52	51 1/2	51 1/2	51 1/2	52	51 1/2	51 1/2	51 1/2	51 1/2	51 1/2	8,389
Ph. & R. RR.†	50			19 1/2		20	19	20 1/2	19 1/2	21 1/2	20 1/2	21 1/2	20 1/2	20 1/2	20 1/2	66,279
Spring Mountain	50															
Westmoreland Coal.†	50															

* Of the sales of this stock, 26,864 shares were in Philadelphia and 39,415 in New York. Total sales, 340,197.
† The quotations for these stocks are not percentage, but actual price.

San Francisco Mining Stock Quotations.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS.				
	Aug. 7.	Aug. 8.	Aug. 10.	Aug. 11.	Aug. 12.
Albion					
Alpha					
Alta	35		40	40	40
Argenta					
Bechtel					
Belcher				90	
Belle Isle				90	
Best & Belcher	2.37 1/2		2.50	2.25	2.37 1/2
Bodie	1.62 1/2		1.50	2.00	1.87 1/2
Bullion					
Bulwer					
Chollar	1.25		1.37 1/2	1.12 1/2	1.25
Con. Pacific					
Con. Cal. & Va.	2.25		2.25	2.00	2.12 1/2
Crown Point			1.25	1.25	1.12 1/2
Day					
Elko Cons.					
Eureka Cons.					
Exchequer					
Gould & Curry	1.37 1/2		1.50	1.37 1/2	1.50
Graud Prize					
Hale & Norcross	6.37 1/2		6.75	6.12 1/2	6.37 1/2
Independence					
Martin White					
Mexican	.95		1.00	.90	1.00
Mono					
Mount Diablo	2.00		2.00		
Navajo	.75		.75	.75	.75
Northern Belle					
North Belle Isle					
Opair	1.37 1/2		1.50	1.37 1/2	1.50
Overman					
Potosi	.40		.40	.30	.35
Savage	2.75		3.25	2.75	3.12 1/2
Scorpion					
Sierra Nevada	1.62 1/2		1.75	1.62 1/2	1.75
Silver King					
Tip-Top					
Union Cons.	.85		1.00	.85	.95
Utah	1.12 1/2		1.12 1/2	1.12 1/2	1.12 1/2
Wales Cons.					
Yellow Jacket	1.75		1.75	1.75	1.75

chase could not be filled at these figures. Franklin holds its own well, with sales of 50 shares only at \$7. We doubt if any large amounts could be bought at anywhere near this price. Osceola advanced 1/4 on sale of 20 shares at \$9 1/2.

Trading in silver stocks, so far as public sales are noted, is entirely at a stand-still. At the Mining Exchange, there is but little business done beyond one or two stocks of which sales are occasionally made, and the outlook for a boom in mining stocks in the near future is not of an encouraging nature. Bowman Silver stock is dull and lower, being offered at 10 cents without purchasers. There is a little trading in Catalpa at 22@23c. Dunkin is wanted in small lots at 16@17c. Miscellaneous stocks are dull and neglected. Brunswick Ship's Berth Company is inquired for at 22@25c. The Water-Meters are dull at 12 1/2@15c.

3 P.M.—The market this afternoon presented no new feature. A sale of two shares of Calumet & Hecla at \$210 1/2 is reported, and the stock closed firm at \$210 bid, none offered. Tamarack, \$61 bid. Quincy, offered at \$34 1/2. Osceola, \$9 1/2 bid. Franklin, \$6 1/2 bid, \$7 asked for small lot.

The following statement, published in the Houghton Mining Gazette, of the assets and liabilities of the

Calumet & Hecla Company for three years will give a condensed view of the general results of its business:

	ASSETS AND LIABILITIES.		
	1883.	1884.	1885.
Total assets	\$2,433,674.11	\$2,613,378.81	\$2,470,802.43
Less liabilities	452,849.58	78,600.77	53,100.60
Surplus May 1.	\$1,980,824.53	\$1,827,778.27	\$1,940,306.37
Div. due May 15.	5,000.00	None.	None.
Actual net surplus.	\$1,475,824.53	\$1,827,778.27	\$1,940,306.37
Increase or decrease	\$399,953.74	\$351,953.74	\$112,528.10
Profits of year	*See note.	\$1,829,924.24	\$312,528.10
Dividends paid	\$,000,000.00	\$1,500,000.00	\$800,000.00

* There is an apparent decrease in assets of \$1,498,488.03, and the net profits of the year 1885 would appear to be only \$501,511.97, against \$2,000,000 paid in dividends, but \$1,250,000 was paid for lands purchased, and probably from \$100,000 additional extra expenses.

Only two dividends within the financial year, May to May, namely, \$3 August, 1884, and \$5 February, 1885, but since then divided \$700,000 July 13th.

OFFICE OF THE HOMESTEAK MINING COMPANY, MILLS BUILDING, 15 BROAD STREET, NEW YORK, August 14, 1885. DIVIDEND NO. 84. The regular monthly dividend, THIRTY-FIVE CENTS per share, has been declared for July, payable at the office of the company, San Francisco, or at the Transfer Agency in New York, on the 25th inst. Transfer-books close on the 20th inst. LOUNSBERY & CO., Transfer Agents.

THE COLLIERY GUARDIAN AND JOURNAL of the Coal and Iron Trades.

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To	From Philadelphia	From Baltimore.	From New York shipping ports.
Alexandria	.60@.75		
Annapolis	.60		
Albany	.58 1/2		
Baltimore	1.00	1.10	
Bath, Me.	1.00	1.10	.80
Beverly	1.00@1.10		.80
Boston, Mass.	1.00@1.10	1.10@1.20	.75@.80
Bristol			
Bridgeport, Conn		1.00	.50
Brooklyn		1.00	
Buffalo, N. Y.			
Cambridge, Mass.			.80 1/2
Cambridgeport			.80 1/2
Charleston, S. C.	.75	.80@.90	
Charlestown			
Chelsea			.80
City Point			
Com. Pt., Mass.			.80
E. Boston			.85
East Cambridge			.80 1/2
Greenwich, N. I.			.70
Fall River			.70
Salveston	2.50@2.75	2.60@2.75	
Gardiner, Me.			
Georgetown, D.C.			
Honchester	1.10		
Halifax			
Hartford			
Hackensack			
Hudson			
Lynn	1.15@1.25		
Marblehead			
Medford			
Montville, N. J.			
Silton			
Newark, N. J.		1.15	
New Bedford	.90@1.00		.75
Newburyport			
New Haven		1.00	.50
New London			
New Orleans			
New-Berne			
Newport			.70
New York		1.00	
Norfolk, Va.			.75
Norwich			
Norwalk, Conn			
Pawtucket			
Philadelphia			
Portland, Me.	.70@.80 1/2	1.10	
Portsmouth, Va.			
Portsmouth, N.H.		1.20@1.25	.80@.85
Providence	1.00	1.05@1.00	.70
Quincy Point			
Richmond, Va.	.60@.70		
Rockland, Me.			
Rockport			
Roxbury, Mass.			
Saco			
Sag Harbor			
Salem, Mass.	1.00@1.25		.80
Saugus			
Savannah		.90@1.00	
Somerset		1.00	
Staten Island			
Trenton			
Washington	.60@.75		
Weymouth			
Williamsbz, N.Y.		1.00	
Wilmington, Del.			
Wilmington, N.C.	.70@.80	.75@.90	

* And discharging. † And discharging and towing. ‡ 3c. Per bridge extra. § Alongside. ¶ And towing up and down. † And towing. ** Below bridge.