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The excesses in the Hocking Valley coal region have again proved to what lengths miners will go in opposing the inalienable right of any employer to secure his labor in the open market, and take the necessary steps to protect those who are willing to work for him against the peculiar "persuasion" of strikers. It has proved that baffled men are willing to go to the point of violence resulting in death. We believe that the majority of employers have accepted the institution of unions as a just co-operation of the men for a common good, and that the wiser ones will do all that can reasonably be expected to strengthen the hands of the leaders. The danger to the interests of employers lies not so much in the existence of unions, as in the weakness of many of them. Where there are sensible men at the helm who are willing to discuss business questions from a business stand-point, the relations between employer and employed can be easily shaped to promote the common good. But where there are internal disunions, as in Ohio, the leaders lose control, and the worst element injures the cause of labor more than its most embittered enemies could hope to do.

Whatever may be the differences of opinion on the contest now going on in the Pittsburg River District, no one can deny that it is a struggle between citizens who are content to appeal to the laws to obtain their rights. Each party may have its own opinions as to the justice of its cause; but both are pursuing the only course that can secure them their rights without creating a just feeling against them in the public mind. The contrast between the developments in the two regions illustrates strikingly what a power for good a body controlled by prudent men possesses.

THE BUTTE COPPER INTERESTS.

The Butte *Inter-Mountain* has much fault to find with the letter of a correspondent, published in a recent issue of the *ENGINEERING AND MINING JOURNAL*, and dealing with two subjects—the profits of the Butte copper mining companies, and the estimated output of that great district during the current year. Our correspondent intended to state, though he did not sharply express it, that the Montana Copper Company and the Parrott Silver and Copper Company have paid dividends for the past nine months. The *Inter-Mountain* states the figure for the latter at \$12,000 a month. As to the Williams Smelter and the Bell Company, we may be permitted to doubt whether our correspondent was in error. We have been urged to consider, by gentlemen interested in Montana copper mines, that some of the latter were for a long time profitable ventures before they began to pay dividends, but that the net earnings for years went into new plant and equipment, into the accumulation of needed supplies, and into the opening out of the mines. This is probably the case now with many that do not and will not for a considerable period figure in the list of dividend-paying mines. It is a fortunate thing that such is the case, since it has enabled the industry to start without a heavy outlay of capital in many instances, and puts it on a more substantial basis for the future. But it would be manifestly unfair to count such investment of net earnings as profit. We are convinced that, if the three or four millions of dollars invested during the past two years in equipping the three or four new copper mines added to the list of Lake Superior producers, or the sums uncounted that have been wasted in idle smelters in Arizona and New Mexico, had been judiciously spent in the Butte District, investors would have more to show for their money. Very few people outside of Butte, and not many there, have any idea how rapidly the amount of money represented by the metal in high-grade shipping ore crumbles away under a multitude of charges and under the low prices now ruling in the English ore market. Last month, a contract for 2000 tons of Montana arsenical ore was closed at 9 shillings per unit. Let us see what the returns for a car-load of 27,500 pounds of ore containing by humid assay 25 per cent of copper would bring to the producer at 9 shillings per unit. First, 1.3 per cent must be deducted as the difference between the humid and the Cornish assay, making the return £10 13s. 4d. a ton. Reducing the American weight to English tons of 2352 pounds, and taking off the necessary allowance for moisture, etc., there would remain 11 tons, which at £10 13s. 4d. would yield a total of a little more than £117 for the lot. In the aggregate, the freight from New York to Liverpool, portorage, dues, lighterage to ore-wharf, time of men attending the discharge of the steamer, assaying, ore-wharf charges including receiving, weighing, warehousing, stowing, crushing, screening, mixing, sampling, etc., and the commissions at Liverpool, according to a detailed statement, aggregate within a shilling of £19 on the lot. This leaves the amount payable in two months from the time of delivery to date of payment £98. Including interest for one month from arrival at New York to date of delivery, there is a three months' interest charge of a little less than £1 10s., making the net amount returned £96 10s., equal to, counting the pound sterling at \$4.80, \$463.20. Out of this must come the freight from the mine to New York, on 13.75 short tons, which is in the neighborhood of \$22 a ton, or \$292.50 the cost of 275 sacks at 10c.; the loss of interest during the trip from the mine to the seaboard; New York commission and expenses; and the cost of sacking, sampling, crushing, weighing, and handling at the mine, which will leave little more than, if as much as, \$130 for the lot of 13.75 tons. Less than \$10, therefore, is all that is left per ton to pay for the entire mining cost. This shows that it does not pay to ship an arsenical ore containing 25 per cent of copper, especially in small parcels, unless it has notable quantities of silver. Putting it in another light, the value of the entire copper contents is swallowed up by costs and charges of mining, shipment, and treatment, leaving the silver in twenty-five per cent copper ore to bring the profits. In the case of some of the heaviest ore-shippers, the silver contents, it is reported, are not very high. With all its wealth of high-grade ores, Butte must rely principally upon the working of the enormous quantities of low-grade material, carrying from 12 to 15 per cent of copper.

We have given these returns, not with any desire to embarrass the growth of Butte as a copper district, by underestimating the profits of

the industry. We wish to point out that the limit defining the possibility of profitable ore-shipments is a very high one, which no camp can long sustain. There is an early end to bodies of from 35 to 50 per cent ore, and the very fact that the copper mines of Butte are eagerly enlarging plant and are getting ready to handle large quantities of medium-grade material proves this to be the case. New plants can not be expected to come up to capacity, or any thing like it, in the first month of their run, and often do not get into full swing for months. We fail, therefore, to see any reasons for amending our estimate of 20,000 tons net fine for the Butte District for 1884. A little figuring also will teach the *Inter-Mountain* that the Butte District, as well as others, is affected by the general decline in the copper market. It eloquently says, "The publication of the facts about the copper interests of Butte may not sit well on the stomachs of the Calumet & Hecla people, and may cause some trepidation in Arizona, and may scare a few copper speculators in London;" and it seems to be haunted with the idea that our chosen life-work is to protect the unfortunate ones thus worried by Butte by trying to suppress the *Inter-Mountain*. We are far from it. We are trying to obtain even more facts than our belligerent contemporary has so successfully collected. We can do no better service to our "pets" on Lake Superior and in Arizona than to give them the best information obtainable. This points to lower figures, because while the tonnage of ore-shipments is exact, the percentages of fine copper in the ore are probably overestimated.

CORRESPONDENCE.

[Communications will be noticed only when accompanied with the full name and address of the writer. Unless specially desired, only initials will be printed. We invite criticism and comment by the readers of the ENGINEERING AND MINING JOURNAL. Replies not intended for publication should be addressed to the Editor of the ENGINEERING AND MINING JOURNAL in blank, stamped, and sealed envelopes. We do not hold ourselves responsible for the opinions of our correspondents.]

The Duncan Concentrator and Frue Vanner.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your last issue, there was an article purporting to give results obtained at the Carlisle mill, in New Mexico, in a competition of the above-named machines on the tailings of a gold mill. While not denying that it is possible to so run a Frue vanner that a Duncan concentrator would give better results, I am able to give a few facts in regard to the special test quoted that will be of interest to any one accepting the same as a real comparison of the two machines.

In the first place, the Duncan concentrator is a large pan, which has, according to its maker's description, "two motions—an irregular centrifugal, and an oscillating." The vanner it is not necessary to describe, nor its successful work on finely crushed mineral, as over 200 are at work in California alone on gold mill tailings, and have there replaced all other concentrators in general estimation. During the last twenty years, dozens of pan concentrators have been invented, patented, introduced, and, later, disappeared from view. They are all based on an hydraulic miner's idea of concentration, namely, that a gold pan is the ideal form, whereas all concentrator men, used to dressing slimes and finely crushed mineral, are aware that the gold pan is of little use, even in the most experienced hands except on gold amalgam. So much as to the probabilities in the case of a test on stamp-mill tailings between a pan machine and a belt machine, when finely divided sulphurets have to be saved.

Last fall, our Denver agent visited the Carlisle mill, and found the Duncan concentrators in use. The ore was good, the sulphurets rich, and the tailings of the Duncan concentrators were also valuable. The field for improvement was so excellent that Frue vanners were offered on liberal terms to treat the tailings of the Duncan concentrators, and in October an agreement was signed with the Carlisle Mining Company, of which the following extract will convey the substance: "The machines (5) are to be paid for at the rate of — (the regular selling price at that time), for five machines, in the following manner: after the said machines are entered in mill of the party of the first part, at the Carlisle mine, they shall be used to concentrate the tailings from all other machines now used for concentrating in said mill of said company, and the produce therefrom, less thirty-five dollars per ton, shall be used and appropriated to the payment of such machines, until the said sum of — is paid to the party of the second part. And it is mutually agreed by the parties hereto that if the said machines should not prove satisfactory to the party of the first part, he may at his option return the same by properly packing same and paying the freight on same to Denver, Colorado, or Chicago, Ill., and no payment shall be demanded by the party of the second part, provided that said machines are loaded on cars at Lordsburg, New Mexico, within forty days from the time said machines are started in said mill."

The power of returning the Frue vanners was thus left entirely with the mining company; but in the final settlement no regard seems to have been paid to the letter of the agreement, our agent apparently being perfectly satisfied with the fact of machines not being returned, and hearing from one of the directors that they were doing exceptionally good work; the members of the company being also known as responsible men. Now, it seems from the article published by you, and contained in a circular distributed by makers of Duncan concentrator, that in a trial of the two machines at the Carlisle mill in the months of *February* and *March*, the Duncan machines proved vastly superior to the vanners. Yet the vanners were never returned by the Carlisle Mining Company, and on *February* 28th three more vanners were ordered from Chicago, and on *April* 7th two more were ordered. Curious result of such a test! especially as the vanners are more expensive to buy than the Duncan.

Two points about the test described may be noted. The value per ton of concentrations is a little higher for the Duncan than for the vanner. Any man who has seen the two machines run will open his eyes at this;

and any one who has seen the vanner run will be scientifically interested to find that at last a concentrator has been found that will make sulphurets cleaner than pure. As to amalgam quoted in tests, the vanners were not ordered for saving this, as it was expected the amalgamator would keep it on his coppers; but even if, through occasional carelessness at battery or some special difficulty with ore, amalgam is expected at concentrators, we have long ago found that substituting a copper plate, having $\frac{1}{4}$ -inch riffles across top and bottom for ordinary pulp distributor on vanner, made the most effective amalgam concentrator possible to conceive, the shaking motion rolling it into small pellets under the riffles in a form impossible to lose again. For floured quicksilver, as witness the treatment of pan mill tailings, the vanner can not be excelled. On globular quicksilver, we admit being weak; it rolls down the belt when too large; but the mill-man who can not save globules of quicksilver without a concentrator should direct his attention to some other business.

We shall be pleased to make a similar agreement as that above mentioned with the Carlisle Company with any mill having stamps, sulphurets that will concentrate to a value of at least \$100 per ton, and using concentrators of the pan form, in not larger number than the vanners would be employed—say from two to five stamps. Yours truly,

WALTER McDERMOTT,
General Agent.

THE PHILADELPHIA MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

Many members of the Institute of Mining Engineers who reached Philadelphia in season availed themselves of an invitation extended to the Institute of assisting at the opening exercises of the International Exhibition. As yet, like all exhibitions on the inauguration day, the electrical show is in a state of confusion. We shall take occasion, at a later date, to review the latest improvements brought forward.

THE FIRST SESSION

of the Institute found a large number of members gathered in the pretty little theater of Association Hall.

After a few introductory remarks by Mr. John Birkinbine, of the Local Committee, Mr. H. W. Smith, Mayor of Philadelphia, extended to the Institute a hearty welcome in a happy speech, to which the President, Mr. J. C. Bayles, editor of the *Iron Age*, responded.

Mr. James C. Bayles then delivered

THE PRESIDENT'S ADDRESS.

in which he turned to the consideration of economic rather than technical questions. After speaking in a general way on the causes bringing about the periodical recurrence of seasons of depression, he dwelt more particularly on the present condition of the iron and steel trades, and followed with the presentation of a subject that has formed the theme of many discussions during the past year, but which no one has had the courage to allude to in public. In view of the importance of the question raised, we quote Mr. Bayles's words: "It is a deplorable fact that the steady decline of prices during the past two and a half years has encouraged a disposition to cheapen the cost of production by the use of inferior materials. This is, perhaps, an inevitable result of low prices; but it is nevertheless mortifying, and however regarded, it is well calculated to excite grave apprehensions. If the membership of this Institute, standing in controlling or advisory relations to our great metallurgical industries, could be instrumental in checking this tendency, the existence of which can not be denied or doubted, we should do more to promote the best interests of the country than by any other service we could render. Americans have in the past had good reason to be proud of the high reputation of their manufactures. While other nations have sought to reduce the cost of their products even to the extent of debasing them, with the sole purpose of making them cheap, the United States have been known throughout the world for the honesty of their goods. We have not hitherto regarded cheapness as the great end and aim of manufacturing, but have striven industriously, and in most cases successfully, to secure the highest utility and adaptability, leaving the questions of cost and price as secondary matters. American workmanship is, in fact, so highly regarded in many quarters of the globe, that to call an article American is to guarantee its quality and insure its sale. But with the low range of prices for iron and steel, dangerous practices have crept into many branches of trade. The veriest trash ever run through a furnace is furnished as pig-iron, and commands a market where good iron is refused. Bar iron is made from puddled stove plate, and the most inferior grades of wrought scrap are made to do duty in mills that once proclaimed with pride the quality of their best refined bars. Much of this stuff has sunk so low in the scale of quality that manufacturers are ashamed to put their brands upon it, and so-called private brands, frequently changed to mislead the purchaser, are substituted by dealers. The standards of steel have also suffered deterioration, and steel plates, which should be thoroughly honest, considering the uses to which they are put, are in many cases made from materials of which those using them have good reason to be ashamed. In the cheap railroad axles and car-wheels now going into service, the traveling public have grounds for grave uneasiness, and there is reason to suspect that, if the railroads were a little less particular than they are in the matter of rail inspection, twenty-eight dollar steel rails would be worth very little more than the cost. An amusing story, illustrating the stringency of the conditions that the railroads are seeking to impose upon rail-makers, is told of a Southern road, which lately invited bids for a lot of rails that should develop 80,000 pounds per square inch tensile strength and bend without fracture under a drop of one ton weight falling forty feet upon test pieces resting on supports three feet apart. One manufacturer, to whom the privilege of bidding was offered, replied that he expected to furnish steel rails, not boiler-plate, and that he did not care to name a price. I have no doubt the railroad people thought it expedient at present prices to set their standard high, hoping that, if they failed to get what they called for, they would at least get something better than steel rails at \$28 or less could reasonably be expected to be.

"When we seek to fix the responsibility for this tendency, we find it

shifted from shoulder to shoulder. Naturally the manufacturer blames the consumer, and assures us that, as the demand is for cheapness, and quality is made a secondary consideration, we must produce cheaply, even if quality suffers. This is, at best, an unworthy plea. There are scores of manufacturers who refuse to stoop to disreputable methods of earning a profit on their goods, and in spite of a competition without honor or principle, they maintain their standards of quality, demanding and receiving higher prices than those expect who have debased their goods. I do not know that the tendency to lower quality standards as prices decline can be checked save by an appeal to self-interest. It is a business mistake, and will do more injury to our manufacturing interests than can be corrected in years of effort in the opposite direction. Let us hope that, before the evil shall have gone too far, conditions favoring reform will have succeeded those that have induced so many to adopt the short-sighted policy of encouraging the downward tendency of prices by debasing their products."

In conclusion, Mr. Bayles extended a welcome to the members of foreign technical and scientific bodies, alluding humorously to the dangers of their misjudging this country from the exceptional condition it is in during the brief period preceding a presidential election.

Mr. C. Henry Roney, of Philadelphia, was then called upon for a description of the

UNDERGROUND ELECTRIC CONDUITS

introduced by the American & Philadelphia Sectional Electric Underground Company. Mr. Roney alluded to the annoyances, the dangers, and the heavy expense of overhead wires, stating, for instance, that their cost of maintenance per mile ranged between \$20 and \$30. The system now introducing by the company consists in laying cast-iron pipes, built up of sections, in the streets, from 24 to 30 inches below the pavement, providing man-holes at the intersections of streets, about four feet in diameter. The pipe is hexagonal in section, and is composed of top and bottom sections. Within the pipe are shelves dividing up the area into a number of compartments, of which each receives a number of wires. These shelves are made of wire, and their construction is such that the inconveniences of induction are avoided. The wires are drawn through from the intersection of two streets to the next, and by small hand-holes any wire can be tapped to be conducted into the houses along the line. The largest size of conduits laid, 16 inches wide by 10 inches high, has a capacity of 3000 wires, and costs from \$5000 to \$6000 per mile. Such a conduit has been laid in some of the streets of Philadelphia. In Chicago, there are seven miles of a smaller size of conduit, which, embodying throughout the latest improvements, has proved highly successful.

In the discussion of Mr. Roney's paper Mr. N. S. Keith, of New York, spoke with approval upon the methods adopted, and urged the importance of the general subject of electrical communication for mining engineers and metallurgists.

The session was closed by the presentation, by Dr. Raymond, of the latest decision of the law of the apex, in the Sitting Bull case, Dakota. It is to be added to his former paper on the subject, in the form of an appendix, which we shall print in full in a future issue. Dr. Raymond closed his remarks by reading the following poem, the humor of which will be appreciated fully by those who have followed his thorough discussion of an important subject:

THE LAW OF THE APEX.

There was a miner in the West,
And truly wise was he;
His head it was the levellest
That ever you did see.

Now he had found a silver ledge
Outcropping to the view;
And down he sat upon its edge,
To muse what he should do.

This knotty question to decide,
It was no joke, because
His reading had been deep and wide
In all the mining laws.

The coast of his experience showed
Full many a gallant ship
Wrecked on those dangerous rocks, the Lode,
The Apex, and the Dip.

Quoth he unto himself, "Now, Jim,
"You an't no saint, I fear;
But you just foller that old hymn,
"An' make your title clear!"

Descending from the summit lone,
He sought, that miner keen,
Three friends, Hans Breitmann, Mike Mahone,
And G. McClellan Green.

With them he shaped his wily plan:
Locations three they made;
And lo! the claim of every man
Across the rest was laid.

First, Breitmann claimed a mineral vein
According to the strike;
But over this was spread again
The placer-claim of Mike;

And, pointing with a skillful aim
To where the ore was seen,
Appeared the dangerous tunnel-claim
Of G. McClellan Green.

Then in ejection Mike brought suit
To make Hans Breitmann quit
(And some revolvers they did shoot,
But nobody was hit).

The lawyers they explained the law,
The experts made the facts,
The judges they said "hum!" and "haw!"
And quoted various acts.

The jury found against Mahone,
And he retired serene;
While Hans was left to pick a bone
With G. McClellan Green.

This time, the fight was harder yet;
Injunctions filled the air;
Old stakes were moved; new stakes were set;
Bold witnesses did swear.

A model for one side displayed
The mine in minim size;
The other side a model made,
Which looked quite otherwise!

The experts brought their biggest books,
To make the battle hotter—
Dana, Le Conte, De Beaumont, Jukes,
Bischoff, Grimm, Groddeck, Cotta,

Gaetzschmann, Posepny, Burat, Lyell,
Newberry, Whitney, King,
Sandberger—and, in short, a pile
Of almost every thing.

Stenographers took down the case,
And made their talent felt
In jargon written out of place,
And proper names misspelt.

To try it without jury's aid
Both parties did agree;
Because a jury can't be paid
With a contingent fee.

At last 'twas over; and the judge
Declared his final mind:
He thought the science mostly fudge;
The models, very blind;

He said that he had seldom heard
Such learned counsel speak
(Though plaintiff's counsel was absurd,
Because his cause was weak)!

In short, he gave to Hans the case;
And surely ne'er was seen
A calmer man in his disgrace
Than G. McClellan Green.

With Mike and Hans that night he met
Their common partner Jim.
"Old boy, we've fixed it now, you bet!"
Each partner said to him.

"And when we want to stake our land,
And own it without fuss,
"We'll come to you, to take a hand,
"And do as much for us!"

Experts and lawyers, paid in shares,
Soon looked exceeding grim;
For Hans has made, all unawares,
A previous deed to Jim!

So thus the prudent miner got
A title without flaw,
In spite of every puzzling spot
That marks the mining law.

True, when they came to work the claim,
The ore soon petered out,
And nothing but the silvery name
Showed silver was about.

But ere that time, the famous suit
Had brought the mine renown—
Jim sold it to a Tenderfoot,
And got his money down!

THE SECOND SESSION

was opened by the reading of a paper by Mr. N. S. Keith, of New York, on the

DESILVERIZATION OF LEAD BY ELECTROLYSIS.

After a brief statement of the general principles involved, which have been repeatedly and fully dwelt upon in the *ENGINEERING AND MINING JOURNAL*, Mr. Keith described in detail the experimental plant built some months ago at Rome, N. Y. Mr. Keith simply melts the base bullion in a reverberatory furnace of ten tons capacity, without, so far as we understand him, submitting it to any refining except skimming it. The consumption of fuel in melting ten tons per ten hours is stated by him to be one third of

a cord of hard wood. The lead is tapped through a spout having a valve within the furnace, running it into a series of molds hung on an annular frame on a rotating table. The molds, hinged below, are so constructed as to furnish thin plates weighing about 7.6 pounds apiece. While casting, two copper strips are suspended in them, so that they are cast in the plates. Mr. Keith stated that the men are now sufficiently skillful at the work to cast ten plates a minute, so that a casting capacity of one ton an hour is easily reached. When cool, a muslin bag is drawn over them. These anodes are hung upon a frame arranged in concentric rings having between them a space of two inches, and holding 276 plates. The anode frame is lowered into vats about six feet in diameter, made of asphaltic cement and resting on a floor made of the same material. At the Rome works, there are 30 of these vats, which have a capacity for depositing one ton in every seven days. The cathode frames are built up of thirteen rings, two inches apart, placed concentrically, the anode frame being lowered in such a way that the rings of plates pass between two adjoining rings of cathodes, leaving a space of one inch between them. In the center of the frames, is a space two feet in diameter. The vats are filled with the electrolyte, holding 600 gallons of a solution of acetate of soda, in which is dissolved sulphate of lead. Scrapers to brush off the lead and prevent short circuiting pass between the anode plates and the cathodes. In order to provide for the necessary circulation of the solution, Mr. Keith has an underground system of pipes through which the solution is drawn from the vats and pumped into an overhead system of pipes, which deliver it back to the vats. The current from the Edison dynamo machine passes into one vat through the center of the vat by a 1 1/4-inch round copper conductor, and is carried to the next vat after passing from anode to cathode. The dynamo has an electro-motive force at the binding posts of from 6 to 7 volts capacity, but in practice from 2 1/2 to 3 volts is rarely exceeded. The current has been made as high as 1400 ampères, the production of lead being in exact proportion to the ampères. A current of 1000 ampères enables Mr. Keith to dissolve the lead and deposit it at the rate of from 10 to 11 pounds per hour per vat, equivalent to one ton per hour. The residues, which amount to about one per cent of the base bullion used, are worked by melting with nitrate of soda.

Dr. T. M. Drown was called upon for a paper entitled

AN EXPERIMENT IN COAL WASHING.

An attempt to separate coal from its slaty and mineral admixtures without the aid of jigging was suggested by the successful use of dense in the separation of the mineral components of igneous rocks. In the case of coal, it is essential that we have a solution of a specific gravity greater than the coal, and less than the mineral or slate associated with it. Further, in order that such a solution should be particularly admissible, it must be cheap and readily obtainable. Calcium chloride fulfills all these conditions, though it is not intended to be approved in the absence of actual trial that its use on a large scale would be economically successful.

The record of experiments on several samples of bituminous coal go to show that, on a small scale in the laboratory, the separation is easily effected and is thoroughly satisfactory.

A sample of coal was crushed so that it all passed through a twenty-inch sieve, and it was then treated with a calcium chloride solution of a specific gravity of 1.40. After stirring, the greater part of the fragments rose to the surface of the liquid and a portion settled at the bottom. The results were:

Lighter portion (91.54 per cent).....	Ashes. 8.02 p. c.	Sulphur. 0.83 p. c.
Heavier " (8.46 per cent).....	50.65 "	1.540 "

It was found that the fine dust interfered with the process and prevented a prompt separation of the lighter and heavier particles. Another sample was then put in a 60-mesh sieve after having passed the 20-mesh sieve. This coal, freed from dust, gave a prompt separation when treated with the calcium chloride solution of a specific gravity of 1.30.

The results were:

Lighter portion (79.05 per cent).....	Ash. 6.02 p. c.	Sulphur. 0.79 p. c.
Heavier " (20.95 per cent).....	29.84 "	2.19 "

The next table gives results still more in detail:

I. Fine coal passed through 20-mesh sieve, 2.10 per cent.
 II. Retained by 20-mesh sieve, lighter than 1.35; specific gravity, 42.38.

III. Retained by 20-mesh sieve, heavier than 1.35; specific gravity, 35.52 per cent.

IV. Original coal (calculated):

	I.	II.	III.	IV.
Moisture.....	0.88	0.980	0.96	0.951
Volatile matter.....	19.28	19.667	16.10	18.314
Fixed carbon.....	69.27	72.216	49.70	63.567
Sulphur.....	1.71	0.807	1.93	1.251
Ash.....	9.56	6.330	31.31	15.917
Total.....	100.00	100.000	100.00	100.000
Coke.....	79.34	78.75	81.98	80.112

It will be noted from the above that the fine dust is much poorer than the original coal, and could in practice be directly added to the purified coal before coking.

Another series of analyses gave:

I. Fine coal through 40-mesh sieve, 9.50 per cent.
 II. Retained by 40 sieve lighter than 1.35 specific gravity, 44.60 per cent.

III. Retained by 40 sieve heavier than 1.35 specific gravity, 45.90 per cent.

IV. Original coal (calculated):

	I.	II.	III.	IV.
Moisture.....	0.57	0.63	0.62	0.638
Volatile matter.....	19.97	20.31	16.57	18.550
Fixed carbon.....	68.82	72.63	51.68	62.587
Sulphur.....	1.03	0.80	1.34	1.071
Ash.....	9.61	5.63	29.75	17.144
Total.....	100.00	100.00	100.00	100.000
Coke.....	78.95	78.65	82.10	80.272

The process tried on a sample of great purity, gave:

I. Fine coal through 20-mesh sieve, 21.63 per cent.

II. Retained by 20 sieve lighter than 1.35 specific gravity, 76.37 per cent.

III. Retained by 20 sieve heavier than 1.35 specific gravity, 2.00 per cent.

IV. Original coal (calculated):

	I.	II.	III.	IV.
Moisture.....	0.63	0.79	1.02	0.760
Volatile matter.....	2.11	19.84	11.56	19.730
Fixed carbon.....	75.11	75.16	69.58	75.040
Sulphur.....	0.77	0.67	4.40	0.768
Ash.....	3.98	3.54	13.44	3.704
Total.....	100.00	100.00	100.00	100.000
Coke.....	78.88	79.04	85.22	79.127

In practice, the advantages of this method of purifying coal would be its promptness and the cheapness and simplicity of the plant required for the separation. As an offset to these advantages, must be put the loss of calcium chloride in the liquid adhering to the coal and slate. To determine how thoroughly this could be removed by washing, the following experiments were tried: 611 grams of purified coal were allowed to drain 15 minutes, and were then washed six times with 350 cubic centimeters, five minutes in each case being allowed for draining.

From the first washing, 21.90 grams were recovered; from the second, 3.49 grams; the third, 0.76 gram; the fourth, 0.17 gram; the fifth, 0.15 gram; and from the sixth, 0.10 gram were recovered. The lost amount remaining in the coal after the fifth washing is equivalent to 2 1/2 pounds of calcium chloride to the ton of coal. The washing would therefore be a somewhat tedious process, and would require a series of large tanks. The dilute wash waters could be used for subsequent lixiviation until they become sufficiently saturated to be still further concentrated by heat to the original density. The heat need not be here considered as an item of expense, for there is always plenty going to waste about coke-works. The effect on the quality of the coke of the small amount of chloride of calcium that would always remain in the coal would be inappreciable. The ash would be slightly increased, and perhaps there might be some sulphur volatilized; but this is not worth taking into consideration.

During the discussion, Mr. John Fulton, mining engineer of the Cambria Iron Company, Johnstown, Pa., stated, on the general subject of coal washing, that extensive experiments showed that the cost of washing preparatory to coking was 23 cents a ton; while the best coking coal, which needs no washing, can be obtained at \$300 an acre in the Connellsville District. Oswald J. Heinrich, of Drifton, Pa., insisted that the trouble with coal washing in this country, in spite of its simplicity, was, that the persons in charge of such works were not generally capable of running the works.

Mr. Frank Firmstone, of the Glendon furnaces, described a new charging-bell that has been in successful use for years. It is a modification of the Langen charging apparatus. In the absence of the necessary sketch illustrating its construction, we must postpone a presentation of Mr. Firmstone's paper for the present. During the discussion, Dr. Raymond urged that the modern methods of fast driving crowded into the background the importance, formerly considered so great, by blast-furnace men, of the methods of filling. Messrs. Firmstone, Cook, of Pottstown, Platt, of Waterford, and Birkinbine quoted instances showing how great an effect upon the working of the furnace apparently unimportant changes in the construction and the dimensions of the charging apparatus may have.

TEMPERING STEEL BY COMPRESSION.

We have repeatedly alluded to the method brought forward in France by Clémantot for tempering steel by compression. Further details have been furnished lately by a report by M. Ad. Carnot to the Société d'Encouragement. M. Clémantot's method consists in heating the metal so that it becomes sufficiently ductile and then submitting it during cooling to a strong pressure. He noticed that this treatment affected the structure of the metal in such a way that it acquired properties analogous to those brought out by tempering. The metal thus obtained differs considerably from steel simply cooled, by its finer grain, its greater hardness, and its greater resistance to rupture, particularly with certain grades of pretty high carbon steel. In these respects, it approaches in quality steel tempered in water, without being identical with it. It has two different effects, almost simultaneously, an energetic and continuous compression, and a rapid cooling of the steel. The cooling is caused by the contact with the platform of the hydraulic press, and takes place much more rapidly than when the same piece is allowed to cool without being compressed. The remarkable results obtained by M. Clémantot are explained by the combined action of cooling and compression. The first, in its results, resembles the compression effected by hammering or rolling; the second, the effect of tempering by immersion. It has been urged that the piece of steel must be inclosed by a mold into which it fits exactly. It is, however, only necessary that the compression act upon two opposite faces. A square bar, whether straight or curved to horseshoe shape, need only be laid down flat and compressed between the two platforms of an hydraulic press. In order to obtain the best results, the cherry-hot piece of steel should be as rapidly as possible subjected to the pressure settled upon beforehand, ranging from 10 to 30 kilograms per square millimeter.

While the tempering process by immersion brings about an increase in the volume of the steel and a corresponding decrease in its density, the action of high mechanical pressure during the entire process of cooling tends to bring the metal back to its original volume or its normal density, thus preventing the creation of a state of intermolecular tension noted in tempered steel. Actual experiment has confirmed these theoretical deductions, so far as the resistance of the compressed steel to stress is concerned.

A "BLOWER" USED FOR LIGHTING.—At the Cymmer collieries, near Cardiff, there is a small gas-works that contains a feature of interest. A "blower" of gas is conveyed up the shaft by pipes, and is forced into the purifiers attached to the gas-works by a steam-injector. The gas made is forced down the pit by another injector, and is there burnt for use. A receiver is placed at the pit bottom to separate from the gas the water resulting from the condensation of the injector steam.

AMALGAMATING MILLS.—II.*

STAMP BATTERIES.

WET AND DRY CRUSHING.—For gold ore, the wet-crushing battery is exclusively used, and for free-milling silver ore it is also generally employed. In some cases, as at Eberhardt, in White Pine, and the Lancaster mill, at Tuscarora, dry-crushing is practiced on the ground that a much higher percentage is saved, owing to the avoidance of loss of finely divided horn-silver in the slimes, which is apt to occur when the ore is crushed wet. This is highly probable with chloride ore; for, although the slimes are very thin, the earthy material in them seems to be richer in silver than the ore itself. There are also some ores that, when crushed, produce so much slime that it is impossible to keep a reasonable percentage of pulp in the mill. For such ores, dry-crushing is preferable; but for other free-milling ores, wet-crushing is by far the best, as more ore can be crushed, there is less wear and tear on the battery per ton, and the hands are not subjected to that inconvenient and unhealthy dust that everywhere pervades the atmosphere of a dry-crushing mill, in spite of attempts made to get rid of it. To a certain extent, the advantages of dry-crushing and wet-crushing for free-milling ores are combined in the plan adopted at Bodie and elsewhere of pumping back the water from the settling-tanks into the battery. When it is intended to roast ore, it is always crushed dry.

WHERE BUILT.—The machinery of most of the mills in operation on the Pacific coast has been constructed in San Francisco; the plant of some mills, however, has been brought from the East, and of the latter Chicago has furnished a large proportion. Recently, the work of the Eastern foundries that turn out mining and milling machinery has improved greatly in quality; and, aided by the cheapness of labor and of material, they have been able to compete with San Francisco and other Pacific coast establishments, even at a relative disadvantage in point of freight charges. As a rule, the types of machinery in vogue have originated and have been developed in works in the neighborhood of the mines, and these establishments have shown much enterprise in adopting new improvements. Lately, however, since the manufacture of mining and milling machinery has grown to be an industry of importance in the East, novelties and improvements are to be found in the product of the Eastern works. Innumerable worthless inventions have also issued from all points at which mining machinery is manufactured.

SIZE OF MILLS.—Among the large mills may be mentioned the following: In California, the Empire (80-stamp), in Amador County, and the Plumas-Eureka (88-stamp), in Plumas County. In Nevada, the California (80-stamp), at Virginia City. In Dakota, the Homestake old (80-stamp) and new (120-stamp) mills, in Whitewood District, and the Father de Smet (80-stamp), in Lost Placer District. In Colorado, the Black Hawk (125-stamp), of Gregory District. In Arizona, the Central Arizona (80-stamp) mill, at Vulture, Maricopa County. There is, on the other hand, a steam battery of two stamps at Globe, Arizona, and a Huntington double-stamp battery at Queen's River, Idaho, while a single-stamp battery, the Kendall, is in course of introduction for prospecting tests. The largest mills, as gauged by the number of stamps only, are as a rule gold mills, though there are several 40 and 60-stamp silver mills, besides the California (80-stamp), above mentioned.

The most common size for a mill seems to be 20 stamps; it is also a very convenient size, especially for a roasting-mill. The size, of course, ought to be governed by the quantity of ore available; but this is not always the case, for mills have been built where there was no ore, and often where the crushing capacity was vastly in excess of any probable output of the adjacent mines.

NUMBER OF STAMPS PER BATTERY.—Five is the usual number of stamps per battery, though some of the older mills have but four. The Gold Stripe mill, in Plumas County, California, has six. Mill-men are commonly of the opinion that an even distribution of pulp in a mortar can only be secured with an odd number of stamps, and of such numbers five is on several accounts the most convenient.

WEIGHT OF STAMPS.—In new mills, the usual weight of stamps is from 700 to 800 pounds each, although great variations still occur in practice. The range in weight is from 300 to 1050 pounds. The average for 280 mills reported on, having 5367 stamps, is 689 pounds. The heaviest batteries, as a rule, are to be found in Nevada, and the lightest in Alabama and Georgia. Of the important mining States, Colorado appears as the locality where light stamps are most in vogue.

WEIGHT OF SHOES AND DIES.—The weight of the shoe bears a certain relation to the weight of the stem, tappet, and boss. For a stamp that weighs 800 pounds, the shoe should weigh about 125 pounds, and the die say 100 pounds. Some mill-men advocate a very thick die; but the one great objection to this plan is, that the loss of crushing power when the level of the die surface is worn much below the discharge more than compensates for the gain in time and material in changing dies less often, and if the thick dies are set high at first, the breakage of screens is much above the usual amount.

MATERIAL OF SHOES AND DIES.—Cast-iron is still much more frequently used than steel for shoes and dies. Thus, of 253 mills reported, only 23 use steel exclusively and 11 both steel and iron for this purpose, or 34 use steel altogether or in part; while in 219 mills, iron is the material employed. Among the best equipped mills, however, the proportion of steel shoes and dies is undoubtedly higher than is shown by these figures; for among the 34 mills using steel, are some of the finest of the recently constructed works.

On the first introduction of steel for this purpose, great expectations were aroused among mill-men as to its superiority; but, unfortunately, many of the earlier castings sent out proved defective, and a reaction of opinion set in. The difficulty with the first steel shoes and dies seems to have been that, although they outlasted the iron shoes in the ratio of 2 to 1, many of them wore cup-shaped and chipped; but this may have been owing to the fact that the outside of steel shoes and dies, on casting, cooled more rapidly than the inside, and thereby became harder. The steel shoes and dies at present manufactured are, however, of much better quality, and usually wear very evenly, the improvement being due to a better knowledge of the requirements and to greater care in casting.

* From the Census Report by G. F. Becker and S. F. Emmons. Compiled chiefly by Mr. J. S. Curtis.

The question of steel *versus* iron for shoes and dies is purely one of relative economy, and not of theoretical merits of one metal above the other. Steel lasts longer than iron, but costs proportionately more; on the other hand, a less frequent adjustment of drop is required with the more slowly wearing material. In districts remote from railroad communication, and where the freight charges are high, steel is more economical than iron; for the first cost of material becomes a matter of less moment when the expense of transportation reaches from 3 to 5 cents a pound, as is sometimes the case. If it requires two sets of iron shoes and dies to do the work of one set of steel ones, evidently it will cost twice as much in freight charges for this item to keep a mill supplied with the former.

In many districts, there are foundries, sometimes connected with the mining works, that recast the worn shoes and dies, thus utilizing the old iron, but which have not facilities for producing perfect steel castings. This consideration, no doubt, has weight in the choice of material. There is also no market for the old steel, while scrap-iron, on the other hand, can be readily disposed of in most localities. In dry-crushing mills, running on very hard rock, steel is generally preferred.

The iron in use is nearly always a mixture of white and gray iron in different proportions, and is sometimes chilled and sometimes not. Of 39 mills reporting the use of chilled-iron shoes and dies, specific description was received from 25, as follows, without any attempt at classification further than to quote the wording of the reports:

Gray	1	White	15
Mottled	1	White double chilled	1
Nearly mottled	1	Hard (white?)	1
White mottled	1	Common cast	2
White surface-chilled	2		

No details were received from 14 other mills reporting the use of chilled iron for this purpose. In 143 reports, in which it was not stated whether the castings were or were not chilled, the following varieties are included:

Very soft gray	1	100 parts white mottled, 25 gray, and 15 wrought-iron	1
Very soft (gray?)	1	One third No. 1 (gray) and two thirds scrap	4
Soft gray	1	Hard white	5
Gray	3	White Scotch pig	2
Mottled	12	Woodstock white charcoal cold-blast	1
Common cast	12	Car-wheel iron	1
Mottled nearly white	1	Scrap	3
White mottled	13	Hard scrap	1
Common cast low white	1	Scrap and pigs	2
Nearly white	22	Franklinite (mixed?)	8
Medium white	1		
White	47		

MATERIAL OF TAPPETS, ETC.—Steel has been introduced as the material for tappets, cams, bosses, etc., as well as for shoes and dies. It has been found to work excellently for these purposes.

LEVEL OF THE DIE BELOW DISCHARGE.—In gold mills where amalgamation is carried on in the battery, the level of the die surface is kept from two to six inches below the discharge, in order to amalgamate as much gold as possible in the mortar. By means of a movable slide at the bottom of the screen, the level of the discharge can be kept the same as the die wears out.

In silver mills that crush wet, it is intended to keep the die surface about one or two inches below the level of the discharge; but as the die wears down, its surface is gradually lowered, and this decreases the crushing power of the battery. It is the aim of the mill-man to set his die as high as possible, without endangering his screens, so as to utilize most of his die to the best advantage. In dry-crushing silver mills, this is also the case, except that there is a greater loss of power in the dry than in the wet-crushing battery when the die surface is much below the level of the discharge.

GUIDES.—Many varieties of guides have been experimented on, but the prevailing practice is to use plain wood ones. The wood chosen is generally oak, although other hard woods answer the purpose; sometimes soft wood is employed, because of the difficulty of obtaining other kinds. At the California mill, Virginia City, both oak and hickory are used, and heart of maple, when obtainable, is recommended by some mill-men. At Austin, Nevada, the cast-iron guides have square holes, which are filled out with pine blocks with the grain vertical and bored out to the proper size from the stem. These blocks can be replaced at any time, and only one stamp need be hung up. At the Buffalo mill, at Atlanta, Idaho, guides of yellow pine and fir, the only woods in the district, having given much trouble by wearing out very rapidly, the superintendent, to avoid the necessity of transporting solid guides of hard wood from a distance, hit upon a similar expedient. Oak keys, four for each bearing and with the grain vertical, were mortised into the fir-guide-frames, with the bearing surface turned concave to fit the stem. These keys are replaced by new ones without disturbing the frames or removing a bolt.

Some of the cast-iron guides in use are lined with babbitt-metal, and at one mill in Utah a lining of raw hide is adopted. In dry-crushing batteries, babbitt-metal and brass are cut by the quartz dust. In one Nevada mill, brass guides are used with part of the batteries, while iron is used in the rest; but the result of this trial, side by side, of the two styles is not reported. One mill in Colorado and one in Georgia have upper guides of wood and lower ones of iron.

CAMS.—Double-armed cams are now used almost exclusively, but in a few of the older mills single-armed cams are still found. The advantage of the double-armed cam is obvious; the cam-shaft, which is subject to an enormous strain, can be run at one half the speed necessary to obtain the same number of drops per minute with single cams. The attempt to carry this principle still further by adopting three-armed cams has not been successful, as the tappet has not room, in falling, to clear the rising cam-tips safely, while the latter could not be shortened without assuming a less advantageous curve.

MAXIMUM DROP.—The maximum drop obtainable is not the same in silver and gold mills, as the stamps of gold mills should drop farther than those of silver mills, in order to produce the splash that assists in battery amalgamation. In gold mills, the maximum drop obtainable is from 12 to 20 inches, and in silver mills from 9 inches upward.

WIDTH OF MORTAR.—The width of the mortar at the bottom of the screen varies from 10 to 14 inches, and depends upon the hardness of the ore. At the California mill, where the quartz is very friable, the width of the mortar is only 10½ inches, although the stamp weighs nearly 1000

pounds and the shoe has a large diameter. Such a mortar could hardly be used for hard quartz, as the screens would be continually in danger. Of course, the narrower the mortar, the faster the battery will discharge.

DOUBLE AND SINGLE DISCHARGE.—In gold mills where battery amalgamation is practiced, the discharge is always single, as one screen will discharge the ore as fast as it is amalgamated. In wet-crushing silver mills, where the ore is hard, it is also usually single, as the battery will discharge from a single screen nearly as fast as the ore is crushed. At the California mill, although the ore is soft, a single discharge is used; in other places, as, for instance, Silver Reef, Bodie, and Tombstone, a double discharge gives better results than a single one. Comstock men think there is no advantage in a double discharge, as, no matter how soft the ore, the water will carry it out of the battery as soon as crushed. This, however, is doubtful. In Silver Reef, where 10 tons to the stamp are crushed a day, it is unquestionably advantageous to use a double discharge, and it is extremely doubtful whether power is not always saved and the percentage of slimes diminished by this construction. Local conditions must decide whether the saving effected is counterbalanced by the inconvenience of a double set of sluices and an increased consumption of screens.

For dry-crushing mills, a double discharge is necessary; for the ore will not screen nearly so fast as it is crushed. The main point in adjusting a dry battery to crush properly is, to make the splash of the pulp as regular and as high as possible; and this is done by dropping the stamps in the proper order, so that the material crushed shall be evenly distributed in the mortar, and by keeping as little of it as possible under the stamps at one time. Where there are three inches or so of ore under the stamps, there is no chance for the splash; very little pulp passes through the screens, and the battery is soon choked and fills up.

SCREENS.—There are four kinds of screens in use for quartz-mills: steel and brass wire, and slot and needle-punched sheet-iron. A tin screen is mentioned in the schedule of a gold mill in California, but the advantages are not apparent. For gold mills, the punched-slot screen is the one mostly used, though steel wire is sometimes met with; in wet-crushing silver mills, steel and brass wire and needle or slot-punched iron are all used. The preference seems to be for the brass wire, though steel is now replacing it. Punched screens are not so much used as formerly. At the California mill, they use a horizontal-slot punched screen, which is said to correspond to a No. 50 wire. This may be the case when the screen is new; but after it is slightly worn, as the tank sand shows, it certainly lets through much coarser pulp. These screens are said to work exceedingly well, and are the invention of the superintendent of that mill. In dry-crushing mills, the brass and steel wire screens are used.

In gold mills, from No. 5 to 9 slot is the common size; in silver mills, wet and dry-crushing, from No. 40 to 60 wire screens, though the usual number is 40. At Bodie (wet-crushing) they use as low as No. 20, and at the Manhattan and Eberhardt & Aurora (dry-crushing) they use No. 60. No account of any concave screens is included in the census schedules.

The numbers by which punched screens are known correspond to those of ordinary sewing-needles, from which the punches are made. The width of the slots in slotted screens is equal to the diameter of the holes in a punched screen of the same number. The number of a wire screen is the number of meshes to the linear inch.

SELF-FEEDERS.—The automatic ore-feeders employed are the Hendy, Tulloch, Stanford, Victor, and some others, and they seem to be used irrespective of whether the battery is a wet or a dry crusher. Out of 272 reported, 115 used automatic feeders and 154 were fed by hand.

An automatic quicksilver-feeder, for gold mills, acting on the principle of the ore-feeders, is a new feature. It is so connected with the cam-shaft that each revolution of a large ratchet-wheel, which can be regulated to revolve once in one, two, three, or four minutes, as desired, dips a small cup into a reservoir of quicksilver, and by a trip of its cam empties the contents into a pipe leading to the mortar. The feed is therefore regular and practically continuous.

PLATES.—Gold mills are usually provided with a copper plate or a silver-plated copper plate, which has been amalgamated with quicksilver, for the purpose of catching the gold or the amalgam as it comes from the battery. This plate is called an apron, and is as wide as the discharge of the battery, being sometimes rectangular and sometimes tapering toward the sluice. Mill-men seem to differ in regard to the respective virtues of the copper and the silver-plated copper plates. Some think that the silver plate, after amalgamation, is too "hard" to catch the amalgam; others (and these are the majority) prefer it, and its use is becoming more general. A silvered plate is much more readily amalgamated and kept clean.

BATTERY POWER.—As a rule, the whole mill is run by one engine or wheel. The California mill is an exception; for the battery of 80 stamps is situated a quarter of a mile from the pan mill, to which the pulp flows through a long sluice. The settling-tanks are in the pan mill.

ROCK-BREAKERS.—Blake's (or some modification of it, for the patent has lapsed) is the rock-breaker in use in most mills. Some have none at all, the rock either being fine enough for the battery as it comes from the mine or being broken by hand when necessary. In a few mills, Chinese are employed to break rock for the batteries.

DRYING THE ORE.—In dry-crushing mills, the ore is generally dried on cast-iron plates set over the flues of the roaster, where there is one; where no roaster is used, the plates are heated by a special fire. The Pacific rotary drier is in use in some mills, and it consists of a revolving cylinder, through which the ore passes continuously at the same time that the heated air from a special fire-place passes through the cylinder in the opposite direction. The cylinder is set at a slight angle from the horizontal, and acts somewhat on the principle of the Howell furnace. This rotary drier seems to work very well, and it certainly produces a great saving of labor; for in drying the ore by the ordinary method on plates, it is necessary to turn it over frequently by hand. This mechanical process of drying, however, fails to utilize the waste heat from the roasting-furnace, in case one is employed; which fact renders the rotary drier less profitable than it otherwise would be.

MORTAR CASTINGS.—Mortars are now almost invariably made in one solid casting. The practice of casting them in several pieces, to be bolted together, is justified only when great difficulties in transportation are to be overcome. If the only possible means of conveying machinery to a district difficult of access is by pack-train, the separate portions

must not be heavier than from 300 to 350 pounds each. Foundry men, in supplying plant for remote districts, as, for example, in Mexico and Central America, have shown great ingenuity in furnishing sectional castings. This plan is available in the case of many items of mining and milling machinery; but for mortars, single castings are so much stronger that piecing should be avoided if at all possible. The strain upon a mortar, in case the mortar-bed settles in the least degree irregularly, requires corresponding rigidity in the casting; and the pieced mortars can not be relied upon with confidence, notwithstanding the care taken to make them as efficient as the circumstances admit. Of some 250 mills from which data on this point were obtained, not one had a sectional mortar.

DROP.—The length of the "drop" for dry-crushing batteries is usually from 6 to 8 inches, and in wet crushing from 6½ to 9 inches. The drop for gold-mill batteries is greater than for silver, as it seems that more splash is required where amalgamation is carried on in the mortar than where it is only necessary to pulverize the rock. The greatest drop noted for silver mills is that of the Martin White battery at Ward, Nevada, where a 750-pound stamp drops nine inches ninety times a minute.

ADJUSTMENT OF DROP, SPEED, AND WEIGHT OF STAMPS.—Engineers have not been able to deduce any general law governing the length of drop and the number of drops a minute for a given weight of stamps and ore of a certain texture. The fact that in many batteries the weight of stamp, drop, and speed are not the best for the kind of ore that is to be crushed is admitted. It is, however, much easier to condemn the arrangement of a particular battery working on a given ore than it is to say exactly what drop and what number of drops would do the most work with the least proportionate wear and tear. It is a self-evident proposition that the heavier the battery, the greater its drop, and the greater the number of drops, the more ore will be crushed. Of course, these have their limits in practice. If a 750-pound stamp, dropping six inches one hundred times a minute, crushes a given kind of ore at a certain rate, for a harder ore a heavier stamp would be required, or a greater drop, or more drops a minute, and perhaps all three, in order to crush the same amount of ore in a given time. Taking the wear and tear into account, it would seem that, if the stamps be made heavier, the drop as well as the number of drops should be decreased, in order to keep the wear and tear of a battery down to a minimum. The converse of this would be true of a lighter one.

In practice, however, these factors are governed by other considerations. Suppose a company has 15 tons of ore to be crushed in twenty-four hours, and it is intended to put up a battery of 15 stamps, weighing 700 pounds each, to crush this ore; it would be much more advantageous to build a 10-stamp battery of say 1000-pound stamps (granting that this battery would crush the given quantity of ore, which it would probably do); for the 10-stamp battery would cost about one quarter less, and the amount saved in cost of plant would more than compensate for the proportionate difference in wear and tear between the two, even taking it for granted that, in point of fact, the wear and tear of the lighter battery would be less per ton of ore crushed.

It is considered a good rule to put up a heavy battery, no matter what may be the character of the ore to be crushed; to give that battery as great a speed as possible, say 100 drops a minute; and to give the stamps as long a drop as their weight and speed will permit. Of course, there are some limits to be placed on weight, speed, etc. Stamps ought not to exceed 1000 pounds in weight, the speed ought not to be over 110, and the length of drop not over 8 inches for wet-crushing silver mills. For dry-crushing mills, these figures, with the exception of speed, should be somewhat less. The greatest speed of any battery reported is 108, in the Eberhardt & Aurora mill, in White Pine, Nevada, the stamps weighing 750 pounds, and the battery being a dry-crusher with 8-inch drop. Gold-mill batteries are run at a less speed and with a greater drop, other considerations than mere crushing power, such as amalgamation, altering the usual rules for wet batteries. The Rising Sun mill, in Placer County, California, for instance, has, with 800-pound stamps, a speed of 65 and a drop of 11 inches—the longest noted.

STEAM STAMPS.—A single steam two-stamp battery is reported in Arizona. Not much progress has been made in the introduction in the far West of steam or of air-cushions to increase the force of the blow given by the stamp in falling. For the copper ores of the Lake Superior region, the steam stamp has been found to be very effective, and it would seem that it should be equally so in the case of very tough gold and silver ores, although no sufficient tests have yet been made to afford a basis for comparison with the ordinary gravity stamps. The whole question is, of course, one of relative economy; if the first cost, wear, and repairs of the steam stamp overbalance its superior crushing capacity, it would not be practicable to adopt it.

THE ORDER IN WHICH THE STAMPS FALL.—The order in which the stamps fall has a great influence upon the crushing power of the battery. Four orders are in general use, namely: 1-4-2-5-3, 1-5-2-4-3, 1-3-5-2-4, and 1-3-5-4-2. Many other orders are used, but they are usually adopted through ignorance of the proper order. Mill-men do not agree as to which one of the above named four orders is the correct one; it is a safe rule to lay down, however, that no one of the five stamps after falling should be followed by either of its neighbors. This is the case with the second and fourth orders mentioned; and although they do not give the pulp a bad motion, the first and third orders are preferable, and of these two the first seems to be the best. This opinion is borne out by the usage in most places, many more batteries dropping in the order 1-4-2-5-3, although 1-5-2-4-3 is the order in the California mill batteries and many others.

There is generally one cam-shaft for every ten stamps, the second row of stamps having their cams so set that no two stamps fall at the same instant.

In dry-crushing batteries, it is often customary to give the outside stamps a half-inch more drop than the others, in order to prevent the pulp from drifting too much to the corners.

ROTATION OF STAMPS.—The rotation of the stamp in rising is governed by the amount of grease on the cam and the tappet. Where the cam and the tappet are dry, the stamp makes nearly a complete revolution; and where there is much grease, it scarcely revolves at all. From one twelfth to one eighth of a revolution is about what the stamp ought to

revolve in rising, as this will be sufficient to cause the shoes and dies to wear evenly and at the same time permit of the cam and the tappet being well lubricated. The rotation in falling is usually very slight.

MINERALOGICAL CHARACTER OF THE ORE.—The mineralogical character of the ore has considerable influence on the quantity crushed. As a rule, quartz ores are more readily pulverized than limestone, which, though softer, is less brittle, and oxidized or chloride ores easier than sulphurets. The least difficult ore to crush is the Silver Reef sandstone, and the hardest the flinty quartz of some of the Arizona mines.

AVERAGE NUMBER OF TONS CRUSHED.—In wet-crushing, the number of tons pulverized varies from one to five in twenty-four hours, according to the character of the ore, and in dry-crushing from three quarters of a ton to two tons to the stamp. At Silver Reef, however, no less than 10 tons of sandstone per stamp are passed through a wet battery. This rock requires to be disintegrated rather than crushed, the individual particles of quartz composing it being small enough to pass through the screens without further division.

AMALGAM CAUGHT IN THE BATTERY.—The data in the schedules in regard to the amount of amalgam caught in the batteries of gold mills are rather vague. From one third to two thirds of the total amount of amalgam saved is caught in the battery, and the usual amount is over one half. There is ordinarily little silver saved, except that which is alloyed with the gold. Battery amalgamation in silver mills, which was formerly common, is now seldom practiced.

GOLD AND SILVER IN BATTERY AMALGAM.—The gold and silver in the battery amalgam of gold mills form from one third to one half of the weight of the amalgam; the more silver the gold contains and the finer it is, the more quicksilver does it require for amalgamation. The gold bullion from this mixture is worth from \$12 to \$18 an ounce, showing that the proportion of silver in the alloy is very small. Scarcely any other metals are found in this bullion with the exception of a little lead or copper. The fact must not be lost sight of that in the amalgamation of gold that metal is not so perfectly alloyed with the quicksilver as is the case with silver, but is merely coated on the outside with a thin film of quicksilver, which causes the separate particles of gold to adhere together, thereby forming a pasty mass which has the appearance of a true amalgam. This is easily perceptible where the gold is coarse, as the particles can be distinctly felt by pressing the amalgam between the fingers. In the amalgamation of gold, it is necessary to keep the amalgam at a certain consistency. If there is too much quicksilver, it will flow too easily and not be caught on the amalgamated copper or silver plates; and if there is not enough, the gold is imperfectly amalgamated, and is carried off in the tailings.

WEAR AND CONSUMPTION.—Cams last from one year to three years, the length of time depending on many things, but principally on the care with which the battery is handled. At the California mill, where especial pains are taken to keep account of the wear and tear, experience shows that the usual life of a cam is sixteen months. Cams usually break at the hub, but sometimes the extreme tips break off. It is said that in certain European works where the stamp battery has been introduced it has been abandoned on account of the rapid wear of cams. Inappropriate handling only can explain such a result.

Other things being equal, the length of time that shoes and dies last depends upon their dimensions. A frequent replacement of those portions of the battery causes a serious interruption of work and a rapid accumulation of old iron, while the battery is less efficient with old shoes and dies than when provided with such as are new or but little worn. The usual practice is to employ shoes and dies that will last one or two months in wet crushing and from two to four months in dry-crushing.

Shoes wear much faster than dies, because the latter are always covered with a layer of rock or pulp, the impact being between the shoe-face and the ore. The exact relation probably depends upon the feeding, a thick layer of ore protecting the die more effectually than a thin one. From a half to two thirds as much iron is worn from the dies as from the shoes in a given time. In many mills, the dimensions of the shoes and dies are so selected that they will wear out in the same time, and this plan certainly seems commendable, since only a single stoppage is required to reset the battery instead of two. Shoes and dies are commonly used till their weight is diminished to from 25 to 50 pounds. Occasionally, however, they break in the battery, and must then, of course, be removed, however little they may be worn.

The consumption of iron in the battery per ton of ore crushed depends on a number of points, some of which are as follows: The material employed for the castings chips if too hard and wears rapidly if too soft. Steel generally lasts about three times as long as iron. The character of the ore is perhaps less strikingly influential on the consumption of iron than might have been supposed. The Comstock ores, for example, are usually in a fine state of division as they leave the mine; yet the shoes and dies of the California mill do not wear unusually long. The fact is, that comparatively little of the Comstock ore will pass the screens without further division, and the large particles are as hard to crush as any quartz. The Silver Reef ores, as has already been pointed out, are exceptional. The level of the die surface has much to do with the consumption of iron. In the gold mills of California and Colorado, where battery amalgamation is practiced, the freedom of discharge is intentionally diminished by setting the die surface several inches below the lower edge of the screen. The wear of iron is consequently greater in these mills than in wet-crushing silver-stamp batteries. The size of the openings in the screens, and no doubt also their number, have an influence on the wear of the iron corresponding to the work done in reducing the pulp to the necessary fineness. Dry-crushing batteries certainly consume less iron than wet-crushing batteries per ton of ore crushed, probably because in wet batteries the particles of dust are removed from the face of the iron as fast as formed, allowing the die to descend immediately upon the larger fragments. The modifying conditions are so numerous that accurate data as to consumption of iron in the batteries can not be given. The wear per ton of ore crushed in dry batteries, however, sometimes falls a little below one pound per ton, and may average one pound and a quarter, while in wet-crushing over two pounds is not uncommon, and a pound and three quarters is not far from the mean.

Screens last from five to thirty days in wet crushing and from seven to forty days in dry. The average for both wet and dry-crushing mills is

about fifteen days where punched screens are used in wet mills and brass wire in dry; for in wet-crushing the punched screen will last one third longer than the brass-wire screen.

QUICKSILVER USED IN BATTERY.—In battery amalgamation, the amount of quicksilver added depends on the quantity of gold in the ore. It is necessary to add quicksilver enough to amalgamate the gold and still keep it in that pasty condition that causes it to adhere to the copper or silver plates. From one to two ounces of quicksilver per ounce of gold in the ore is about the usual quantity used.

WATER USED IN THE BATTERY.—It is generally difficult to ascertain the quantity of water used in batteries; but some trustworthy data show a consumption of from 500 to 700 gallons per ton crushed. According to the circular of Prescott, Scott & Co., of San Francisco, each stamp requires 10 pounds a minute, which, at the rate of three tons crushed per stamp in twenty-four hours, would make 576 gallons per ton. Many mills, however, use much more water. Where water is scarce, it is usual to pump it back from the slime-tanks or ponds to the battery.

SHAPE OF OLD SHOES AND DIES.—Shoes generally wear slightly concave in the center, the outer rim being rounded or clipped off. Dies usually wear a little convex in the center, gradually becoming somewhat concave toward the outer edge. These depressions commonly vary from half an inch to one inch.

METHOD OF HANDLING DRY-CRUSHED ORE.—In almost all dry-crushing mills where the ore is roasted, the ore is removed from the screens by means of a screw-conveyor. Where no roasting is done, the "pulp"* is removed in cars, which are placed to catch it as it falls from the battery, and is thus carted to the pans.

GRADE OF SLICES.—The grade of slices from the battery to the settling-tanks is usually from three quarters of an inch to two inches per foot; one inch to the foot is sufficient, except with very heavy ores, and more than two inches is probably never necessary. Where higher grades are employed, as they often are for short sluices, it is not because they are necessary, but because the disposition of the apparatus makes it convenient. The California mill at Virginia has a sluice 1200 feet long with an average grade of five eighths of an inch. It is probable that a somewhat steeper grade would have been adopted had circumstances permitted; but the fact that so low a grade answers the purposes of a highly successful mill shows that high grades are indispensable only with very heavy ores. These data apply for the normal quantity of water fed to the batteries. It is worth while to remember, however, that the carrying power of water varies with the sixth power of the velocity, and the velocity varies as the square root of the fall. The transporting power of a current, therefore, varies as the third power of the fall. The slower the current in the settling-tanks, too, other things being equal, the more complete the separation of the pulp from the water or the smaller the quantity of slimes leaving the mill. These facts show that a small consumption of water is desirable, and indicate, as the most economical practice, batteries with great discharging capacity fed with as little water as is compatible with efficient discharge, sluices of ample grade, and comparatively few settling-tanks.

SETTLING-TANKS.—Settling-tanks vary in size; but the greater part of them are 6 feet long by 5 feet wide by 38 inches deep. The pulp generally fills them to a depth of about 24 inches, which represents about 3 tons of dry ore. A few tanks are made much larger, the maximum reported being 12 by 15 feet with a depth of 3 feet, and the minimum 4 by 4 feet with a depth of 32 inches.

PROPORTION OF SLIMES.—From 1 to 15 per cent of the ore passes out of the mill in the form of slimes. Ores carrying clay produce far more slimes than those from which it is absent, and of course fine crushing and insufficient tank capacity increase the amount of ore that fails to settle in the tanks. Slimes from doré ore are usually poorer in silver and richer in gold than the ore itself. The treatment of the slimes, if they are saved in settling-ponds, forms the subject of special manipulation; but there are many mills at which no attempt is made to collect and work the slimes.

PROF. D. M. GREEN, of the Troy Polytechnic Institute, of Troy, N. Y., is testing the engines of the new water-works at Alleghany City.

NOVA SCOTIA COAL AND IRON.—The amount of coal raised in Nova Scotia mines in 1883 was 1,422,553 tons, being an increase of 56,000 tons over the production of 1882, and of nearly 300,000 tons over that of 1881. The amount of coal exported to the United States last year was 102,755 tons, being an increase of 3453 tons over the exports of 1882. The largest shipments are to Quebec. New Brunswick is the market next in importance, while considerable quantities of coal also go to Newfoundland, Prince Edward Island, and the West Indies. It is stated that £300,000 were paid out by several coal mining companies of Nova Scotia last year, and that altogether the number of persons employed in and about the mines and in transporting coal by land and sea is about 10,000. The production of iron last year in Nova Scotia was 52,410 tons, an increase of 10,000 tons over the previous year.

WORKING LEAD FUME INTO LITHARGE AND RED LEAD.—A new process for working lead fume into litharge and red lead has been described in the Journal of the Society of Chemical Industry. The fumes evolved from the working of galena contain lead sulphate, sulphite, and oxide, arsenic and antimony, also lead sulphide, and, when zinc ores are present, zinc oxide. The lead fume is mixed with sodium carbonate or hydroxide, and roasted. The roasted product is then washed, whereby sodium sulphate and sulphite, and sodium compounds containing arsenic and antimony are separated. The lead compounds are converted into lead oxide by this treatment. The lead fume may be boiled also with a solution of sodium carbonate or hydroxide, lead carbonate and hydroxide being formed, while arsenic and antimony are dissolved. The washed precipitate is then roasted. In the presence of zinc compounds, they are removed by boiling with sulphuric acid. If lead sulphide be present, it is necessary to boil first with a solution of calcium hypochlorite. Sodium sulphate is recovered from the liquors after separating arsenic and antimony.

* The word "pulp" is used by mill-men to distinguish pulverized ore, whether wet or dry, roasted or raw.

THE WALDRON ROTARY ENGINE AS APPLIED TO HOISTING-ENGINES.

Mr. E. W. Bliss, of Brooklyn, has recently introduced the Waldron rotary engine for a variety of purposes, among which its application for hoisting and elevator purposes is prominent. Mr. Bliss describes the engine as follows:

The inner portions of the cylinder in which the piston-heads revolve are cylindrical and true to a common center, while the intervening part is shaped to give such a reciprocal motion to the piston-valves that an equal transmission of power is maintained at all points of the revolution. The piston, Fig. 2, is of cast-iron, slotted radially through its full length at four equidistant points, each of the slots being of sufficient capacity to receive the piston-valve that travels therein. The opposite slots or recesses are connected with each other by means of two holes, into each of which is fitted a cylindrical tube, bored from both ends, leaving an intermediate portion solid. These cylindrical tubes contain springs that bear on the valves, keeping them in contact with the inner periphery of the cylinder, the tubes and springs moving reciprocally with the valves. Each end of the piston is let into and accurately fitted and secured to a cast-iron piston-head, Fig. 3, the periphery of each piston-head and the inner periphery of its cast-iron packing-ring forming a ground joint. The arms of the packing-rings are fitted into recesses in the piston-heads, and the ends of the arms are in contact with the periphery of the piston, their inner faces being in line with the sides of the recesses of the piston. The packing-rings and arms are kept in contact with the ends of the cylinder by means of spiral springs inserted between them and the followers screwed to the piston-heads. The four piston-valves that transmit the power of the steam travel in the recesses in the piston, between and in contact with the arms of the packing-rings. They are of crucible steel, and are recessed in such a manner that only the portions that travel between the arms of the packing-rings, and the parts required to form a close connection with the piston, are subject to contact.

The shafts are also of crucible steel, each formed with a flange of sufficient diameter to give a broad base, which is fitted into a recess on the outside of the piston-head. The bolts or screws that combine the piston and piston-heads pass through these flanges, thus in effect making of these parts one solid piece, revolving with the packing-rings on a common center. A metallic packing, invented for and peculiar to these machines, prevents any steam or water that may accumulate between the piston-heads and the cylinder-covers from coming into contact with or escaping by way of the shafts. Each shaft packing consists of a gun-metal cylinder having a uniform internal diameter of sufficient capacity to enable it to receive the base of the shaft, the annular space between the packing-cylinder and the shaft being filled with asbestos packing, compressed by means of a gland screwed on the shaft. The entire packing revolves with the shafts, but the packing-cylinders are free to move laterally, being kept in contact with the engine cylinder-heads by means of spiral springs inserted in the packing-cylinders and bearing against the flanges of the shafts. The reversing apparatus consists of an ordinary slide-valve somewhat modified to suit the requirements of the engine, with which it is combined in a manner as simple as it is compact and reliable. This valve starts, stops, and controls the speed of the engine, as well as instantly reverses it, even when at full speed.

While some of these engines, intended for other uses, have a cut-off, the one here illustrated works without a cut-off; but as the leverage upon which the steam acts does not vary, the steam naturally expands, on entering the cylinder, to a pressure just sufficient to overcome the resistance of the engine. The loss from friction is exceedingly light, naturally varying according to the size of engine and the load. When the reversing-valve is raised, it opens the lower port, and at the same time connects the upper port and the exhaust-port in the valve-seat, steam filling the lower half of the cylinder, and delivering its effective pressure on the piston-valve then in position between the upper and lower ports, causing the revolution of the engine in the direction indicated by the arrow. This valve passes on to the opening of the upper port, and is there relieved of its pressure before it meets the incline, which moves it toward the center of the piston. Immediately with this escape of steam from the first valve, the next following valve, which by this time is in position, receives the effective pressure of the steam, and in this manner the four valves follow each other. While each piston-valve is transmitting power, its opposite valve is preventing the escape of steam which would otherwise take place between the piston and that portion of the cylinder nearest to it; and while these two valves are doing duty, the other two are moving into position to relieve them. The tubes and their springs move with the valves. As the illustration shows, the ports in the cylinder lap the eccentric curves, and the pressure on the back, front, sides, and ends of the piston-valves is balanced while they are moving radially. The recesses in the piston valves, and the clearances between their contact sides and the races in the piston, and between the arms of the packing-rings, allow free circulation of steam during the reciprocal movement of the valves; but when they have reached the end of their inward or outward stroke, they are instantly made steam-tight by the steam pressure holding them against their seats. These piston-valves are balanced slide-valves, self-adjusting and self-packing.

Leakage between the piston-heads and the cylinder ends is prevented by the close but light and flexible contact of the packing-rings and their arms. Any accumulation of steam in the space between the piston-head and cylinder-cover on one side has free passage by means of a pressure-balance opening to the corresponding space on the other side, and thus the side-thrust which would otherwise take place is avoided. Neither the piston nor the piston-heads touch any part of the cylinder, and it will be seen from the foregoing description that of all friction surfaces required to be kept in close contact the stationary is rigid, and the moving is flexible and self-adjusting, and, having a large reserve of material for wear, these engines are and will keep steam-tight. The working parts are inclosed in a steam-tight cylinder, and consequently are protected from dust and grit.

Fig. 1 represents a class of reversible hoisting-engines that are especially designed for service on board ships, but they are also applicable for hoisting generally. The hoisting-drum is of more than the usual capacity, and of a form that combines great strength with the least possible weight.

MINING IN VICTORIA.

From the first discovery of gold in Victoria to the 31st December of last year, there have been raised 52,245,367 ounces, which, valued at £4 an ounce, gives £208,981,469. The mineral statistics published for preceding years have disclosed a steady increase in the annual yields of gold in Victoria from the year 1878 up to the end of the year 1882; but the statistics for the year 1883 show a falling off in the annual yield, as compared with the immediately preceding year, of 85,956 ounces, and also a large decrease of 3515 in the mean number of miners employed. According to the London *Mining World*, the unfavorable returns of gold raised in the past year are due partly to the further exhaustion of the auriferous deposits in the older gold-fields, and to a decrease in the yields from quartz lodes at Ballarat, Stawell, Egerton, and Dunolly, and also to the difficulties encountered in the sinking of shafts and the opening up of the newer-discovered auriferous leads beneath the basalts in the Smeaton portion of the Ballarat District. The estimated yields of gold from alluvial and from quartz mines since the year 1867, as prepared by the mining registrars, were as follows:

	Alluvial Ounces.	Quartz Ounces.		Alluvial Ounces.	Quartz Ounces.
In 1868	1,087,502	597,416	In 1876	357,901	605,859
1869	934,082	610,674	1877	289,754	519,899
1870	718,729	585,575	1878	204,453	493,587
1871	698,190	670,752	1879	293,310	465,637
1872	639,551	691,826	1880	299,926	529,195
1873	504,250	666,147	1881	313,828	519,550
1874	433,283	604,300	1882	352,078	512,532
1875	426,611	641,806	1883	304,666	475,587

The quantity of quartz raised was 924,430 tons, as compared with 1,027,826 in 1882. The produce in the latter year was £463,463, and in the former £440,636. The quality of the ore dealt with in the Sandhurst District has improved, and the yield from Ballarat and Ararat has fallen off very much. In the Gippsland District, the quantity has been comparatively small. The quantity of wash-dirt puddled or sluiced during the year 1883, as compiled from the returns made by certain companies and individual miners, was 826,829 tons 10 cwt.; and the yield therefrom 76,353 oz. 1 dwt. 11 grs., or an average of 1 dwt. 20.32 grs. per ton. Information has been obtained respecting the crushing of 6221 tons 3 cwt. of cement during the year 1883, which yielded 1655 ozs. 12 dwts. 18 grs. of gold, or an average of 5 dwts. 7.74 grs. a ton. The number of miners employed in the alluvial mines was 17,543 in 1883, and 14,078 in quartz mining, or a total of 31,621. It will be seen that in the last quarter of the past year there was a decrease of 5269 in the number of persons employed in auriferous alluvial and quartz mines, as compared with the last quarter of the previous year. In alluvial mining, the decrease in the number of men employed in 1883, as compared with the last quarter of the preceding year, was 3470, while in quartz mining the decrease was 1799. There is also a decrease of 3515 in the mean number of miners employed during the year 1883, as compared with those employed during the year 1882; the respective numbers being 33,931 and 37,446. The number of Chinese engaged in mining operations in Victoria continues to decrease. On the 31st of December, 1883, the number was 6387, or 887 less than the number employed at the same date in 1882. The decrease in the number of miners in the past year is caused by the gradual exhaustion of some of the older workings of the gold-fields. Dividing the value of the gold raised, according to estimates made by the mining registrars and that purchased in Melbourne from private holders by the Royal Mint, banks, etc., among the mean number of miners employed in the year 1883, the average per man is £95 6s. 3.51d. The average earnings per man in 1880 were £81 18s.; in 1881, £95 11s.; in 1882, £95 19s.; and in 1883, £95 6s. The employment of steam machinery is on the increase, and the estimated value of the machinery is now £1,897,129, as against £1,953,466 in the previous year. The deepest mines appear to be those of the Sandhurst District, 1306 feet, and there are now 1698 gold leases in force, and the revenue derived from the treasury from these workings has amounted to £21,644. In 1883, 171 new mining claims were registered, having 3,936,990 shares, and a nominal capital of £2,262,292. This is a striking decrease, as compared with the past three years. In 1881, for example, 448 companies were registered with a capital of £6,647,838. No silver was raised in Victoria during the year. The raisings of other metals were as follows: 94 tons of tin, 381 tons of copper, 35 tons of antimony, but no lead ore; 12 tons of iron ore were raised, and 428 tons of coal. The mineral strength of Victoria therefore lies entirely with its gold, and this, we regret to see, is falling off. There are only 11 smelting-furnaces in the colony, of the estimated value of £22,190.

A MACHINE FOR MINING COAL.—The Eagle Works, of Norristown, are engaged in making a machine for mining bituminous coal, which is the invention of Benjamin F. Asper, of Pittsburg. The machine is nearly completed, and will be exhibited to the public some day next week. It is calculated to do the work of thirty men, and will be run either by steam or electricity. Mr. Asper some years ago invented a machine for the same purpose, and brought it into practical use. His patent was purchased by the Hercules Mining Company, among whose members were James G. Blaine, at that time a United States Senator; General William Mahone, of Virginia; Senator Davis, of West Virginia; General James A. Beaver, of Pennsylvania, and others. It is considered probable that the improved machine will be taken by the same company.

ALUMINIUM AND ALUMINIUM BRONZE.—At a recent sitting of the Glasgow Physical Society, Professor Jamieson communicated the result of his researches upon the electric qualities of aluminium. The metal was nearly pure, its density 2.786, its electric resistance 1.96 times that of pure copper wire of the same length and diameter. For wires of equal length and weight, the resistance of aluminium is a little less than that of pure copper. The addition of a small quantity of aluminium to copper largely increases both the mechanical and the electrical resistance. The first experiments furnished specimens in which the electric resistance was twenty-five times as great as that of pure copper. Such an alloy would be very useful in the manufacture of resistance coils. On account of its lightness, pure aluminium wire might often be found desirable in military telegraphy.

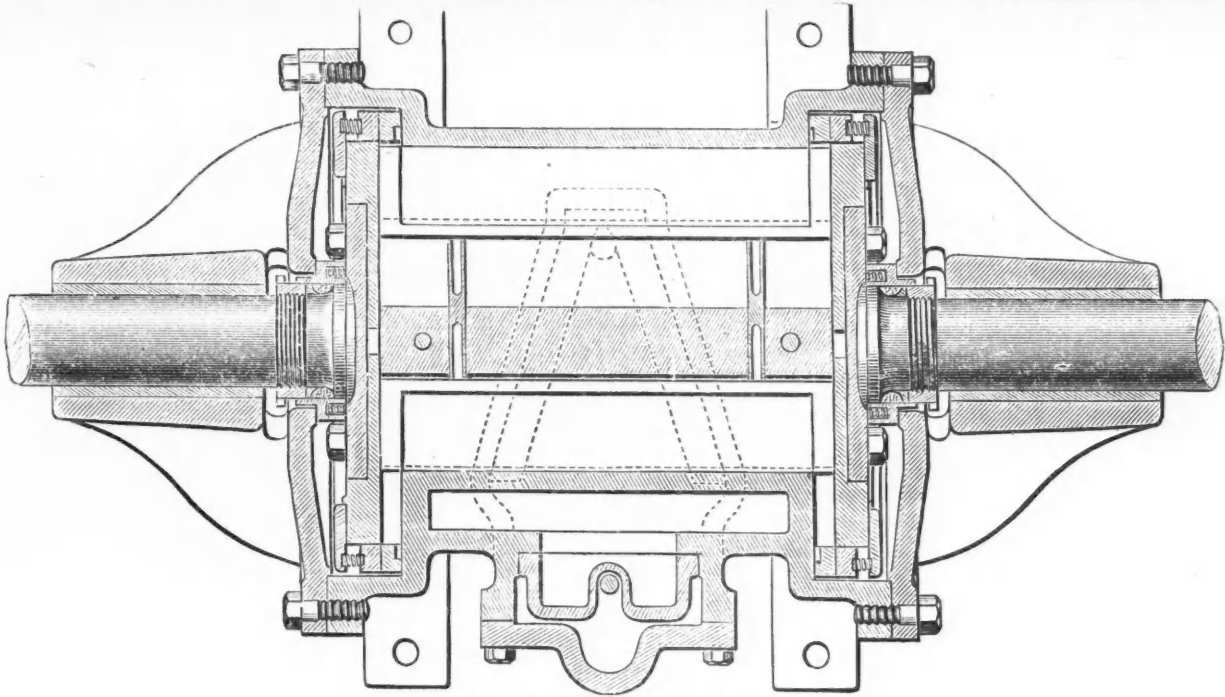


Fig. 3.—Horizontal Section.

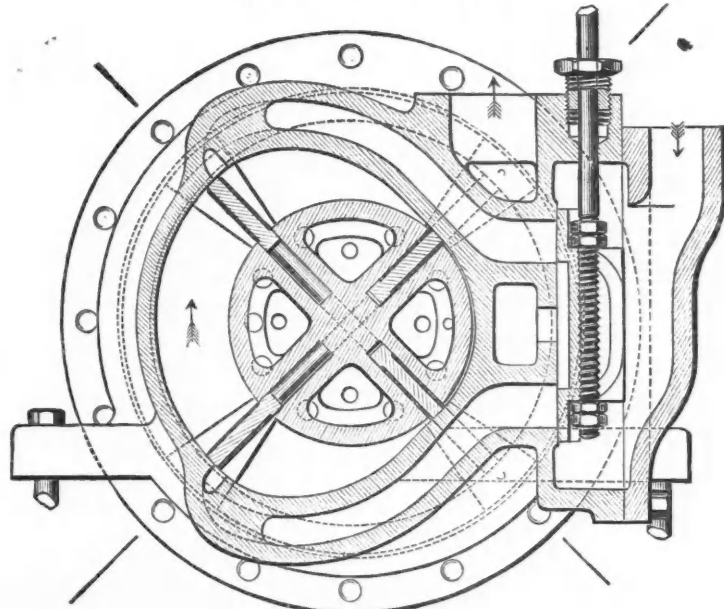


Fig. 2.—Vertical Section.

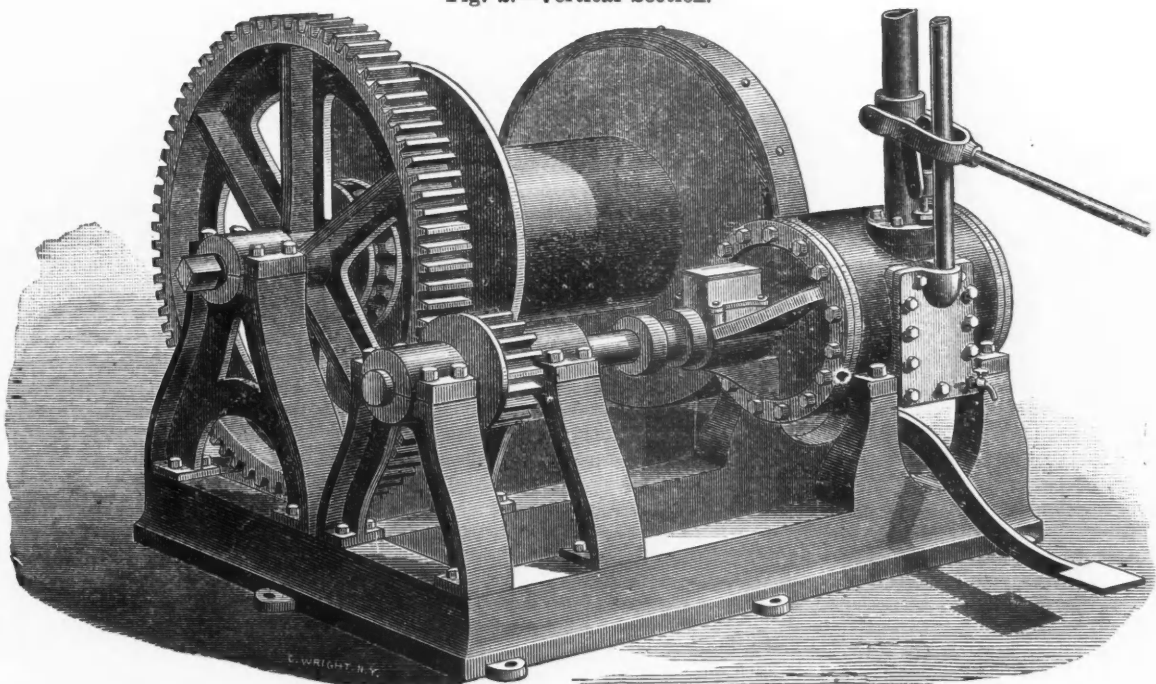


Fig. 1.—Hoisting and Elevator Engine.
THE WALDRON ENGINE.

FURNACE MILL, AND FACTORY.

The furnace at Appleton, Mich., has gone out of blast, to remain so until the market brightens up. On the other hand, the Fox River furnace at Depere is now in full blast.

The Bower-Barff process is to be introduced in Cincinnati.

At the Spang Steel and Iron-Works, Sharpsburg, Pa., a Pernot seven-ton steel rolling-furnace is coming down, only to be replaced by a 14-ton Siemens open-hearth furnace.

Shoenberger & Co., Pittsburg, are about to begin tearing down the smallest of their two blast-furnaces, and in their place to build a large one that will cast daily about 100 tons of pig-iron, which is to be used for steel making. In the mill, a new train of nail plate rolls have been erected, in order to make a soft grade of low carbon all steel for nails.

The Roberts furnace, at Allentown, Pa., after being idle a year, is to resume operations.

The plate mill and heating-furnace of the Burgess Steel and Iron-Works, Portsmouth, Ohio, has been started, and the puddlers and entire mill are on in full force.

There were rolled at the Spang Steel and Iron-Works, Pittsburg, two steel plates, each 25 feet in length, 84 inches in width, and five eighths of an inch thick. The ingots weighed 4750 and 4725 pounds. The rolling occupied the train less than half an hour. The plates are said to be the heaviest steel plates ever rolled in Pittsburg. They are to be shipped to San Francisco. The same train recently rolled a plate 12 feet by 111 inches by three eighths of an inch.

A number of applications have been filed at Harrisburg, Pa., for charters for what are termed hydro-carbon companies. The gentlemen interested are the same as those who secured natural gas company charters throughout the western part of the State, namely, Eben Crawford, Emlenton; M. C. Treat, East Brady; Frederick W. Crawford, Emlenton; A. Blakely and A. M. Blakely, Pittsburg. The applications filed on the 27th ult. at the State Department are for the Johnstown Hydro-Carbon Company, of Cambria County; Cambria Hydro-Carbon Company, of Cambria County; Millvale Hydro-Carbon Company, Cambria County; Altoona Hydro-Carbon Company, of Blair County; Huntingdon Hydro-Carbon Company, of Huntingdon County. The capital stock of each company is one thousand dollars. It is understood that like companies will be chartered in all the northeastern counties within the next few days.

The pig-iron business in Pittsburg, Pa., is at present in a very unsatisfactory condition, owing to the depressed state of the iron trade. For about seven months, six furnaces have been idle, with no fixed date when they will be blown in. The restriction of these furnaces is an aggregate of 700 tons each day, while the amount produced daily reaches about 1200 tons from nine furnaces—four of the Bessemer, at Bessemer station; two of the Eliza; one of the Lucy; one of the Isabella; and the Clinton Furnace. The stock in hand at these furnaces will not go beyond 3000 tons, which may be considered a small amount to be at one furnace that has an output of 100 tons a day. The sales of pig-iron can not be said to amount to any thing, for the simple reason that all the blast-furnaces in the country are connected with mills; consequently there is very little made for the run of the market here. Still there are small lots of foundry iron selling, but that will not amount to 1000 tons a month. If pig-iron could now command the price that it did at this time last year, it would leave about 800 tons a day for the market as the present running of the mills; but until a change in the business takes place, the furnaces now out will remain so for some time. The work of those in blast is managed with great economy. Recently the Lucy and Isabella furnace companies have dispensed with nearly 100 men. The Shoenbergers, of the Juniata Iron-Works, are about to tear down one of their blast-furnaces, which is to be replaced by a larger one.

Gouverneur Paulding, Gouverneur Kemble, Peter Kemble, and James N. Paulding, composing the firm of Paulding, Kemble & Co., of No. 30 Broadway, New York, former proprietors of the West Point Foundry at Cold Spring, have made an assignment to Charles J. Nourse, Jr. The firm prefers the National Bank of the Republic for whatever amount may be due to it, and preferences are given to the following individual creditors of James N. Paulding: his wife, Emily P. Paulding, National Bank of the Republic, Solomon H. Kohn, of New York, and the First National Bank of Fishkill Landing.

Fire on August 30th destroyed the works of the Marshall Car-Wheel and Foundry Company, at Marshall, Texas. The loss is \$100,000; insurance, \$22,000.

LABOR AND WAGES.

The coal miners of Colorado and New Mexico have met at Pueblo to organize a union.

The managers of the Lackawanna Iron and Steel Company have resolved to reduce the wages of all the company's employes 15 per cent on the 1st of October, and have sent out notices to that effect. The reduction will apply to the salaries of the officers as well as to the wages of the ordinary workmen. The company employs nearly three thousand men. Next October, the men will be paid 25 per cent less than they received in October of last year. The works have not been idle at any time during the year except when they were shut down for repairs.

Absalom Bowser, who was convicted of murder in the second degree for killing Obadiah Haymacks during the Murrysville gas-well riots last November, was refused a new trial at Pittsburg, on August 30th, and was sentenced to pay the cost of prosecution and to undergo ten years' imprisonment in the Western Penitentiary. The trial of the other defendants will be taken up early next month.

A dispatch to the New York *Tribune*, dated Pittsburg, September 1st, says: A new element of excitement was added to the strike of coal miners in the river district to-day. One of the early trains to the fourth pool had on board a large party of Hungarians. They were put off at Courtney station, and at once taken to the Garfield mines, and put to work in the places of the men who had quit work. The campers on the opposite side of the river were taken by surprise. No attempt has ever been made before to introduce Hungarian labor into the Pittsburg districts, and they did not expect that any thing of the kind would be attempted now. They held a long consultation and decided to establish a new camp to-morrow near the Garfield mines to compel the Hungarians either to live underground or leave the district. Their introduction at this time is regarded as unfortunate on all sides. Many persons predict that unless they are removed it will be impossible to prevent a riot. The operators say that they are entitled to protection under the law, and that, unless the men soon return to work, Hungarians and negroes will be employed in all the pits. The campers did not disturb the mines to day. They devoted their attention to the men at work in Empire pit, but met with no success. Many left the camp last night to escape the raid that was promised for to-day. The sheriff did not put in an appearance, however, and to-night the whole body returned. They seem as determined to hold out as they were three weeks ago, when the siege was begun.

Grand Master Workman Powderly and a committee were in session all day at Philadelphia, September 1st, receiving credentials of delegates to the Knights of Labor Convention that began on the 2d. About 200 delegates are expected, including representatives from New Orleans, New York, New Jersey, Alabama, Denver (Col.), Memphis (Ala.), Massachusetts, Maine, and other points in the South and West. Among the subjects to be considered are insurance co-operation, foreign organization, and extending the operations of the order into new fields, especially in the Southern States.

The 14 and 18-inch and the Belgian trains, in the Albany & Rensselaer Iron and Steel Company, at Cohoes, New York, were started up September 1st. They had not been run for some time, owing to the depressed state of the iron trade. The men started to work, agreeing to accept a reduction of 10 per cent from

former prices. The starting up of other departments will soon follow. Superintendent Hunt says he is pleased that the men can see the benefit of accepting a reduction, and he will now make an effort to get orders so that the works can be continued right along. This gives employment to hundreds of men who have been idle. The Bessemer Steel-Works also started up to-day, but the reduction does not affect the men here. It is not known, however, at what moment a reduction will come to shut down the works again.

A dispatch to the New York *Tribune*, dated Wheeling, August 31st, says: The relations between the owners of the iron mills in this district, about twenty in number, and their workmen, have been somewhat strained for some time, and may now be said to have reached a crisis. The principal difficulty arises from the substitution of steel for iron in making nails and sheet. Recently, 200 men in the furnace department of La Belle mill, in this city, were summarily discharged. Prior to that time, forty puddlers were discharged from the Riverside Mill. Both of these mills make nails. Yesterday, the Aetna Sheet-Iron Works, at Aetnaville, across the river, discharged twenty puddlers and their assistants, about sixty in all. Last evening, a convention of delegates from all the lodges of the Amalgamated Association in the district met in this city. The proceedings were secret, but it was resolved that workmen in all departments should stand by the boilers. The nailers will demand 20 per cent extra for cutting steel nails, and possibly mill-owners will be required to sign yearly contracts with their men. It is scarcely possible that a strike can be averted, though, as yet, no definite course of action has been publicly announced. A strike would now be a grave blow to the industries of this section.

A Cincinnati dispatch to the New York *Times*, dated September 1st, says: The trouble between the Hocking Valley Coal Company and its striking miners is the outgrowth of an old and stubborn opposition on the part of the miners to any innovations on the old methods and scale of prices. The Hocking mines are made up of veins of coal from nine to thirteen feet in thickness. Instead of working on their hands and knees or in a bent position, the miners stand upright in great chambers, whose upper walls can only be reached by ladders. But notwithstanding this advantage, the Miners' Union has always insisted on a uniform scale of prices for the entire State, and the thick veins of coal in the Hocking Valley have benefited the miners, and not the operators or the public.

The Columbus & Hocking Valley Company is a strong corporation with several million dollars capital, and is closely associated with the Columbus, Hocking Valley & Toledo Railroad Company. The thickness of the coal veins in the Hocking region makes it possible to introduce drills and other machinery, by the use of which one miner can do the work that has heretofore been done by two. Some three months ago, the coal company determined to make the issue with its men and work its mines by improved processes, let it cost what it might. It knew that the fight on the part of the men against the innovation would be the bitterest and most determined ever seen in the Ohio coal-fields, and made preparations accordingly. The first move was to empty the mines. For this purpose, a reduction was ordered of from 70 to 60 cents a ton for mining. The result was as anticipated. The miners, drivers, and every body else went out on a strike. The men supposed it was to be a strike of the usual kind, and borrowed little trouble on account of it. Had they penetrated the purposes of the company and the magnitude of the issue, their course would have been different. The mines cleared, the company at once put in the new machinery and set it safe in position before the move was understood by the strikers. Then green men were taken to the mines on special trains, guarded by Pinkerton police armed with Winchester rifles. The first move of the miners was to drive out the Pinkerton men by legal measures. They were charged with usurping the duties of constables, but they evaded the charge by giving special bonds. Then the company won to its side the "bank" bosses, without whose direction the green hands could not do any thing. As the deceived strikers who were out of the mines began to come to want, they saw that the mines could be run without them. Hardly had this startling truth dawned on them, when the company brought suits to eject them from their houses. The strikers saw that it was starvation or emigration, and became desperate. Then followed the assault on the renegade "bank" bosses on their way home from the mines, the stoning of the train loaded with imported laborers at Carbon Hill, the attack on the guards at Buchtel, and now this final organized appeal to violence by these men, who are goaded to madness by being driven from labor and home. They have a certain degree of sympathy, and all the more because they are fighting against the inevitable. The disturbance culminated at half past one o'clock Sunday morning by an attack of armed strikers, variously estimated at from 75 to 100, resulting in the instant killing of one guard and the wounding of two others. It is known that quite a number of the attacking party were shot, but it is impossible to ascertain their names. Until recently, Snake Hollow has been guarded by thirty-five Pinkerton guards; but a few days ago they were transferred to other points and their places filled by guards from Logan and that neighborhood, twenty-two in number, armed with breech-loading shot-guns and a brace of revolvers apiece. At the time of the attack, but seven guards were on duty. They gave the alarm and opened fire. The rest of the guards rallied, and for ten minutes a continuous fire was kept up. More than 1000 shots were exchanged, and the strikers were at last driven back.

Governor Hoadly and others, who have been making an inspection of the mining situation in the Hocking Valley, returned to Columbus September 1st. The governor says the situation is perplexing, and of a threatening character. He thinks, with the men in their present temper, that it will be some time before the struggle is over, unless the operators should determine to make some concessions. He made a personal visit to the mines, with the hope that the situation would prove to be such that there would be no necessity for sending troops. In this, however, he was disappointed. At five o'clock, September 1st, he honored the requisition of the sheriff for troops, and sent three companies to the most critical points, being Longstreth, Snake Hollow, and Sand Run. On the way to Columbus, the governor had a request for two more companies at Longstreth, two at Murray City, and two to guard the property of the Hocking Valley road and its bridges in the valley. He, however, refused to send more troops to-night, but ordered several companies to be in readiness to go to-morrow afternoon should they be needed. At the two latter places, they feared an attack to-night. When the governor left Logan for a trip to the mines this afternoon, he telegraphed to all points that he wished to consult with the leading miners, and at some of the places, on the arrival of the train, there were as many as 500 idle miners who had gathered to hear what he had to say. At Nelsonville, there were between 600 and 700 men present, with carriages and a band, to escort the governor to the public square for the purpose of having him make a speech. They had appointed a committee earlier in the day to ask a number of questions, as the governor proposed, and they made it quite interesting. The appeal of the governor was for the observance of order, and the importance of their doing their part in this matter. It was at this point that he ordered the troops to the places named, and the miners were not very well pleased at this move, as they had supposed the governor would not make such an order unless he was forced to do so. In reply to the demands of the sheriff for men, he expressly stipulates that they shall be used only for the purpose of protecting life and property. This is thought to indicate that they will not be allowed to remain as a mere guard for the coal and railroad companies.

A Pittsburg dispatch, September 3d, says: Since the advent of Sheriff Chambers, the aspect of affairs at Coal Center has completely changed. His method of dealing with the strikers is so entirely different from that of the other officers that he has won the strikers completely over, and it is believed that before the close of another week the men will return to their homes. The practice of stopping non-union men on their way to work is practically a thing of the past, and more men are at work than at any time for weeks. The only trouble to be feared is the introduction of Hungarian miners. The small party that

arrived at Courtney on Monday has gone to work in Neel's mines. This has caused considerable bad blood, and the men say there will be lively times if any more importations of the same kind come to the Monongahela Valley. The miners despise the Hungarians, and there is no telling what they might do if a movement to fill their places with that kind of labor was inaugurated by the operators. An attempt was made to establish camps at Courtney and Coal Bluff to-day, but they proved failures, as all told there were not twenty-five men in the two camps.

The miners in the Ohio Central region along Sunday Creek went out on September 1st on the pretext of not getting the September advance. It is expected that they will join the Hocking Valley strike, being adjacent to that region.

COAL TRADE NOTES.

COLORADO.

The anthracite breaker at Central Butte has been leased to the Colorado Fuel Company.

OHIO.

The non-union men at Longstreth, Sand Run, Murray City, and Nelsonville are working harmoniously, and are daily increasing their production. The aggregate output of these mines is 75 cars of lump coal a day, making fully 1000 tons a daily output. Mine No. 23, at Buchtel, will go into operation this week, when 20 cars more will be added to the output. So it may be safe to figure on 100 cars lump coal as a daily output of the non-union mines.

With the Buchtel mine and the No. 7 mine at Straitsville started, the syndicate will have four mines in operation on the non-union basis, at 50 cents a ton, which mines, when run to their capacity, will make an output of 140 cars lump coal a day. The Columbus & Hocking Coal and Iron Company will then have all the mines in operation it desires until the iron trade revives, when one or two other mines for furnace use will be started. The syndicate managers say that four mines will be all they will operate this winter in any event, as their trade can be fully supplied with this number of mines.

PENNSYLVANIA.

ANTHRACITE.

The fire at Buck Ridge Colliery has been located in No. 8 gangway, and three pumps are now forcing water into it. It will take at least eight months to fully extinguish the fire. Over 300 men and boys are idle, and the damage will be over \$80,000.

The Pennsylvania Coal Company's new Cooper shaft, at Port Blanchard, is going down at a highly satisfactory rate, having reached a depth of 270 feet, and it is anticipated that about 70 feet more will open up the first workable vein. This will require about nine weeks' more rapid operations. At this shaft, a new breaker will be erected to prepare for market the anthracite mined from beneath the Carey and Abbott farms and contiguous properties under lease to the company. At present, some of the coal mined under these properties is drawn over one mile in the gangways to reach a surface opening, and this extra labor will be obviated by the new shaft, and also new veins that can be profitably worked will be opened up by the orifice. The breaker will be supplied with the latest improved machinery.

The East Boston colliery will soon be operated by the new first motion engines of large size lately put on the plant.

The Susquehanna Coal Company has decided to erect the new breaker at the Newport colliery by day work, and therefore no contract will be awarded.

The Lehigh Valley Coal Company's No. 5 shaft has already attained a depth of over three hundred feet, and is going down at the rate of about two feet a day. The new breaker is now framing, the foundations being prepared.

The labor of putting down the air-shaft of the Black Diamond colliery, at Luzerne Borough, does not prove to be so precarious as was the case when the main opening was put down by Mr. Hutchinson. The quicksand is not as treacherous, and better modes of operation are in use.

Every thing is moving along swimmingly at the Pettibone shaft on the Kings-ton flats that the Delaware, Lackawanna & Western Coal Company is putting down. The air-shaft has been commenced at a point near the main opening.

The Delaware, Lackawanna & Western Coal Company will soon enlarge the shaft at the Diamond colliery, in the upper region, from the dimensions twelve feet by twelve feet to twelve feet by twenty-four feet. The work is to be let by contract and bids are advertised for.

Some months ago, the Butler Coal Company rented some workings at Carbon-dale and prepared to operate them for all they were worth. The coal proves to be of such an inferior quality, and it is attended by such a heavy cost to bring it to the surface, that the company has suspended work and will close up store and colliery.

For one of the Philadelphia & Reading Coal Company's collieries, a mammoth drum was cast a short time since at Pottsville. It is fourteen feet long, nineteen feet in diameter at the center, and twelve feet six inches when put together. Eight men labored five weeks to prepare the mold, and each part weighs 32,000 pounds.

The lowest royalty that is paid for coal in the Wilkes-Barre region is said to be one shilling a ton, and that is received by Kingston parties. One man in the Lackawanna region receives but two cents a ton for his coal that is brought to the surface by the Delaware & Hudson Coal Company. Strong efforts are making, we are informed, to break the lease first referred to.

NATURAL GAS.

A company has been organized that put the drill into operation about two miles back of Emsworth, Pa., on the Pittsburg, Fort Wayne & Chicago Railroad, in search of either gas or oil.

GENERAL MINING NEWS.

ARIZONA.

RAY.—The company has found it necessary to put up a new furnace. The old one will not do the work required of it. This will probably occasion another delay in the starting up of the Ray works.

COCHISE COUNTY.

It is understood that Ward Priest will begin shortly the work of concentrating the tailings at the Watervale mill, Tombstone, if he can lease the water-works engine from the city council. As the engine is idle, and brings in at present no revenue to the city, there would seem to be no good reason why the lease should not be made.

GRAHAM COUNTY.

ARIZONA COPPER.—For the week ended August 16th, the company shipped 109,020 pounds of black copper.

PIMA COUNTY.

QUIMTOA.—The water question has been practically settled. The company's well encountered an abundant supply at a depth of 466 feet, in a stratum of wash-sand and gravel. The present well was sunk only to prospect for water. A double-compartment shaft or well will be sunk and heavy pumps employed to raise the water. Mr. Lyle, on his return to San Francisco, will consult with the directors relative to the erecting of a mill. He inclines to the belief that no steps will be taken in this direction until the Peerless tunnel No. 1 enters the vein—a contingency that may require a month or six weeks' more time. Power-drills are to be used henceforth in developing and working the mines.

CALIFORNIA.

MAY LUNDY.—The mine has been attached by the following-named persons: Rosenwald Coblentz & Co., between \$12,000 and \$13,000; George W. Penter, \$7400; Donnelly & Hunewill, from \$1200 to \$1300; also miners' and mechanics' liens to the amount of some \$13,000 have been levied.

MONO COUNTY.

BODIE CONSOLIDATED.—In San Francisco, an important mining stock suit has been brought before Judge Hunt. S. Mann sues the Bodie Mining Company for \$92,625, money of which the plaintiff claims he was defrauded by the defendants by an irregular stock transaction. Mann avers that he was owner of 6500 shares of Bodie Consolidated, the certificates standing in the names of different persons. In August, 1883, an assessment was levied on the stock. Mann tendered the amount due on the assessment, but the Bodie Company refused to receive it. On the 21st of January last, the plaintiff went to the company's office, presented his certificates, and demanded that they issue new ones in his name. The company refused and still refuses to receive the certificates or acknowledge their validity. The stock, which was worth \$14.25 a share, was then sold by the company for \$92,625, of which Mann received no part or interest.

SIERRA COUNTY.

SIERRA BUTTES.—Superintendent Preston has signified his intention of letting a contract for the burning of 100,000 bricks to be used in the building of chlorination-works at the lower mill. Having come to the conclusion that it would pay them to save the sulphurets, the company placed Frue vanners in the new mill.

YOUNG AMERICA.—Charles Hendel has been surveying for a mill-site at the Young America mine. There is enough ore in sight already at the mine to warrant the owners in putting up a mill. They are pushing along the developments underground as rapidly as possible, and intend to have the mill erected before snow flies.

COLORADO.

BOULDER COUNTY.

Concentration works with the Rouse tables are to be erected in West Boulder, near the railroad.

SMUGGLER.—A vein of rich ore fully a foot thick has been struck. The men had been working off the vein, and concluded to drift to one side, and had gone only a few feet when the above body was struck.

CLEAR CREEK COUNTY.

The Silver King Concentrating-Works at Montezuma burned last week.

There seems to be some probability of a smelter going up at Empire. The Big Chief mill, at Empire, has been started up, and is running to its full capacity—50 stamps.

CUSTER COUNTY.

BULL-DOMINGO.—A special correspondent of the *Denver Tribune-Republican* reports: Three shifts, of six men each, are engaged upon the main working-shaft, which is to be extended from the 350-foot level to the 500-foot level. This shaft is 16 feet by 9 feet, so as to be adapted to three lines of cages, and is the same as the original plan of Mr. Callahan, who supervised the workings down to the 350-foot level. Three shifts also are put upon the winze, between the 450-foot level and the 550-foot level, as also a body of stopers at the ore-body found at the 450-foot stope. The great impediment is the difficulty of getting out the ore that has been developed by the recent workings, and which will be overcome whenever the main shaft is extended 200 feet, and a level run northward to the ore-body. The capacity of the main hoister is about 150 tons in twenty-four hours, while with the small engine in use at the head of the winze only about one third that amount can be secured daily. The output is about thirty cars of ore a day, and thirty-six of waste, and the capacity of each car about 1500 pounds. The ore is shipped directly from ore-bins to the concentrator; and as the machine has a capacity daily of about double the amount received, it can be run only on half-time, until the dead-work now undertaken is complete, which may require several months' time, or probably 130 days.

The shipments by rail of concentrates and assorted ore from Silver Cliff amount to about ten or twelve cars a week. Of this amount, the Bassick mine supplies not far from six cars, and the rest is from the Racine Boy, the King of the Carbonates, the Bull, Polonia, Humboldt, Leavenworth, and a few re-concentrates, with assorted lots from various dumps worked on lease. The workings about Rosita are confined, so far as shipping lots are concerned, to the Humboldt, Leavenworth, and Polonia, although considerable effort is making to realize on other properties, and much of the assessment-work is done in the way of leasing.

FREMONT COUNTY.

GREEN MOUNTAIN.—A contract has been let for breaking ore by the ton in the Green Mountain mine. Hereafter all roasting will be done at the mine, where wood in abundance can be had for the cutting, besides making a considerable saving in the weight of the ore. The company expects to have enough ore mined and roasted to enable it to start the smelter in thirty days.

GUNNISON COUNTY.

FOREST QUEEN.—Work has begun on the concentrator.

HINSDALE COUNTY.

ARGENTA FALLS.—This company has twenty-one men at the mine and ten at the mill. The machinery is partly in and getting into place. The concentrator is rapidly pushed.

LAKE COUNTY.

The Leadville *Herald* says: The repeated discoveries of limited pockets of good ore, in the limestone just below the contact, in the Modest Girl, Thistle, and other properties on Carbonate Hill, warrant the belief that this section of the Leadville District will yet come to the front as a worthy producer. There is no reason why the southern portion of Carbonate Hill should not have been acted upon by mineralizing current, as well as the northern part. The contact, so far, however, has been found barren of paying ore-bodies, and the only explanation that can be advanced is the possibility of the ore-current having sunk in the limestone, and so far escaped exploration-work. It would not be at all surprising if the near future should disclose as large and profitable ore-chutes in the limestone of this section of Carbonate Hill as have been opened and worked in the Silver Cord mine, which is situated only about half a mile east of the territory in question.

CHRYSOLITE.—The company has closed a contract with Mr. Kearney, of the Leadville gold and silver mill, for the use of this mill for three months, and for a longer period if agreeable to both parties. As soon as Mr. Clark was advised of the action of the company, he got to work to put the mill in running condition, and began the shipment of ore. So far, the work has made good progress, and the mill will doubtless be started up on Chrysolite ores, under the direction of Mr. Clark. The character of the ore to be milled is the iron mineral now covering the premises of the company and comprising the bulk of the large blocks of ore remaining in the mine, and containing from eight to fifteen ounces in silver to the ton. A test run on this class of ore was made some months since at this mill, under the direction of Mr. Clark, which resulted very favorably, and which led the company to make the present arrangement.

The company is advertising for bids for the grading of about 3000 feet of railroad bed intended to connect its mines with the Rio Grande Railroad. The branch is to be put in to facilitate the shipment of low-grade ores from the Chrysolite mine to the Kearney stamp-mill.

DENVER CITY.—From Mr. Robert Bunsen, the manager of the Denver City mine, the *Herald* learns that mechanical engineers are now at work on the Denver

City hoisting and pumping machinery, preparatory to a resumption of work. The task of overhauling the machinery will be completed in a day or two, and the pumps in the mine will probably start up soon. The property extends greater promise of becoming a productive mine now than ever before in the history of the property. The Forest City mine, of the Small Hopes group, adjoins the Denver, and at present shows very large and rich ore-bodies, almost on the line of the Denver City, and, we might add, insuring for it an equally fine bonanza.

IRON SILVER.—The company's property during the present month will ship about 3500 tons of ore. The portions of the property worked under lease are all looking well, and considerable fine ore is included in the month's shipments.

MORNING STAR.—A short time since, drift No. 32, running south from the McHarg shaft, on the upper contact, struck a body of iron ore running from twenty to forty ounces in silver to the ton. As the drift advanced, it passed through the iron, and encountered a twelve-inch streak of carbonate ore, carrying 110 ounces in silver to the ton, and thirty-four per cent of lead. The vein is making into a large tract of solid ground, and presents great possibilities.

SMALL HOPES.—Mr. John Elkins, manager of this group of mines, states that the net profits of this company for the month of August will exceed \$100,000, and that ore to the value of \$150,000 will doubtless be extracted. The daily output of the Forest City mine, of this group, averages about fifty tons. The ore ranges in contents from 70 to 400 ounces in silver to the ton. A lot of from fifty to sixty tons of ore, hoisted through the new Denman shaft, was settled for on the 29th ult., on a basis of 389 ounces in silver to the ton.

OURAY COUNTY.

LAKE MOUNTAIN.—During the past ten days, the machinery for the new concentrator at Mineral Point has been passing through Animas Forks from Silverton. This machinery was manufactured by the Fort Scott Company.

SAMPSON.—A 10-stamp mill has been purchased by the Sampson from the Colorado Iron-Works. It will be set up and put in operation on the gold ore as soon as it reaches here. The tramway is again in running order, and about 300 tons of ore are awaiting the arrival of the mill. The sulphure ore is sampled as fast as taken out, and it will probably be shipped East for treatment.

SAN JUAN & NEW JERSEY.—Merchants and contractors have attached the San Juan & New Jersey Company's properties. Amount of indebtedness about \$5000.

PARK COUNTY.

On Mosquito Mountain, some important discoveries of lodes have been made within a week or two past. In two instances, pay ore has been taken out of the mine already.

The clean-up on Beaver Creek yielded something over \$1000 in fine gold. The result was in some senses a disappointment, as, while it paid about four dollars a day to the man while running, yet the clean-up will not quite cover the cost of repairs made on the flume before mining began.

GOLD SOVEREIGN.—The boiler and engine from the Fanny Barrett smelter is moving to Montgomery. They will be used to furnish power to run the air-drills and electric dynamo for the Gold Sovereign Company. The arrival of the machinery for the concentrating mill is daily expected.

DAKOTA.

FATHER DE SMET.—The superintendent of the mine writes to the secretary as follows: Inclosed find express company's receipt for bar No. 190, containing 1172.05 ounces of gold, the run of the mill for the first half of August. The general outlook of the mine shows no material change to speak of. Stopes in and around the open cuts and underground chambers continue to yield their usual amount and quality of ore and look very promising as to permanency. East cross-cut, second level, has not developed any thing of much value yet, but we feel very hopeful of ultimately finding ore in this part of the mine. Golden Gate uprise, third level, is making fair progress and is still in ore. The mill is in good working condition and mining very regularly.

GEORGIA.

The Dahlonega *Sentinel* reports:

BARLOW.—The continued dry weather is beginning to be felt at this mine. The new flume or trestle above the mill, for conveying water to the mine, is completed, and the water was turned through it. Only thirty stamps are in operation.

CALHOUN.—The mill is running on full-time, but work has been somewhat retarded at the mine on account of a cripple about the pump.

FISH TRAP.—Work is to be pushed at this mine now, as Mr. Lovell, one of the principal owners, has arrived. The mine is reported to be looking well, and plenty of pay material in sight to run the mill for months.

GARNET.—The clean-ups here are good, the yield being altogether satisfactory. The mill is on full-time, and under the present management must necessarily make money so long as the ore continues of its present richness.

GORDON.—The mill building is near completion, and the foundation for the mill is about ready. The erection of the mill will be commenced in a few days. The piping to carry water to the wheel is all on the ground, and will be put up in a short while.

IVEY.—Owing to the continued dry weather, this mine is not working as lively as usual, the water in the ditch being so low that they are only able to run twenty stamps.

MICHIGAN.

COPPER MINES.

BELT.—At the mine, the principal work is confined to the Knowlton vein, according to orders from London to mine and stamp one thousand tons of the vein rock. Over 500 tons have been treated, and its yield has been 2.53 per cent.

CENTENNIAL.—The mill has been idle since last fall; but as soon as the price of copper advances slightly, it will be started again.

WASHINGTON.—Articles of the Washington Copper Mining Company have been filed with the Secretary of State in Michigan. The capital stock is fixed at \$500,000 in 20,000 shares, which are held by Frederick Beck, J. C. Watson, and Francis Huenewell, of Boston. Operations are to be carried on in T. 58 N. R. 29 W. Keweenaw County.

IRON MINES.

The *Marquette Mining Journal* of August 30th gives the shipments of iron ore from the four ports of the district for the past week as 81,739 gross tons. Of this quantity, 38,017 tons went forward from the port of Marquette, 39,538 tons from Escanaba, 3647 tons from L'Anse, and 537 tons from St. Ignace. The lake shipments of ore from the district for the season, up to and including Wednesday, the 27th, aggregate 1,733,961 gross tons. The gain over the shipments for the corresponding period last year is 378,367 tons.

PENN.—The *Chronicle* is informed that the Penn Iron Mining Company is considering the project of driving a tunnel through the hill to the Norway mine. As the whole formation at the mine dips to the south, it is thought by the management that a large deposit of ore will be encountered.

MONTANA.

SILVER BOW COUNTY.

CLEAR GRIT.—The ledge on the 320-foot cross-cut is found to be 20 feet between walls, and is compact, regular, and well defined. For the first ten feet, the cross-cut penetrated a body of promising-looking quartz heavily impregnated with iron and assaying about 12 ounces in silver. After passing through this, ten feet of copper ore were encountered, extending to the hanging wall, and sampling 12 per cent copper and 30 ounces in silver. The three feet next to the hanging-wall assayed 12 per cent copper and 46 ounces in silver.

MARYLAND & MONTANA.—This is a new organization that has purchased the Margret Ann mine. The president of the company is J. R. Stonebreaker, of Baltimore, and the auditor is D. W. Laws, of the same city. J. J. Hammer will be general superintendent. The property is located about 1500 feet north of the Alice and parallel with that claim. It is developed by a shaft 80 feet deep, from which two leve's have been extended, exposing in both the east and west drifts a fine and compact ore-body, having an average width of four feet of pay rock, though the ledge itself is much wider. The claim contains two ledges, but only one of them has been developed to any considerable extent. What ore has thus far been produced was treated at the Silver Bow mill, where its average pulp-assay was 46 ounces in silver. The terms of the transaction are, that in consideration of a deed for a half-interest in the property, the Baltimore men agree to build and equip a fifteen-stamp mill; the parties to be afterward capitalized, and the stock equally divided between the parties to the deal. The contract for the erection of the mill was let to Tuttle & Co., of Butte City, and the work of construction will at once begin. Milling operations will not probably begin before late in the fall. It is designed by the company to abandon temporarily the old workings of the mine and to start a new shaft without delay. It will contain two compartments, and will be sunk forthwith to a depth of several hundred feet, in order to insure the thorough development of the mine before the mill starts.

MADISON COUNTY.

MOHEGAN.—Messrs. Elling & Word, of Virginia City, have made an arrangement for the immediate erection of a stamp mill and concentrator at Red Bluff. The machinery has been ordered of Fraser & Chalmers, Chicago, and will be on the ground in thirty days. The plant includes a ten-stamp battery and two Frue vanners. At first, only five stamps will be operated, and the others will be put in when the mine is further developed. The works will operate on Messrs. Elling & Word's mine, the Mohegan. The site of the mill is in the Hot Spring Creek Cañon, about one mile below the Olds & Hickman mill.

NEVADA.

THE COMSTOCK LODE.

ALTA.—Superintendent Boyle's report of operations during the past year is as follows: At the date of my last annual report, we were engaged in putting in the drain-boxes to convey the water through our drain-drift to the Suro Tunnel, and on September 12th, 1883, the work of pumping and bailing with tanks was actively begun, and continued until the mine was free from accumulated water. We enlarged our pump from the tunnel level to the bottom (2150 level) from the original size of 10-inch to 12-inch pumps, which was of itself quite an undertaking, considering the difficulty of handling the water in the mean time; but after many drawbacks, the work was accomplished without any accident. The capacity of our pumps is over 864,000 gallons a day. We found the shaft in a bad condition, especially that portion between the 1550 and 2000 levels. The ground had swollen to the extent of breaking up the wall-plates and lagging in many places, and everywhere squeezing the timbers so that it was necessary to set them all back before we could get the cages and tanks to pass through. When the water was out, we found the east and west drifts on the 1550 level in a badly caved condition, and it took us five weeks to remove the *débris* and retimber the same before reaching the face. We have used the diamond drill frequently as a matter of precaution and safeguard against flooding, and the little water we found west has almost entirely drained off, there being not more than 22 gallons a minute coming from the drift that is now in from the shaft 2231 feet. At 2178 feet, we struck a ledge of good-looking quartz, mostly barren, with an occasional streak yielding low assays. The ledge is large and strong, and by drifting north and south on it, something of value may be found. The east drift is in 1120 feet, and the diamond drill was put in a farther distance of 93 feet, when a strong flow of water was encountered, the water coming through the drill-hole with such force as to make it impossible to take samples of the drillings. It was, therefore, thought best to discontinue drilling for a time and allow the flow of water to exhaust itself; but I believe the ledge was reached in the above distance. The water is still quite strong; but in a few days every thing will be in readiness to drill another hole near the first one, and thus draw off the water more rapidly.

STAFFORD.—This mine is located to the west of the ground lying between the Eberhardt and the South Aurora. It will be remembered that the largest bodies of rich ore found on Treasure Hill occurred in those two mines. It appears, from an inspection of the ground, that the ore-body that was lost in them, there is the best reason to expect, will reappear in the Stafford. The formation is in lime. The body of ore struck in the Stafford dips to the east, as the great bodies did in the North Aurora and South Aurora. The ore is free chlorides. Daily assays made across the ore-body show from \$65 to \$439 a ton, and will average fully \$100. The strike occurs below the old chamber at the north end. A drift has been run 13 feet across without striking the limit—still in ore. Not enough work has yet been done to determine its depth or its length; but its length can be reasonably estimated to be of the length of the body that was taken out above it in the same mine—which body was over 200 feet long. Mr. Robinson is running the main incline down to the level of the strike. He will then drift toward the strike and also south. He has taken out already a considerable quantity of very high-grade ore, and is getting the Smoky mill ready as fast as possible to reduce it. The present capacity of the mill is ten stamps. He has engaged S. R. Krom to at once draw plans of a large leaching-mill to be erected next spring. In these works, he expects to reduce the Stafford ores and a vast quantity of low-grade ores from the Original Hidden Treasure and other mines belonging to the Sweetwater Company.

WARD DISTRICT.

MARTIN WHITE.—The annual report shows receipts of \$37,083.66, of which \$32,225 were realized from three assessments. Among the disbursements, figure \$12,738 for stock brought in, and \$13,842.28 for mining.

UTAH.

CRESCENT.—Colonel Ferry will be running 150 tons of ore a day down on his tramway after the middle of September. A mile of it is tracked now. It is nearly five miles long, and drops 2080 feet from the mine to the concentrating mill. The highest grade is 459 feet to the mile. Without shedding, this tramway can not probably be used more than two thirds of the year; but while it is used, say for eight months, it saves a dollar a ton on the cost of transporting the ore; at 100 tons a day, \$24,000. During the winter, sleighs can be used. It is supposed that about two thirds of the ore will be concentrated. Mr. Ferry has begun the concentrating mill.

SILVER WAVE.—This company is organized for the purpose of mining, purchasing, and disposing of mines in Utah, and engaging in smelting, concentrating, and the reduction of ore. The capital stock is placed at 250,000 shares, of \$10 each, all of which has been taken by the organizers. The principal office is in Chicago, and the property is located at Bingham. The following are the directors: R. S. Gilliam, A. G. Story, J. D. Allen, Allen Donaldson, William Allen, M. J. Story, A. E. Story, H. H. Armstead, D. Eyer, and J. W. Allen.

VERMONT.

ROOKS.—The winze has now reached its intended depth, 155 feet below the hoisting-engine station of the present working adit of the mine. This is the depth of the level now driving from the foot of the mountain at the uppermost part of the mill. A sump 6 feet deep has been sunk at the bottom of the winze for receiving the water that the mine makes, while the cross-cut begun goes forward that is to be connected at right angles with the adit now approaching at the rate of 12½ feet the past week. The mill is doing the usual amount of work.

FINANCIAL.

Gold and Silver Stocks.

New York, Friday Evening, Sept. 5.

Business continues very dull in the mining market, and there is nothing of special interest to note. The Comstocks sold at irregular prices, and were but moderately dealt in. The Leadville stocks were steady, while the Bodie stocks sold at irregular prices. The Tuscaroras suffered a slight decline and sold at weaker prices. Horn-Silver rallied and was strong under small transactions. A complete summary of the market is given below. The total number of shares sold was 46,275, as against 41,297 last week.

The Comstock shares were moderately dealt in, and sold at irregular prices. California sold at from 32@30c., assessment paid, and at from 12@10c., assessment unpaid. Consolidated Virginia was moderately dealt in at irregular prices; it sold at from 34@25@40c. Sierra Nevada sold at weak prices under a small business; it was quoted at from \$1.40@1.25. Union Consolidated was about steady, selling at from \$1.30@1.20, with a small business. Mexican records a small business at steady prices, selling at from \$1.65@1.55. Ophir sold at \$1.35, and Gould & Curry at \$2. Hale & Norcross was a little weak, and was but moderately dealt in; it sold at from \$4@3.60. Sutro Tunnel was irregular under a small business; it sold at from 20@17@18c.

The Leadville stocks were quiet and steady. Amie sold at 7c. Chrysolite was quiet at 85c. Brece records a small business at steady prices, selling at from 20@25c. Iron Silver sold at from \$1@1.15, with a small business. Little Chief was quiet and steady at 29@30c.

The Bodie stocks record but a small business, selling at irregular prices. Standard was quiet and irregular, selling in small lots at from \$1.45@1.25@1.40. Bulwer sold at 55c. Consolidated Pacific recorded a fair business at irregular prices, selling at from 59@54@56c.

The Tuscarora stocks were moderately dealt in at weak prices. Grand Prize sold at from 45@40c., with a small business. Belle Isle was quite weak, selling at from 65@53c. under a moderate business. Navajo was also weak and was but moderately dealt in; it sold at from \$4.20@3.80.

In the miscellaneous list, Bassick sold to-day at \$5. Eureka Consolidated was fairly dealt in, but sold at irregular prices; it was quoted at from \$2.65@2.80@2.65. Green Mountain was quiet and steady, selling at from \$1.80@1.85. Horn-Silver was quite strong under moderate transactions; it sold at from \$5.50@5.8. Robinson was quiet at 25c.

Barcelona sold at 15c. Caledonia was weak with a small business; it sold at from 50@40c. Central Arizona sold at 22c. Harlem and Lacrosse record one transaction each at 5c. Oriental & Miller was quiet and steady at 12@13c. Rappahannock sold at steady prices with a small business; it was quoted at from 18@17c. Sonora sold at 3c.

DIVIDENDS.

The Big Bend Hydraulic Mining Company has declared its monthly dividend (No. 16) of \$6000, payable to its stockholders on and after September 5th, at 181 Broadway, New York City.

The Bonanza King Consolidated Mining Company, of California, has declared dividend No. 7 of twenty-five cents a share, payable on the 15th inst. Eastern stockholders of record may be paid at the office of Laidlaw & Co., No. 14 Wall street, New York.

The Dunkin Mining Company, of Colorado, has declared a dividend (No. 17) of five cents a share, payable September 15th, at the office of the Farmers' Loan and Trust Company, Nos. 20 and 22 William street, New York City.

The Plymouth Consolidated Gold Mining Company, of California, has declared its regular monthly dividend, for September, of 50,000, being fifty cents a share on its capital stock, payable on demand. This is the sixteenth consecutive monthly dividend of \$50,000, making a total to date of \$800,000.

The Syndicate Mining Company, of California, has just declared a dividend of ten cents a share.

PIPE LINE CERTIFICATES.

The following table gives the quotations and sales

at the New York Mining Stock and National Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
Aug. 30.....	\$0.90½	\$0.91½	\$0.90	\$0.90½	5,760,000
Sept. 1.....	.90½	.90½	.89	.89	5,315,000
2.....	.88½	.89½	.88½	.89½	5,956,000
3.....	.89½	.92	.89½	.92	6,407,000
4.....	.92	.92	.87½	.87½	8,365,000
5.....	.87	.88½	.85½	.86½	9,479,000
Total sales.....					41,282,000

SAN FRANCISCO MINING STOCK QUOTATIONS.
Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS.					
	Aug. 29.	Aug. 30.	Sept. 1.	Sept. 2.	Sept. 3.	Sept. 4.
Albion.....						
Alpha.....						
Alta.....	2½	2½	2½	2½	2½	1½
Argenta.....						
Bechtel.....	.90	.80		.90	.90	.90
Belle Isle.....						
Best & Belcher.....	2½	2½	2½	2½	2½	2½
Bodie.....	1½	1½	1½	1½	1½	1½
Bullion.....						
Bulwer.....						
California.....	.15	.15	.10	.10	.15	.35
Chollar.....	3	2½	2½	2½	2½	2½
Con. Pacific.....			.55	.60	.60	
Con. Virginia.....	.35	.30	.30	.25	.30	.25
Crown Point.....	1½	1½	1½	1½	1½	1½
Day.....						
Elko Cons.....						
Eureka Cons.....						
Eschequer.....						
Gould & Curry.....	2½	2½	2½	2½	2½	2½
Grand Prize.....						
Hale & Norcross.....	3½	3½	3½	3½	3½	3
Independence.....						
Martin White.....			.30	.30		
Mexican.....	1½	1½	1½	1½	1½	1½
Mono.....						
Mount Diablo.....			2½	2½	2½	2½
Navajo.....	4½	4½	4	4	3½	3½
Northern Belle.....						
North Belle Isle.....						
Ophir.....	1½	1½	1½	1½	1½	1½
Overman.....						
Potosi.....	1½	1½	1½	1½	1½	2½
Savage.....	1½	1½	1½	1½	1½	1½
Scorpion.....						
Sierra Nevada.....	1½	1½	1½	1½	1½	1½
Silver King.....						
Tip Top.....						
Union Cons.....	1½	1½	1½	1½	1½	1½
Utah.....	1½	.1	1½	1	.90	
Wales Cons.....						
Yellow Jacket.....	1½	1½	1½	1½		1½

Boston Copper and Silver Stocks.

BOSTON, Sept. 3.

[From our Special Correspondent.]

The general situation is unchanged in the mining share market, although a better tone is noticeable in the fact that stocks are less freely offered, and it is very clear that, when the demand sets in, prices must advance sharply. Meantime those who can should hold and bide their time. At present, there is little in the ingot copper situation to give encouragement, and holders of Lake will be only too well satisfied if present figures can be sustained. The transactions from day to day are merely nominal, and the aggregate for the week insignificant. Calumet & Hecla continues to hold a commanding position, from the fact of having assumed a speculative character, the passing of one dividend and reducing the next having completely annulled its former prestige of being an undoubted and unquestioned dividend-payer. A slightly increased activity is shown this week, but without material improvement in prices. Calumet & Hecla, sales at \$165½@166, but only 79 shares in all, and the stock is still offered at \$166. Franklin sold at \$7 for 100 shares, without change, and a small lot of five shares brought \$7½. Although \$7 is the best bid, there is little stock offering under \$8. Osceola has sold in a small way at \$11, which is one point off. This would look low for the stock, with a quarterly dividend of 50 cents a share due October 1st. Pewabic has developed greater strength, and further advanced from \$1½@2, with sales of 500 shares. More stock would probably be taken if offered. Quincy has ruled steady on small sales at \$36½@36½; but the stock lacks animation, and this may be fairly remarked of the whole market, although, as above stated, the general tone is better. Of Allouez, 100 shares were sold at \$1, the first public transaction since April 28th, at same. Atlantic is without sales, nominally \$7½, a little stock being offered at \$8.

Silver stocks remain quiet, but in some there is a slightly increased movement. Bowman, dull at 11c. a few days since, is now firmer at 12c., sales and bid, notwithstanding the 10,000 shares advertised to be sold by auction, Saturday, for the non-payment of the

five cent assessment. It is quite probable, however, that four fifths of these will be paid up before the day of sale. Dunkin was a little active, in anticipation of the dividend, and advanced to 31c.; but now that the dividend has been actually declared, the price has settled back to 25c. asked, ex dividend. Bijou is firm at 13@14c. Water-meter stocks, which last week took on quite a boom, advancing largely, have since receded somewhat, but are again in good demand. New England closes firm at 40c. bid, with considerable sales at 45c. Standard is 50c. bid, 60c. asked, without sales.

BULLION MARKET.

New York, Friday Evening, Sept. 5.

DATE.	LONDON.		N. Y.		DATE.	LONDON.		N. Y.	
	Pence.	Cents.	Pence.	Cents.		Pence.	Cents.		
Aug. 30	50½	110	50½	110	Sept. 3	50½	110	50½	110
Sept. 1	50½	109½	50½	110½	4	50½	110½	50½	110½
2	50½	110	50½	110½	5	50½	110½	50½	110½

BULLION PRODUCTION FOR 1884.

MINES.	States.	Month of July.	Year from Jan. 1st, 1884.	
			\$	\$
*Alice, g. s.....	Mont.		520,843	
*Belmont.....	Mont.		8,081	
*Black Bear.....	Cal.	2,500	19,600	
*Bodie, g.....	Cal.		396,063	
*Bonanza King, s.....	Cal.		211,904	
*Boston & Montana, g.....	Mont.		239,779	
*Caledonia.....	Dak.		73,511	
*Chrysolite, s. L.....	Colo.	13,113	98,478	
*Consolidated Bobtail, g.....	Colo.	9,791	57,071	
*Contention, s. g.....	Ariz.		314,929	
*Deadwood-Terra, g.....	Dak.		260,923	
*Derbec Blue Gravel, g. s.....	Colo.	16,196	89,813	
*Father de Smet, g.....	Dak.	43,699	267,637	
*Grand Prize, s.....	Nev.		25,000	
*Hecla Cons., g. s. L. C.....	Mont.		320,052	
*Helena, s. L.....	Mont.	106,250	625,036	
*Homestake, g.....	Dak.		607,988	
*Hope, s.....	Mont.		39,301	
*Horn-Silver, s. L.....	Utah.		1,444,000	
*Iron Silver, s. L.....	Colo.		381,358	
*Kentuck, g. s.....	Nev.	1,717	20,577	
*Lexington, g. s.....	Mont.	96,794	709,479	
*Little Pittsburg, s.....	Colo.	3,355	56,304	
*Moulton, g. s.....	Mont.	61,241	432,147	
*Mount Diablo, s.....	Nev.		24,820	
*Murchie.....	Cal.		19,000	
*Navajo, g. s.....	Nev.	34,667	243,697	
*North Belle Isle.....	Nev.	5,874	5,874	
*Ontario, s. L.....	Utah.		1,021,841	
*Original, s. C.....	Mont.		29,724	
*Oxford, g.....	N. S.	2,471	22,378	
*Paradise Valley, s. g.....	Nev.	16,000	87,950	
*Plymouth Consolidated, g.....	Cal.	91,189	623,546	
*Rooks, g.....	Vt.	6,328	28,661	
*South Yuba, g.....	Cal.	2,400	18,016	
*Stormont.....	Utah.	17,847	117,595	
*Syndicate, g. s.....	Cal.	14,067	98,078	
*Tombstone, s. L.....	Ariz.		370,078	
United Gregory, g.....	Colo.		7,174	
Total amount of shipments to date.....			\$9,938,304	

* Official. † Assay value. ‡ Not including value of lead and copper. ** Silver valued at \$1.05 an ounce. G. Gold; S. Silver; L. Lead; C. Copper. — No bullion produced.

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 lost £119,259 bullion; but the proportion of its reserve to its liabilities was reduced from 44½ to 44¼, against 47¼ per cent at this date last year. The weekly statement of the Bank of France shows gains of 692,000 francs gold and 573,000 francs silver.

METALS.

New York, Friday Evening, Sept. 5.

Copper.—Negotiations between the manufacturers' pool and the lake companies were brought to a happy conclusion night before last, the result being that the latter sold the former 20,000,000 pounds of copper at a price supposed to be 13c. We say "happy," because, if this is the price, both parties to the bargain have done well—the producers, in view of the enormous production going on in this country, to be much larger next year; and the buyers, because they wanted lake copper, and have got it at a figure that may be considered fair under the circumstances. Delivery of the above lot will be spread conveniently over the coming months. In making the sale at the figure named, the companies probably also took into consideration that the brass trade is excessively dull, and that manufacturers assume no small risk in fixing a price for many months

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.										SALES.	NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.										SALES.				
	Aug. 30.		Sept. 1.		Sept. 2.		Sept. 3.		Sept. 4.				Sept. 5.		Aug. 30.		Sept. 1.		Sept. 2.		Sept. 3.			Sept. 4.		Sept. 5.	
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.			H.	L.	H.	L.	H.	L.	H.	L.	H.	L.		H.	L.	H.	L.
Alice, Mon.												Albion															
Amie Con., Co.											300	American Flag															
Argenta											300	Barcelona, a.												300			
Bassick, Co.											5.00	Bechtel Con., g.															
Belle Isle, Ne.											1.50	Belvidere															
Bodie Cons., Ca.											600	Best & Fisher, g. s.															
Breece, Co.											100	Big Pittsburg, s. L															
Bulwer, Ca.											2.90	Bradshaw, s.															
California, Ne.											2.90	Bull-Domingo, s. L															
Cal. & Hecla, Mich.											2.80	Cal., B. H., g.												300			
Castle Creek											2.80	Central Arizona, s.												100			
Chollar											1.00	Climax, Co.												1,900			
Chrysolite, Co.											100	Colorado Central															
Cons. Va., Ne.											7.100	Cons. Imperial															
Copper Queen											1,010	Con. Pacific												4,300			
Dunkin, Co.											2.75	Decatur															
Eureka Cons., Ne.											2.80	Durango, g.															
Father de Smet, Dk.											2.85	Eastern Oregon															
Findley, Ga.											40	Goodshaw, g.															
Gold Stripe, Ca.											200	Harlem M. & M. Co.												100			
Gould & Curry, Ne.											400	Hortense, s.															
Grand Prize, Ne.											1.85	Lacrosse, g.												300			
Green Mountain, Ca.											400	Mariposa Prof., g.															
Hale & Norcross, Ne.											325	" Com., g.															
Hall-Anderson, N. S.											940	Mexican, g. s.												200			
Homestake, Dk.											600	Mono															
Horn-Silver, Ut.											400	North Standard, g.															
Independence, Ne.											400	N. Horn-Silver, s. L															
Iron Silver, Co.											2,000	Orint'l & Miller, s.												3,500			
Leadville C., Co.											2,000	Rappahannock, g.												3,500			
Little Chief, Co.											1,300	Red Elephant, s.															
Little Pittsburg, Co.											400	Ruby, of Arizona															
Martin White, Ne.											650	Silver Cliff, s.															
Navajo, Ne.											250	Sonora Con.															
Northern Belle											100	South Bodie, g.															
North Belle Isle, Ne.											650	South Bulwer, g.															
Ontario, Ut.												South Hite															
Ophir, Ne.												South Pacific															
Quicksilver Pref., Ca.												State Line, 1 & 4, s.															
" Com., Ca.												" No. 2 & 3, s.															
Robinson Cons., Co.												Sutro Tunnel												5,600			
Savage, Ne.												Taylor Plumas															
Sierra Nevada, Ne.												Unadilla, s.															
Silver King, Ar.												Union Cons., g. s.												800			
Spring Valley, Ca.																											
Standard, Ca.																											
Stormont, Ut.																											
Tip Top, Ar.																											
Vizina, Ar.																											
Yellow Jacket																											

Full tables giving the total amount of dividends, capital, etc., will be printed the first week of each month. Dividend shares sold, 24,475. No dividend shares sold, 21,800.

to come at a time when the future of this metal is any thing but reassuring, even admitting that consumption outside of the brass line, and especially for electrical purposes, is very large. Since this sale became known, there is, of course, no market for the moment, manufacturers being provided, and the price of lake copper is nominal, while Baltimore would not unlikely be obtainable at 12½c., the last sale of 25,000 pounds, from second hands, having been made at 12½c. Chili Bars are this morning cabled £53 17s. 6d. from London.

Tin.—Since our last report, the price of Straits tin in London has gradually recovered, £82 10s. this morning, and our own market with it. At one moment, the latter gave way to \$18.15 cash, Straits Tin, but the price is now 18½c., with a steady feeling on both sides of the Atlantic. The visible supply on this coast is moderate, 2650 tons; but this favorable feature is counterbalanced by extreme dullness of trade, aggravated by a tropical heat.

Lead.—Almost no sales have been effected during the week, and the market is practically stagnant. Small lots have moved off at 3.55c.; at the close, in sympathy with dull Western markets, the asking price is 3.55c., but not more than 3.50c. is offered for Common Domestic. Corroding lead is offered at 3.60c., but less desirable lots may be had at 3.55c.

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

Our market is unchanged. Sales for the week sum up to about 430 tons of Refined. Nothing doing in Common.

Messrs. Everett & Post send us the following dispatch from Chicago to-day:

Our market is quiet and dull; prices unchanged; the demand is very limited, and continues from hand to mouth only. Prices are nominally 3½c.

Spelter.—The moderate demand noticeable is met at \$4.60, Common Domestic.

Antimony.—The demand is light at 10½c. Hallitt's, and 10½c. Cookson's.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Sept. 5.

American Pig.—There is nothing new to report in this trade, business continuing very dull. Prices remain about the same, with a tendency to firmness.

We quote standard brands: No. 1 Foundry, \$20

@\$21; No. 2, \$18@19; and Gray Forge, \$17@18, with outside brands from 50c. @ \$1 lower. Foreign Bessemer is nominally \$19@19.50. Spiegeleisen is nominally \$27.50@28 for 20 per cent, a small business having been done during the week.

Scotch Pig.—The market continues very quiet. Prices in Scotland are higher, but this has not increased the demand here. Importations are lighter, not more than 800 tons arriving here during the week.

We quote ex ship and to arrive: Coltness, \$22; Langloan, \$21.50; Summerlee, \$20.75; Dalmellington, \$20; Gartsherrie, \$21; Eglinton, \$19.25@19.50; and Glengarnock, \$20@20.50.

At the Metal Exchange, the following cable quotations have been received: Coltness, 59s. 6d.; Langloan, 54s. 6d.; Summerlee, 52s.; Gartsherrie, 52s. 3d.; Glengarnock, at Ardrossan, 49s. 6d.; Dalmellington, 47s.; and Eglinton, 43s. 3d. Warrants, 41s. 6d.

Steel Rails.—We hear of large sales during the week at from \$26@27. Inquiries continue to be quite numerous in the market, and there is considerable competition among the steel rail companies for business. Prices, however, remain firm at \$27.

Old Rails.—Small transactions are reported on private terms. Prices remain firm at \$18@18.50.

Philadelphia. Sept. 5.

[From our Special Correspondent.]

Pig-Iron.—The market for pig-iron is quiet, and there is no material change in prices, though good brands are held with increasing firmness. A good deal of business has been done, and on medium grades of iron concessions have been granted in some cases, in order to secure desirable orders. Only the furnaces that are compelled to will blow out. All prospects of the shut-down extending to Eastern furnaces have now disappeared. There are less offerings of low-grade irons this week than heretofore. Prices for No. 1 Foundry Iron range from \$19@20; No. 2, \$18@18.50. Mill irons of best quality still command \$17.50@18. Forge irons have sold more freely during the week, owing to the indications of a slight improvement in manufactured iron.

Foreign Irons.—Bessemer iron is quoted nominally at \$19@19.50, with no sales reported, except for very small lots. Spiegeleisen is without activity at

\$27.50@28 for 20 per cent; 10 to 12 per cent can be had at \$23@23.50.

Merchant Iron.—There is a little more firmness displayed in merchant bars, but the business of the week has been confined to small lots. There are large orders to be placed, but they are withheld, though there is but little probability of any further weakness in prices. The mills are but scantily supplied with orders, and it is probable that the hope of some manufacturers, that they would be able to start up double turn in a few weeks, will not be realized. Most of the mills that are in operation are now on single turn. Sales of common iron have been made at very low rates, in interior mills. Western iron is depressing prices by its competition. Best Refined Iron commands 1.90@1.95c., but good iron is selling as low as 1.80c.

Muck-Bars.—Sales of small lots of Muck-Bars are reported at prices ranging from \$29@30.50 at mill.

Blooms.—Charcoal Blooms have sold all the way from \$50@55, and Anthracite at \$40@44. Scrap Blooms, \$40@42. No large lots are called for.

Plate and Tank-Iron.—The plate manufacturers are fairly busy, in comparison with other manufacturers, but no large orders are coming in, and there is not enough work ahead to prevent some very sharp competition. An effort is made to hold prices firm, but anxiety for business will probably keep them very low. Nominal quotations are as follows: 2.10c. for Plate; 2.15c. for Tank; 2.75c. for Shell; 3.75c. for Flange; and 4.25c. for Fire-Box.

Structural Iron.—Structural iron is a great deal less active so far this month than last. Only small orders are placed, and prices are very low, though quotations are nominally unchanged. The supply of orders on hand is becoming small, and there is no heavy business in sight just at present.

Nails.—There is a fair demand for nails, but prices are too low to suit manufacturers. Moderate orders are readily taken at \$2.20 and even less.

Wrought Pipes and Tubes.—There is very little demand this week, and prices show the same weakness reported previously. Quotations are the same, but all kinds of prices are taken, and this is having the effect of keeping large buyers out of the market.

Steel Rails.—Trade is joggling along quietly, with however, an increased firmness in prices, which seem

to have reached their lowest point. There is an improved inquiry for small lots for fall and spring delivery. Business has been done at \$27, and a little more is asked, and will probably be paid for small lots, though makers are still inclined to make some concessions to secure business. Old rails are without special change. Early in the week, there was a little attempt to stiffen prices, but, with one or two exceptions, old prices are obtained. There are very light stocks on hand, which accounts for the improved feeling. American rails are quoted at \$18@20 here. Double-Heads are offered at \$21.

Scrap-Iron.—No. 1 Wrought Scrap-Iron is firmly held at \$20@20.50, but there has been little movement, excepting in small lots. Inferior grades can be had at low rates, but buyers are indifferent.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Sept. 5.
Anthracite.

No improvement is to be reported in the anthracite coal trade, though the stoppage of mining for six days this week has reduced the surplus at the different shipping points. The question of a further stoppage of a second week in September is frequently discussed, and there is a firm belief that it will be agreed upon, but no official action has been taken in this direction.

Bituminous.

In the bituminous market, there is nothing to report, beyond the continuance of the depression heretofore quoted. The consumption of this class of coal is evidently increasing, but has not yet reached a point to bring out any notable reaction in the matter of prices. There has been a tendency at Baltimore toward an advance in sea freights, owing to a scarcity of vessels at that point, although figures from Philadelphia have not yet changed. It appears probable that as the season progresses there must be an advance in prices as well as freights, and consumers who use this class of fuel would be wise if they put in their stocks under the very favorable conditions now existing.

Philadelphia. Sept. 5.

[From our Special Correspondent.]

The mines in the anthracite region are all idle this week. Nothing definite has been decided as to further suspensions, but there is a great deal of talk, in and out of the offices, in reference to restriction, and it is probable that it will result in a further curtailment of production. Leading members of the coal trade are very anxious to avoid this, and are looking forward to a revival of demand; but every day develops some vexing circumstance or influence that checks the expected demand. It has been stated, on good authority, that, if there is another restriction this month, it will not be until the last week, and probably the next restriction will not take place until next month. Possibly the matter is already decided; but if it is, the information is kept very close. To-day, there are 66,000 tons of coal at Port Richmond. Stocks are slowly accumulating, and the probabilities are, that stocks there and at other shipping points will continue to pile up, because of the indifference of buyers in Eastern and Western markets. Vessels are plenty, and prices are as low as at any time during the year. Rates are quoted this week at 90c. to Providence and \$1 to Boston. Vessel owners say there is no money in the business at these figures, with 25 cents to be paid for loading, and 5 cents for trimming in the vessel. The Schuylkill collieries are in better condition than others, owing to the difference in the quality of the coal and the improved breakers. There is really no necessity for making broken at all, as there is no demand for it. They can make all into stove sizes, with some waste, it is true; but this is better than piling up broken, when there is no market for it. Within a month or two, there will be an improved demand for stove in the local and line trade. Neither New York nor Philadelphia has been stocking up very largely, and with the approach of winter, the demand will increase. In the local trade, there is every indication of a great improvement, and there is certainly room for it, because domestic consumers and manufacturers have very little coal on hand, notwithstanding the possibilities of an upward tendency after the first of next month. Yard men are trying to draw

in customers with warnings of higher prices to come, but householders and manufacturers, as a rule, are indifferent to these threats, and are buying coals they need it; of course, there are a good many exceptions. The school-houses are stocking up; most of the public offices are supplied. There is a shading of prices on all sides, and very little if any coal is selling at full prices. The manufacturing demand within 200 miles of the mines is not looming up as was expected. In fact, the same reasoning actuates buyers in all markets.

The bituminous operators can furnish no items of special interest this week, reporting only a movement of small lots. To-day's reports show the production of the Clearfield region for the week to be 65,253 tons, as against 51,255 tons for the corresponding week last year, and the production this year, to date, 2,054,292 tons, against 1,867,362 tons for the same time last year, showing an increase of 186,950 tons for the year. The Cumberland output for the week just reported was 45,576 tons, against 35,819 tons for the corresponding week last year, showing an increase of 9658 tons. The increase of this region to date this year is 128,468 tons.

Buffalo. Sept. 4.

[From our Special Correspondent.]

Trade in anthracite coal is very quiet and prices unchanged. Stocks are expected this month to go into the hands of consumers, and money to move among the fraternity.

The sub-committee appointed a few days since to regulate the trade of Chicago, Milwaukee, and Racine left Buffalo for Chicago on Monday last. It will report the result of its labors to the Joint Western Committee on the 11th instant.

One of our city papers credits Mr. Robert Law, of Chicago, with saying, relative to the meeting of anthracite coal men here last week: "These soulless corporations are trying to ruin the Western coal trade with their high prices; but we came down in force and stopped them. They would have done it if we hadn't."

The *Express* of this city thus refers to the meeting of the bituminous coal trade interests held here last week: "After a long and labored session, the representatives of the soft coal interests assembled at the Tift House succeeded in fixing up something like an agreement before adjourning. As to the details of the resolutions passed, the public is not informed; but they look toward a central body that is to dictate the amount of coal mined, the prices asked, and the percentages allowed each interest. Only a part of those present signed the agreement, however. A committee was appointed to call on the railroad companies and others having producing interests in the trade, notify them of the proposed arrangement, and urge them to agree to it. It is understood that the advocates of the plan are mostly the smaller producers, the larger ones quite generally standing aloof and predicting a speedy failure of the idea. The outlook is, therefore, not very favorable to a syndicate that shall be of any great value, although all agree that it is the beginning of a movement that will ultimately rescue the trade from its present low state. One gentleman thinks the undertaking too far-reaching to begin with, and says it ought to be enough to arrange the amount of output now. When that is done, another point can be taken up. Another gentleman believes that the railroads running to the soft coal mines ought to see to it that the production be not allowed to ruin the trade. It would be easy to refuse shipment whenever the market was found overstocked. It is learned that something of this kind will be undertaken hereafter. Already the roads refuse to let large amounts stand in cars ready to be used for cutting prices."

There is nothing new in the bituminous coal trade. Coke, unchanged.

Coal freights tumbled to 10 cents last Thursday afternoon, and another 10 cents on Friday to Chicago and Milwaukee. Coal is scarce here, and, the mines having shut down, this scarcity is likely to continue, and result in a continuance of the present rate, 50 cents a ton, or perhaps even less, although vessel men will, it is thought, refuse to carry lower than 50 cents. The outlook for the vessel interests at this end of the route is any thing but bright and cheering; but at the other end, grain freights have advanced, and are tending upward, so that matters will be equalized.

The following were the going rates per net ton at which charters have been made since my last letter:

To Chicago and Milwaukee, 70c., 60c., and 50c.; to Houghton and Port Arthur, 70c.; to Duluth, on contract; to Superior City, Racine, and Green Bay, 60c.; to Sandusky and Toledo, 20c.; to Windsor (Canada) and East Saginaw, 30c.; to Kincardine, 50c. Closing dull, with vessels finding it difficult to obtain enough coal to fill out cargoes without tedious waiting.

Shipments by lake from August 28th to September 3d, inclusive, 52,420 tons; namely, 27,140 to Chicago, 8980 to Milwaukee, 3330 to Toledo, 3100 to Duluth, 1100 to Port Arthur, 350 to East Saginaw, 1080 to Racine, 1000 to Houghton, 500 to Kincardine, 640 to Windsor, and 5200 to Superior City.

The shipments by canal include 1 load coal to Port Jackson, at \$1.10, and 2 loads to Syracuse at 75c.; 10c. to be paid for unloading.

Receipts by the Lake Shore & Michigan Southern Railroad for the month of August were 3376 tons; 2068 tons for Buffalo, and 1308 tons for other points.

Receipts by canal for August, 32,744 tons; from opening of navigation to date, 66,562 tons. Shipments by canal for August, 2968 tons; from opening of navigation to date, 22,378 tons.

Exports by lake for August, 20,490 tons; from opening of navigation to date, 870,010 tons, as compared with 908,210 tons in 1883, and 687,857 tons in 1882. Lake freights on coal hence to Chicago and Milwaukee closed 30th August at 50c. per net ton, as compared with 70c. in 1883, and 85c. in 1882. Receipts at Duluth for the week ended August 30th, 7820 tons; total of season, 203,497 tons.

Boston. Sept. 4.

[From our Special Correspondent.]

This is emphatically the dull period of the year in Boston's coal trade, and no important news can be looked for. The anthracite buying has not yet begun in good earnest, and there are no bituminous contracts in the market. This is the customary state of affairs, although the dullness may seem to be greater this year than usual. A fortnight, now, will put a different aspect on the trade, but this is not a year in which dealers may safely look for a fall rush. Consumers have not yet got out of the habit of buying commodities of all kinds conservatively, and there is every reason for pursuing this course in the coal market so long as it is followed at all.

The market continues in buyer's favor; the companies in agreeing practically to restrict production during half of September, fortify their own position, but they must have patience and wait for the trade.

We quote f. o. b. prices nominally as follows:

At New York, Stove, \$4.25; Broken and Egg, \$3.65; individual coals, \$4.15@4.20 for Stove, \$3.50 for Broken and Egg. At Philadelphia, \$3.90@ \$4 for Stove, \$3.65 for Chestnut, \$3.35@3.50 for Broken and Egg, \$2.50 for Pea. Special coals, \$4.85 for Broken, \$5.35 for Stove.

There is no demand for bituminous coal and no effort to sell. The market is without foundation nominally at \$3.60@3.70 delivered.

There is a firmer feeling in freights, particularly at Baltimore, where \$1.15 is the current rate. There is also a stronger feeling at other ports. The fleet is now eastward, and the supply of vessels at tide-water is light. Whether the firmness will continue is another question. We quote: New York, 85c.@90c.; Philadelphia, \$1@1.10; Baltimore, \$1.10@1.15; Newport News, \$1@1.10; Richmond, \$1.20; Cape Breton, \$1.50; Bay of Fundy, \$1.30.

The retail buyer is not yet "on deck," but the vacation season will now be over shortly, and this means a very fair degree of activity in the Boston city trade, which is accustomed to stock up at this season without special regard to price. Retail trade in the suburbs is very fair.

We quote Boston prices, ton lots, delivered:

White ash, furnace, and egg	\$5.50
" " stove and nut	5.75
Red ash, egg	6.00
" " stove	6.25
Lorberry, egg and stove	\$6.75@ 7.00
Franklin, egg and stove	7.50
Lehigh, furnace, egg and stove	5.75
" nut	5.75

Wharf quotations: \$4.50, Broken; \$4.85, Stove.

New Orleans. Sept. 1.

[Specially reported by C. A. MILTENBERGER & Co.]

The coal market has shown little animation the past month, the demand being hardly equal to the usual August demand. There is a general dullness pervading all branches of trade, in consequence of the scarcity of money, and the coal business comes in for its share of the stringency of the times. An advance in prices of Pittsburg coal may be anticipated as soon as the demand springs up, as the stock on hand is rather light for the season, and the figures have been below actual cost of production.

No change in quotations as last given.

FREIGHTS.

Coastwise Freights.

Per ton of 2240 lbs.

Representing the latest actual charters to September 5th.

Ports.	From Philadelphia.	From Baltimore.	From Elizabethport, Port Johnson, South Ambo, Hoboken, and Weehawken.
Alexandria.....	.65@.75		
Annapolis.....			
Albany.....			
Baltimore.....	.58		
Bangor.....	1.15		.95
Bath, Me.....	1.00@1.05	1.20	.95
Beverly.....	1.05@1.10		.95
Boston, Mass.....	1.00@1.10	1.20	.90
Bristol.....	1.05	1.15	
Bridgeport, Conn.....		1.10	.55
Brooklyn.....		1.10	
Buffalo, N. Y.....			
Cambridge, Mass.....	1.10@1.20		.90
Cambridgeport.....	1.10@1.20		.90
Charleston, S. C.....	.75	.70	
Charlestown.....	1.05		
Chelsea.....	1.00@1.05		.90
City Point.....			
Com. Pt., Mass.....	1.15		.90
E. Boston.....	1.00@1.05		.90
East Cambridge.....	1.10@1.15		.90
E. Greenwich, R. I.....	1.05		
Fall River.....	1.00		.70@.75
Galveston.....			
Gardiner, Me.....	1.15		
Georgetown, D. C.....	.65@.80		
Gloucester.....	1.10@1.15		
Hartford.....			
Hackensack.....			
Hudson.....			
Lynn.....	1.15@1.25		
Marblehead.....	1.10		
Medford.....			
Milville, N. J.....			
Milton.....			
Newark, N. J.....		1.25	
New Bedford.....	90@1.00	1.10	.80
Newburyport.....			1.05
New Haven.....		1.10	.55
New London.....		1.10	.65@.70
New-Berne.....			
Newport.....	1.05		.70@.75
New York.....		1.05	
Norfolk, Va.....	.60		
Norwich.....			
Norwalk, Conn.....			
Pawtucket.....			
Philadelphia.....			
Portland, Me.....	.75*	1.20@1.25	.90
Portsmouth, Va.....	.60		
Portsmouth, N. H.....	1.15@1.20	1.30	1.05
Providence.....	.90@1.00	1.10	.70@.75
Quincy Point.....			1.00
Richmond, Va.....	.80		
Rockland, Me.....			
Rockport.....			
Roxbury, Mass.....	1.00@1.05		
Saco.....			
Sag Harbor.....			
Salem, Mass.....	1.10@1.25		.90
Saugus.....		.90@1.00	
Savannah.....			
Somerset.....	1.05		
Staten Island.....			
Trenton.....			
Troy.....			
Wareham.....		1.25	
Washington.....	.65@.80		
Weymouth.....			
Williamsbg, N. Y.....			
Wilmington, Del.....		1.00	
Wilmington, N. C.....			
St. Thomas, W. I.....			

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

Market firm.

GEORGE W. JONES & Co.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended August 30th, and year from January 1st:

TONS OF 2240 LBS.	1884.		1883.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co.....	126,510	2,455,427	104,005	2,533,162
D. L. & W. RR. Co.....	112,277	3,269,985	129,058	3,199,182
Penna. Coal Co.....	37,929	831,379	36,695	918,238
L. V. RR. Co.....	37,366	908,010	42,899	902,771
P. & N. Y. RR. Co.....	6,203	146,506	4,831	137,562
C. RR. of N. J.....	*	*	*	1,202,078
Penn. Canal Co.....	11,300	250,581	15,515	282,087
North & West Br. RR.....	14,786	548,650	5,696	293,825
	346,371	8,410,538	338,702	9,468,905
Lehigh Region.				
L. V. RR. Co.....	116,467	2,924,144	118,338	3,201,863
C. RR. of N. J.....	*	*	*	1,126,889
S. H. & W. B. RR.....	4,528	147,741	*	36,680
	120,995	3,071,885	118,338	4,365,432
Schuylkill Region.				
P. & R. RR. Co.....	315,526	7,059,743	292,565	5,570,315
Shamokin & Lykens Val.....	*	*	34,046	950,363
	315,526	7,059,743	326,611	6,520,678
Sullivan Region.				
St. Line & Sul. RR. Co.....		43,411	1,642	41,540
Total.....	782,892	18,585,577	785,293	20,396,555
Increase.....				
Decrease.....	2,401	1,810,978		

* Included in tonnage of the Philadelphia & Reading Railroad.

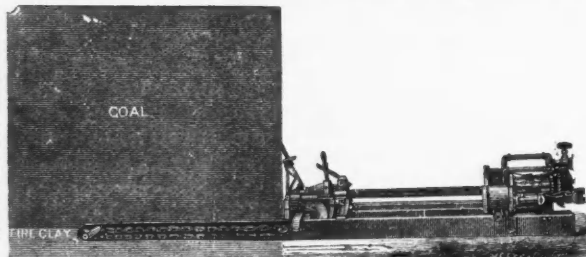
Total same time in 1879.....	16,972,754 tons
" " " 1880.....	14,216,454 "
" " " 1881.....	18,033,921 "
" " " 1882.....	18,440,500 "

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.

Betwiders-Delaware Railroad Report for the week ended August 30th:

	Week.	Year. 1884.	Year. 1883.
Coal for shipment at Coal Port (Trenton).....	4,061	65,379	75,716
Coal for shipment at South Amboy.....	14,630	405,154	440,647
Coal for distribution.....	19,832	508,116	523,063
Coal for company's use.....	2,833	121,416	103,626
Total.....	41,356	1,100,065	1,143,052
Increase.....			
Decrease.....		42,787	

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