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The great Anaconda mine has long been a distributing factor in the European markets for copper furnace material. It will be so no longer, for we are able to announce authoritatively that it has been decided by Mr. HAGGIN to refine the entire output of the mine in this country. This admirable decision will enable us to export fine copper or manufactures of copper instead of matte, and will be another and important step in the path of progress that is leading to the metallurgical supremacy of this country.

The Anaconda Company will not hereafter ship copper matte abroad, but has arranged for the electrolytic treatment of its product at Baltimore. The Baltimore Electric Refining Company has decided to largely increase its works and has already contracted to double its tankage, which, when completed in the early fall, will enable it to treat four million pounds monthly. The silver and gold obtained from all the Anaconda stuff constitutes an important element in the value of its output, and hereafter it is proposed to extract the precious metals before marketing the copper. While the output of the Anaconda mines will for the present be reduced, the treatment of all the material in America, instead of, as heretofore, sending a large part of it abroad in the form of argentiferous matte, will add largely to the employment of labor at the smelting and refining works and thus compensate for the reduced force in the mines.

THE legislation seeking to establish free silver coinage in this country without the co-operation of European nations is probably dead beyond resurrection, and there is now a hope and possibility of establishing international bimetalism. The ENGINEERING AND MINING JOURNAL has always advocated an international agreement to secure the free coinage of gold and silver at a ratio to be adopted by the great industrial nations. Then and then only can free coinage of silver be adopted here without producing the most disastrous effects.

It remains to be seen whether the representatives of this Government to the convention shortly to meet in Europe, can by their personal characters, as well as by the logic of their arguments, convince other nations that it is for their interests to adopt bimetalism. It is absolutely certain that as long as they believe us capable of the folly of opening a market to take all their silver and give them all our gold they will not adopt bimetalism. It is also absolutely certain that it would be fatal to the cause to appoint as one of our representatives Senator J. P. JONES, the president and part owner of the infamous Comstock mill ring, who escaped the personal verdict which was decreed against his partners only by keeping out of the jurisdiction of the court.

The cause we advocate is not so strong that it can carry such an unnecessary load as this, and the honor of the nation should not be smirched by such an appointment.

The report of the Director of the Mint on the production of the precious metals in the United States for the year 1891 has just been published. From this report it appears that the output of gold amounted to 1,604,840 fine ounces, of the value of \$33,175,000, an increase of \$330,000 over the previous year. This output was equal to that of 1888 and was larger than in any year since 1881, with the exception of 1886, when it reached a value of \$35,000,000. There were many new finds during 1891, notably in Oregon, Montana and Colorado, but there were no rich strikes and many old properties ceased to be productive. The increased product is due chiefly to the improved processes of treatment. Of silver, 58,330,000 fine ounces were produced during the year 1891, as compared with 54,500,000 fine ounces during 1890.

This increase is partly due to the fact that the increase in the value of silver during the early part of the year made it possible to work many mines profitably which had been obliged to close down when the prices reached a very low point, but it is principally due to the new and valuable finds of silver, particularly at Creede, Colo., and to the cheapening of the processes for smelting silver bearing lead and copper ores. The product of gold throughout the entire world increased from \$119,475,300 in 1890 to \$125,299,700 in 1891. This increase comes principally from South Africa, whose product increased from \$9,887,000 in 1890 to \$14,199,640 in 1891. The product of Australia increased by \$1,600,000 and that of Russia fell off \$1,350,000. The silver product for the whole world during 1891 was 143,550,000 fine ounces as against 134,380,000 fine ounces in 1890 and 125,420,000 fine ounces in 1889. The increase is chiefly due to the United States, Mexico, Australia and Bolivia.

THE HOMESTEAD STRIKE.

The results of the conflict between the laborers and the representatives of the Carnegie Steel Association at Homestead, Pa., are deplorable in every sense. Apart from the lamentable loss of some 15 lives and the serious injury to perhaps some 50 men, these events must prove extremely injurious to the cause of the workmen, for it is another very sad example of the tyranny of organized labor. It is the unquestioned right of any individual or of any body of men to strike or refuse, singly or together, to work at any rate of wages or under any conditions that they may be

dissatisfied with. This liberty, however, involves a respect on the part of the strikers for the equal rights of others. Each individual has an absolute right to work, as well as to strike, and to accept any wages that may suit him, and each establishment is free to employ or not to employ any workman or body of workmen willing to work for such wages as it offers.

If the employer is unwilling to pay fair wages he will not get men to work for him. It is perfectly within the rights of any workmen or association of workmen to endeavor, by argument or other peaceful means, to persuade men not to accept the rates of wages offered.

No man or body of men has the right to prevent by force any one from working, or to interfere with the absolute right of every employer to manage his works as he pleases in a legal manner.

It is just as much an act of indefensible tyranny on the part of a body of workmen to force other men to quit work, or to forcibly prevent the running of employers' works, as it would be if the employer should force these men to work whether they wanted to or not, and make them accept the wages he was willing to pay.

What would the Homestead workmen say if the Carnegie Company should put a guard over them and force them to work at the wages it chooses to offer, whether they liked it or did not like it? Would there not be an immediate and justifiable cry from every part of the country that the company was working slaves, not free men.

The essence of Liberty is a respect for the rights of others, and in violating these rights the Homestead men have already injured their cause almost irreparably. They will never succeed in closing the works by force. The whole power of the State would, if necessary, be employed to protect the works and those in them, and to give free access to them. The men may as well recognize this fact, and confine their operations to peaceful persuasion, by argument, to prevent the acceptance of work by others, or, better yet, come to terms with the company. They have by this terrible tragedy greatly injured their cause, and it will be the part of wisdom to recognize the fact. It will be equally the part of wisdom for the company to be conciliatory toward the men and promptly put an end to this most unfortunate condition of affairs.

CALVINISTIC GEOLOGY.

My attention was called by a friend, the other day, to a passage in MACFARLANE'S "Coal Regions of America," which I had never before noticed, though I have possessed the book and consulted it from time to time, ever since its publication in 1873. I believe this particular passage does not appear in the latest revised edition, issued since the author's death. It is pretty certain that he would not have permitted the Messrs. Appleton or their editor to take it out while he yet lived to defend it. And I reproduce it here, as a curious illustration of the views which, in the last generation, were still deemed tenable by educated men. It constitutes the concluding paragraph of the chapter on the coal-fields of Nova Scotia, and runs as follows.

To one who takes only an utilitarian view of the Nova Scotia region, there must occur a feeling of regret that in some of its localities its seams of coal are so unfortunately subdivided into thin sheets too small to work, and in other places disposed in masses inconveniently large, uncertain, and irregular in form. But if we take a higher and more thoughtful view of the subject, we will observe the malevolence of that Providence which, in its apparent anger, has submerged beneath the ocean so much that might have benefited our race, or caused it to be eaten away through countless ages by the action of the waves, leaving only poor fragments to tell us of the much larger portions that have been removed. Hence we cannot doubt but that the earth in its rocks, as well as its soil, was cursed for our sake, and that far back in the geological ages there was built up by a Being who saw the end from the beginning, a mutilated plant as a fit habitation for a fallen race.

It does not necessarily follow from this remarkable generalization that Mr. MACFARLANE was a man of exceptional ignorance or bigotry. He was an estimable gentleman, with a collegiate, but not specially scientific, training, actively interested commercially in the coal trade of Western Pennsylvania, and one of the Board of Commissioners of the second Geological Survey of the State. The book from which the above quotation was taken, and the "Geologist's Railway Handbook," which he subsequently prepared, are intelligent and useful compilations, still highly esteemed by scientific men, as well as by the general public. The author never claimed for them any merit of original research, but frankly declared that he had merely brought together from many sources the observations and views of standard authorities as to each region described. It is quite likely, I think, that he found in some scientific work, and adopted as orthodox, the pious explanation of stratigraphic phenomena which he applies, so far as I can discover, to Nova Scotia alone. Not improbably, the sentiment may have been uttered originally in that connection by a Nova Scotian Presbyterian to explain the special difficulties which he or his friends had encountered in coal mining. At all events, I do not find that Mr. MACFARLANE offers any similar comment upon the irregularities of other coal fields.

The view that such supposed evidences of past geological history are also evidences of "the malevolence of Providence," and that the rise of continents was a *previous consequence* of the fall of man, may be found in more than one learned volume of the period to which it belongs—a period in which the facts of science, half understood, but no longer denied, were ingeniously employed to fortify the traditional dogmas of theology. But less gloomy commentators have found in the same facts an argument of

contrary import. It seems equally reasonable, for instance, to hold that a Providence, foreseeing the superior orthodoxy of the Presbyterians of Nova Scotia, and resolved to reward them suitably therefor, shattered the earth's crust, and violently brought up within human reach the coal which would otherwise have been too deeply buried for man's discovery.

In Mr. MACFARLANE'S book the calm assignment of the evidences of Divine malevolence to a rival coal field, while the "elect" coal measures of Western Pennsylvania present all that could be desired in the way of quantity, quality and accessibility of blessing, is amusing and suggestive. Such explanations of the decrees of Heaven almost invariably put the curse on somebody else. As Nova Scotia and Western Pennsylvania are the two regions which represent in this hemisphere the most intense and conservative Scotch Presbyterian theology, we might leave them to settle between themselves the question which of them is to accept the unpleasant but necessary part of the reprobate. But the Nova Scotia coal mines are doing a better business now than in 1873, and perhaps it would be more convenient for the Caledonian-creed to transfer that portion of the evidences of Christianity to the State of New York, in which there is no coal at all—but much damnable heresy. R. W. R.

BOOKS RECEIVED.

In sending books for notice, will publishers for their own sake and that of book buyers, give the retail price? These notices do not supersede review in another page of the Journal.

The Michigan Engineers' Journal, containing the proceedings of the Michigan Engineering Society for 1892. Published by the society, Lansing, Mich. Pages 214. Illustrated.

Report of the Chief of the Division of Forestry for 1891. By B. C. Fernow. Published by the Government, Washington, D. C., 1892. Pages 39. Illustrated.

CORRESPONDENCE.

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

A. I. M. E. Discussion on the Sturtevant Mill.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of July 2, in an article descriptive of the meeting of the Institute of Mining Engineers at Plattsburg you say in your criticism on the paper of W. R. Krom "On Crushing Iron Ore for Concentration" that the paper was "a vigorous attack" on the papers read at Glen Summit and Baltimore on the subject of the Sturtevant Mill. I do not consider that Mr Krom's paper was a "vigorous attack", etc. It was simply a plain statement of facts and figures deduced from actual data obtained from comparative tests of Sturtevant Mill, Crusher and Rolls, operating on the same ore and under similar conditions. Mr. Krom's paper was supported in the discussion which took place on the following evening and evidently after your report was sent in for publication. The only figures brought out by the discussion Thursday evening on Mr. Krom's paper sustained his position and the "remarkable results" attained by this mill seemed to be in the direction of "remarkable" consumption of power, wear and tear and high cost of renewals.

NEW YORK, July 6, 1892.

C. G. BUCHANAN.

Hoffman Magnetic Separator.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR—In your issue of 25th ult. I notice an article on concentration of iron ores, by Axel Sahlin, in which the Hoffman magnetic separator is referred to as a "modification of the Ball Norton separator." I desire to correct this error, as both the electrical and mechanical features of the Hoffman separator are radically different from the Ball Norton. Neither does the action of the one in process of separation resemble in the least the effect produced in the Edison separator. Your correspondent is evidently basing his assertions on a very slim examination, for had he ever seen the machine in operation he would certainly have discovered his error before making such a statement. As the inventor and sole owner of this separator, I feel called upon to offer this correction, which I trust you will give space in your valuable paper. Should your correspondent desire to ascertain any more and reliable particulars concerning the Hoffman separator, I will be pleased to give same to him, or to show him the machine in operation. W. D. HOFFMAN,

Manager Clover Hill Mine and Concentrating Works.

CROTON FALLS, NEW YORK.

Two Mining Enterprises to Leave Alone.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Can you give me any information concerning the Sullivan Consolidated Mining Company of South Dakota. I am informed that its reputation is shady. J. L.

NEW YORK, June 25, 1892.

[We are reliably advised that The Sullivan Consolidated Mining Company, of South Dakota, "is unquestionably a fraud". We advise investors to be guided accordingly.—Ed. E. & M. J.]

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Some of our people have asked us if the "Black Wonder Mining Company, of Colorado," is good or a "fake". We could not answer but, knowing that you never fail to expose a humbug, I write you for information on the subject and would appreciate an early reply.

CUMBERLAND, MD., June 30.

H. W. SCHARDT.

[We would warn our readers against investing in this company, of which Jos. H. Allen is treasurer. The reports we have received indicate that the mine does not thus far show any value to justify the price of th

stock and the scheme generally is denounced in the Colorado papers as a "humbug."—Ed. E. & M. J.]

MacArthur-Forrest Process

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In the issue of 21st May your readers are favored with an article on this process which, among other things, indicates that you are not quite aware of the extent to which it is now in use. Besides the Robinson the MacArthur-Forrest process is being operated in connection with the following mines: In the Transvaal, Salisbury, Ferreira, Langlaage, Champ d'Or, Nigel, Black Reef, Crown Reef, Meyer & Charlton, Jubilee, City & Suburban, May Consolidated, New Primrose, Stanhope and Transvaal Gold (Leydenburg). Though some of the largest in above list were not in full working order, the output for April was 13,500 oz.,* at from 600 to 800 fine, and though the tonnage is not definitely given, we know that it was not under 20,000 oz.

In South Africa the operations have been conducted principally on tailings, though concentrates and ores direct from the mines are also worked. The scope of the process is, however, not confined to African tailings. In New Zealand the proprietors of the MacArthur-Forrest process made a contract about three years ago to work the entire produce of the Crown mines. Unfortunately for both parties the development of the mines did not permit a supply of ore sufficient to keep the plant fully employed, nevertheless, every ton of ore delivered has been satisfactorily worked according to contract and the Crown Mines Co. have now acquired a more extensive local control and more permanent interest in the process. The Sylvia G. M. Co. has also adopted the process under license and payment of royalty.

It is true that a few trials involving 1 ton 16 cwts. were made at the famous Mount Morgan mine of Queensland, and that the manager did not see his way to recommend the adoption of the process, because in his opinion the operation was too slow, *i. e.*, the plant required for the daily tonnage would be too great. As our extractions were from 91% to 100% with ore crushed to an ordinary degree of fineness and with a normal consumption of cyanide, the question of chemical efficiency did not arise. The calculation of the manager as to working capacity of plant were based on the working of the experimental lots amounting in all to 1 ton 16 cwts., and did not agree with our experience derived from continuous systematic work.

Naturally the Mount Morgan Company was guided by its manager's opinion and no contract has yet been made. There are, however, other mines than the Mount Morgan in Queensland, and from them we have bought, paid for and worked hundreds of tons of their concentrates and sludges (residues from pan amalgamation of concentrates). Some time ago a trial of lots of concentrates from several different mines was made of the MacArthur-Forrest process against pan amalgamation. In every case the difference was in our favor. In one case (lot from the Day Dawn P. C. G. M. Co.) there was some doubt about the accuracy of the figures, the trial was repeated and all figures carefully confirmed with the result that the Day Dawn P. C. G. M. Co. has now adopted the process under license and payment of royalty.

Referring to operations in America, the Gold and Silver Extraction, Mining and Milling Company of Denver are in a better position to give a correct statement of affairs than the "Deadwood papers," which in this matter at least "occupy a position of greater freedom and less responsibility."

Had the proprietors of the MacArthur-Forrest process ever committed themselves to the statement that it would work every ore, you and all sensible people would have classed them with the quack whose pills cure all diseases. What we do maintain is that it is of general application rather than limited—a good, sound, practical, commercial process, with advantages more and drawbacks less than other processes.

The following is a statement showing the work done by the process at the Crown Mine, New Zealand:

Statement of 263 tons 7 cwt. of Crown Mines ore treated at Karangahake by Cassel process:

	Gold.	Silver.
	oz.	oz.
263 tons 7 cwt. contained by assay.....	425	940
Recovered and sold to the bank.....	384	664
Percentage of recovery.....	90 1/4%	70 3/4%

The above ore was ground through a 30-mesh in place of 60, consequently 15% of the ore refused to pass a 60 mesh. Had the grinding been as required by the process, much better results would have been obtained.

	Per ton.
	£7 0s. 0d.
	£0 15s. 6d.
Contents of ore before treatment.....	£7 0s. 0d.
Balance not recovered.....	£0 15s. 6d.
Formerly a similar ore treated by battery treatment yielded bullion of the value of £2 per ton.	

GLASGOW, June 10, 1892.

JOHN S. MAC ARTHUR.

Faulting in Veins.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The reply made by Prof. John A. Church to my comments upon his first letter seems to me an evidence of movement in that gentleman's ideas. He now maintains that he has "not said anything like" the assertion "that as yet no evidence exists to prove the motion of one vein wall relatively to another." But the *ipsissima verba* of his first letter were as follows: "If anyone . . . can point to evidences which establish either conclusively or reasonably the fact of motion of one vein wall upon another, he will confer a greater benefit upon geology than any student of vein phenomena in the last thirty years can pride himself upon." Surely this is *something like* the assertion into which I translated his words, after taking the precaution to quote the words themselves.

Again, he now maintains that he has "not said anything like" the assertion "that ore veins do not as a rule occupy fault fissure." But the *ipsissima verba* of his first letter were as follows: "In surface geology, faulting is proved by the discovery that a given member of the strata is displaced vertically along a certain line compared to its position on the other side of the line. When we turn to veins we are met by the remarkable fact that as a rule faults of this kind are not marked by the presence

* The official reports of the Chamber of Mines, Johannesburg, gives the amount extracted by the cyanide process as 10,038 oz. gold, and by chlorination about 4,000 oz.—Ed. E. & M. J.]

of veins." Surely this is *something like* the assertion into which I translated his words after taking the precaution to quote the words themselves.

But there is no necessity for mining engineers to be less liberal than theologians. If Prof. Church tells me that he used certain words not in their literal common-sense meaning, but rather in some recondite signification apprehended most clearly by himself, though veiled from the rest of mankind, I may very properly accept his explanation. I therefore now understand him to admit that faults of dislocation *are*, as a rule, marked by the presence of veins, and that evidences *do* exist of the motion of one vein wall relatively to another.

Coming now to the more fruitful region of facts, and quitting the barren waste of mere words, I find that Prof. Church's reply confronts me with a doubt and a challenge. He doubts the existence of "horses that have presumably been formed by the relative vertical displacement of the walls of a vein of irregular dip"; and he challenges me to describe any case in the nature of a proof "that veins with irregular interlocked walls (for such veins exist) have faulted." And he expresses an opinion that if I can successfully answer him I shall "provide the makers of geological text-books with a new illustration."

First, as to the doubt. I refer Professor Church to a very eminent maker of geological text-books—to Professor Joseph Le Conte. At page 237 of third edition of that gentleman's "Elements of Geology" is the following passage: "Although more regular than other kinds, yet fissure veins are also often quite irregular, sometimes branching, sometimes narrowing or pitching out in some parts and widening in others, sometimes dividing and again coming together, and thus inclosing a portion of the wall rock. Such an inclosed mass of country rock in the midst of a vein is called a "horse." Many of these irregularities are probably the result of movements after the fissure was formed or even after it was filled.

Again, movements may reopen a fissure *after* it is filled. In such cases, if the adhesion of the filling to the wall is strong, portions of the wall rock are torn away; and, if a second filling takes place a "horse" is formed." I may also quote De la Beche's explanation of the term "horse." It is given in a foot note at page 663 of the American (1851) edition of his *Geological Observer*, and is as follows:

"This term is applied in many of our mining districts to large fragments in mineral veins, portions of the adjoining rocks, which from a complication of the fracture forming the main fissure become isolated and jammed in between its sides." Surely these quotations (and many more might be cited) are pretty good evidence that many mining engineers "have frequently noticed horses that have presumably been formed by the relative vertical displacement of the walls of a vein of irregular dip." I will no longer contend that *every* mining engineer has noticed such occurrences since Professor Church says he has "hunted anxiously" for them in vain.

Secondly, as to the challenge. De la Beche says (*op. cit.*, p. 657): "The geologist, when studying the contents of fissures in mining districts, . . . will have his attention arrested by the evidences of many main fissures having been moved more than once, while the new cracks thus produced have sometimes not only traversed any mineral deposits which may have been previously formed in the fissure, in its first state, but also the adjacent country." He cites the Wheal Julia lode, at Binner Downs, Cornwall, the veins at Pontgibaud, France, and a lode at Godolphin Bridge, Cornwall, as cases in point, and says (p. 659): "Examples of this kind, with considerable modification, could be readily multiplied to a great extent." At p. 659 he also remarks: "With respect to the movements producing these parallel arrangement of parts without much, if any, evidence of the previous mineral accumulations in the veins having been broken or disturbed, it will soon be found, while studying those fissures which are not simple cracks, but faults, that this may be produced by the mere slipping of the uneven sides of the fractures, with certain intervals of repose between each movement."

And at page 661 he writes: "When the fissures are more complicated, so that not only the different cavities have been subsequently filled by the introduction of mineral matter into those formed by the mere sliding at intervals of the rocks on one side, but fractures also traverse the substances variously accumulated in them, and are not confined to them, extending to the adjacent rocks on either side, even breaking the walls into fragments, and the whole is again cemented by mineral matter newly introduced, etc." These passages may, I think, be regarded as good evidence that faulting does occur in veins of irregular dip, especially when it is remembered that the mineral veins of Cornwall are always of irregular dip. Indeed, irregularity of dip is the rule rather than the exception in all parts of the world. And if by the use of the word "interlocking" Professor Church desires to limit the question to cases where an actual reversal of dip is observable, the remarks of De la Beche still apply.

I have preferred to base my rejoinder upon citations from recognized authorities, because Prof. Church uses language which implies that he is not aware of the existence of any generally received statements as to "horses" produced by "shearing off the projecting bosses" or as to the faulting of "veins with irregular interlocked walls." It is also more satisfactory to refer to widely known facts rather than to advance one's own personal observations. But if Prof. Church ask whether I have ever seen any cases in point, I reply that when I worked the Kelly Bray arsenic and copper mine near Callington in Cornwall I operated upon a lode which was irregular in dip, which was heaved by a cross-course, and which contained a horse of very great magnitude pinching out above and below and carrying a well marked vein-filling of ore and gangue on both sides.

Wheal Newton, at Harrowbarrow, Cornwall, is another instance. I happened to be the discoverer in that mine of the deposit of silver respecting which the late Professor Warrington Smyth read a very interesting paper at the Plymouth Meeting of the British Association. This deposit was found in an east and west lode of irregular dip to the south, which cut through and displaced an almost parallel arsenic lode dipping irregularly to the north. Both lodes were heaved by a cross-course having a north and south bearing and both lodes contained "horses."

Finally, I venture to suggest to Professor Church that he may usefully turn to Plate XII. appearing in the *Ores of North Carolina* published by the government of that State in 1888. It contains a section of the so-called east and west lodes of Silver Hill Mine, in Davidson County, and shows how "horses" may be formed by the faulting of a vein of irregular dip.

STEPHEN H. EMMENS.

YOUNGWOOD, Pa., June, 1892.

THE MINES AND MILLS IN PRIBRAM IN BOHEMIA.—V.

Written for the Engineering and Mining Journal by John W. Meier, M. E.

(Continued from page 5.)

Experiments on Washing Slimes.—A number of these have been very carefully made by the superintendents of concentration departments. In January, 1879, Mr. J. Habermann published a report *Oesterr. Zschr. für Berg und Huttenwesen*, 1879, No. 8) on two series of experiments made by him with the Salzburg percussion table; the Rittinger table and the hand buddle. He used the very fine slimes from the last settling basin of Adalberti Pochwerk.

The Salzburg table was 4 metres long, 1.58 metres wide and with a pitch of 2°.

The Rittinger double table was made of wrought iron beams, covered with marble plates, each being 2,529 metres long, 1,264 metres wide, with a pitch of 1½°. The hand buddle (*Kehrherd*) used in the first series was 5 metres long, 1.58 metres wide and had a pitch of 5°; in second series it was 6 metres long, 1.58 metres wide with 3° pitch. The clean concentrates and middlings were both sold to the smelter. The losses are figured on this basis. The following tables give the general results:

	Dry wt. slime, kilos.	Hours run.	Kilos. per hour.	Loss of Ag per cent.	Loss of lead, per cent.	Value in florins.	Expense of treatment, florins.
FIRST SERIES.							
Salzburg per c. table.	9,259	256	36	53.0	42.7	120.69	22.08
Rittinger table.....	9,227	894	10	69.5	47.3	72.60	58.85
Buddle (Kehrherd).....	9,185	1,018	9	69.9	51.5	102.25	16.96
SECOND SERIES.							
Salzburg table.....	8,932	426¼	21	55.6	55.6	80.83	21.31
Rittinger table.....	8,848	861¼	10	79.0	88.1	29.10	56.60
Buddle.....	8,826	1,735	5	63.1	70.1	82.82	(loss.) 40.46

Mr. Habermann makes comparisons as follows: The Salzburg treats from two to four times as much slime as any of the others, yields 38 to 53% more silver, and 25 to 73% more lead than the Rittingers, and 24 to 38% more silver and 15 to 34% more lead than the buddle, and in value of product surpasses the Rittinger by 46 to 63%, and the buddle by 15 to 34%. Expense of treatment by the Rittinger is about three times as great as that by the other tables (*i. e.*, first series). The verdict, therefore, was in favor of the Salzburg tables.

Mr. C. von Reytt's experiments (*Berg und Huttenmaennisches Jahrbuch*, Vol. XXII.) come to a somewhat different conclusion. The tables in the article mentioned give the results of 50 tests. For the purposes of this article it will be sufficient to give a limited number of these tests.

Slimes are divided at Pribram into *voesche mehle*, *milde mehle*, *sehr milde mehle* and *mildeste mehle*, which we may translate as coarse, medium, fine and finest slimes.

TABLE OF HAND BUDDLE, SALZBURG AND ROTARY TABLES.

	Dry weight, kilos.	Assays.			Total silver, kilos.	Total lead, kilos.	Loss of Ag, %.	Loss of Pb, %.	Profit of Treatment, florins.	Number of hours run.	Product per hour, kilos.
		Ag, ozs. per ton.	Pb, %.	Zn, %.							
<i>Coarse slimes</i> , Anna P. W. jig waste.....	9,060	15.16	3.5	6.7	4.711	317	.....	.....	.....	.....	.....
Treated on:											
(1) Salzburg table concentrates.....	521	72.23	32.7	11.0	1.205	170	72.5	46.3	98.37	48	208
<i>Medium slimes</i> , large catchpit, Anna P. W.....	3,900	19.54	5.2	.....	2.613	203	.....	.....	.....	.....	.....
Treated on:											
(2) Hand buddle, concentrates.....	138	81.66	40.25	7.9	0.3864	58	85.2	71.4	31.65	54¼	91
(3) Rotary table, headers.....	220	47.68	20.75	8.6	0.3597	46	86.2	77.3	22.52	64¼	77
Rotary table, middlings reworked.....	92	74.37	38.15	6.7	0.2346	35	.....	.....	15.91	14¼	21
Rotary table, total.....	.....	.....	.....	.....	0.5933	81	77.3	60.1	38.43	.....	.....
<i>Medium slimes</i> , same as last.....	3,910	20.41	5.5	.....	2.737	215	.....	.....	.....	.....	.....
Treated on:											
(4) Rotary table, 2 treatments.....	278	.....	.....	.....	0.6819	79	75.1	63.3	42.73	.....	.....
(5) Salzburg table, headers.....	188	76.12	30.0	11.0	0.4907	56	82.1	74.0	32.51	136	37
Salzburg table, middlings.....	73	65.04	27.25	7.6	0.1628	90	.....	.....	.....	.....	.....
Salzburg table, total.....	261	.....	.....	.....	0.6535	76	76.1	64.7	44.45	.....	.....
<i>Medium slimes</i> , same as last.....	3,895	18.08	5.4	.....	2.4149	210	.....	.....	.....	.....	.....
Treated on:											
(6) Hand buddle, headers.....	235	55.41	24.25	8.0	0.4465	57	81.5	73.0	32.77	54¼	91
Hand buddle, second treatment.....	55	50.16	22.0	8.5	0.0947	12	.....	.....	6.52	.....	.....
Hand buddle, total.....	.....	.....	.....	.....	0.5412	69	77.6	67.1	39.29	.....	.....
<i>Medium slimes</i> , 1st half catchpit at Thinnfeld.....	3,930	13.20	3.5	.....	1.8471	137	.....	.....	.....	.....	.....
Treated on:											
(7) Salzburg table, concentrates.....	89	55.12	21.0	17.0	0.1682	19	90.9	86.1	2.24	201	24
(8) Hand buddle, concentrates.....	147	58.33	22.5	9.0	0.2940	33	84.8	75.9	18.90	83¼	60
<i>Fine slimes</i> , from catchpit, Adalbert mill.....	3,515	11.66	3.4	.....	1.4060	119	.....	.....	.....	.....	.....
Treated on:											
(9) Hand buddle, concentrates.....	79	74.37	38.25	12.4	0.2014	30	85.7	74.8	13.43	57	88
(10) Rotary table, middlings reworked.....	264	.....	.....	.....	0.3609	44	74.3	63.0	14.41	76¼	65
(11) Salzburg table, with middlings reworked.....	143	.....	.....	.....	0.2508	34	82.2	71.4	7.24	.....	.....
<i>Finest slimes</i> , from 2d part Thinnfeld catchpit.....	3,725	13.59	3.0	.....	1.6767	112	.....	.....	.....	.....	.....
(12) Rotary table, lead slime and reworked middlings.....	47	46.95	18.8	10.5	0.0757	9	95.5	92.0	3.44	29¼	169
(13) Buddle, lead slimes.....	27	53.95	22.0	11.3	0.0499	6	97.0	94.6	1.54	49	102

In test No. 1 the weight of wet slimes was 10,000 kilos; in all the following tests it was 5,000 kilos. The first column of the table gives only the dry weights of charges or of concentrates. In test No. 1 clean concentrates were sold only; no middlings were reworked. In tests No. 2 and 3 the buddle shows better results on single treatment of slimes than the rotary table does. It is profitable, however, to rework middlings from the rotary table or the same table. In test 4 middlings were treated; that result is included. In test 5 middlings were treated on the hand buddle. In test 6 middlings were reworked on the hand buddle on the second treatment. In test 9 middlings were not reworked. In test 10 middlings were reworked on the rotary table, and that product is included. In test 11 middlings were reworked on buddle, and this product is included. In test 12 middlings were reworked on rotary table and product included. In test 3 the rotary table ran at slow speed (one revolution in 5¼ minutes), and worked seven litres of pulp per minute. In tests 4 and 12 the rotary table ran at high speed (one revolution in two minutes), and 19.2 litres per minute was worked with largely increased amount of sprinkling water. Middlings in both cases were rich enough for a second treatment.

The results tabulated show that with rich mediums, like those in tests 1 and 6, the best results will be obtained by the Salzburg tables, if followed by treatment of middlings on the buddle. It is not profitable to rework middlings on Salzburg tables. With low grade medium slimes, such as in tests 7 and 8, it is more profitable to work once on the buddle than on the Salzburg table. With fine slimes, as in tests 9, 10 and 11, the Salzburg gives the poorest results, and the buddle shows the greatest profit (considering that the slimes are treated but once). With the finest slimes, tests 12 and 13, which cannot be worked profitably on the Salzburg table, the buddle will still pay.

The rotary table at high speed, if concentrates be shoveled back once and reworked, will prove satisfactory (or if the double table be used), as its product is so large. At high speed its product will be double that obtained at slower speed, but in the latter case the zinc blende can be better separated. The concentrates of the buddle are especially low in zinc.

On the buddle the loss of silver is less and the profits are larger in most cases where medium slimes are treated than on the rotary table. A great deal depends, however, upon the skill of the workman, and the longer travel of grains of ore on the buddle gives more chance for successful separation. Too large a surface of the rotary table makes it too cumbersome, so the Linkenbach stationary table, where the sprinklers revolve, has its advantages. It is advisable to have one buddle in every mill, as it will enable the manager to test his tailings and middlings in a very short time, without waiting for assays, and it is also useful in treatment of middlings from percussion tables of all kinds.

From his fifty tests (of which above are a part) Mr. von Reytt draws the following general conclusions:

1. For coarse sands use the sand jig with bed of iron shot, pass the tailings through a very fine revolving screen, and treat the fine particles on the Salzburg table.
2. Finer sands should be treated on the sand jig, all middlings and tailings should go to the Salzburg table.
3. Coarse slimes can be satisfactorily treated on Rittingers, galena will be clean, but all middlings must be treated on the Salzburg tables.
4. Slimes less coarse than the last named, the Salzburg table is by far the best machine. Where ore is rich all middlings should be treated on the buddles.
5. For medium slimes, if rich, wash on Salzburg table with buddle treatment for the middlings; if low grade the use of buddle or even of the rotary table is advisable.
6. Fine and finest slimes are best treated on buddles, but if lower grade rotary will do fairly well.

(To be concluded.)

Transcaucasian Manganese.—About 40 versts (26 miles) from the station of Kvirily, on the Transcaucasian Railway, manganese ore was discovered some years ago in very large quantities and of a superior quality. In 1879, a representative of the firm of Krupp, of Essen, made the first attempt to work out the ore. The quantities of ore are stated to be very large, as the surface of the manganiferous lands is said to be no less than 84 square miles. The ground belongs to a great many proprietors, mostly peasants, and the extraction of the ore is carried on in a primitive way. The cost of the output varies from 60 cents to a dollar per ton; the proprietors get for their rights about 60 cents per ton; the carriage from the mountains and to the railway station varies from six to eight dollars per ton, and the railway carriage from Kvirily to Poti, inclusive of charges on board the ship, amounts to two dollars per ton. The price of the manganese ore on board the ship in Poti (Black Sea) can be taken at about nine to ten dollars per ton.

Coatings for the Preservation of Stone.—The following formulæ for metallic cements are given by M. Grimaud in *La Revue Pratique des Travaux Publics*: Oxide of zinc dissolved in a solution of the chloride has for a long time been used as a paint, and it serves as a base for the following cements: (1) Oxide of zinc, 20 kgs.; pulverized Lorraine cement stone, 20 kgs.; sandstone, 10 kgs. This cement must be tempered by a liquid composed of hydrochloric acid, 22° B, 10 litres; water, 5 litres; zinc, 3 kgs.; ammonium chloride, 0.5 kgs. (2) A cheaper cement can be obtained by mixing: oxide of zinc, 10 kgs.; pulverized Lorraine cement stone, 20 kgs.; sandstone, 5 kgs., and yellow ochre, 0.4 kg. This cement is tempered with the solution just given, diluted with 5 litres of water. For soft stone a cement is made of: oxide of zinc, 10 kgs.; Lorraine cement stone, 30 kgs.; sandstone, 10 kgs., and yellow ochre, 0.3 kg., or the following formula may be used: zinc white, 5 kgs.; plaster, 10 kgs.; Lorraine cement stone, 10 kgs., and yellow ochre, 0.5 kg. If an extremely strong cement is desired, it can be prepared of oxide of zinc, 10 kgs.; pulverized quartz, 15 kgs. For the three last mentioned cements, the liquid given above is used, only 10 litres of water are added instead of 5 litres. These cements can be applied with a brush as a paint. Colors give good results, the coating adheres perfectly to the stone and gives it the appearance of a newly cut surface, and at the same time forms a protecting cover against the inclemency of the weather. The stone should be well cleaned before applying the paint, and if necessary two or more coats can be given.

THE IRON ORES OF THE MARQUETTE DISTRICT.*

By C. E. Van Hise.

The ore deposits of the Marquette district occur in two distinct formations, the Upper and Lower Series, the latter being much the older and more important of the two. The portion of the lower formation containing the majority of the ore bodies consists of bands of nearly pure silica, alternating with bands composed chiefly of oxides of iron and sometimes bearing more or less silica. The alternating layers are generally not more than an inch in thickness. Near the top of the formation the silica is nearly all jasperized, and the jasperization decreases as we go down, until the silica is simply chert. It may generally be said that associated with many of the ore bodies we have either banded ore and chert or banded ore and jasper. Magnetite-actinolite schist is also associated with the ore; the iron is here mainly concentrated into layers. Iron carbonate is also an important constituent of the formation; it is most frequently found at places where the formation dips under a greenstone.

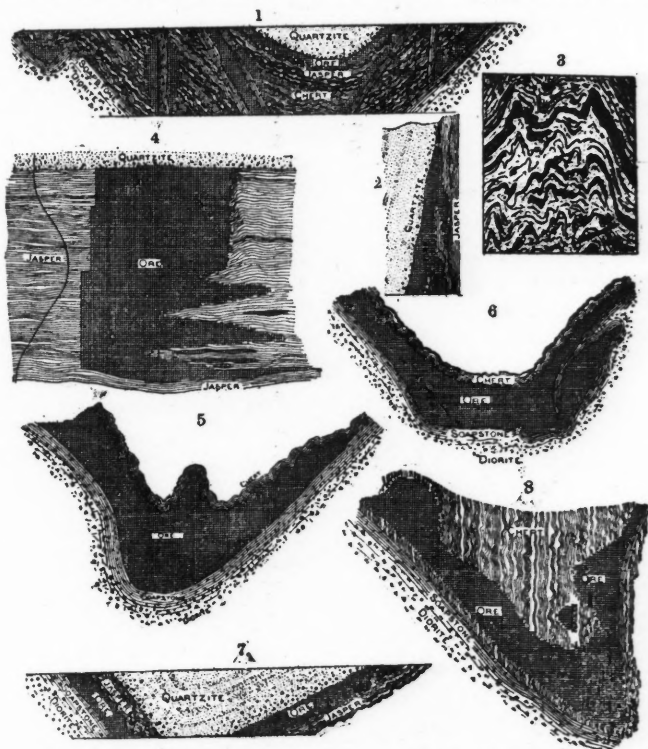
There are two associated formations which must be taken into account, viz., the overlying conglomerate and quartzite of the Upper Marquette series, and the eruptives. The eruptives were originally diabases, but have been much changed, and they occur in bosses and in dikes. In the northeast of the district there is a great deal of greenstone, which, where it comes up near the ore formation, is changed into laminated rock and called soap rock and paint rock. These soapstones are very soft and of a gray and white color, and they consist chiefly of a hydrated silicate of magnesia and alumina. The formation overlying the ore deposits belongs to the Upper Marquette series and consists of a quartzite conglomerate. The known ore-bodies, with reference to their position, may be divided into the following classes: (1)

the jasper, probably on account of the substitution of iron oxide for silica. The ore bodies between the ore formation and the overlying quartzite are not always wholly in the jasper, but they often extend upward to a greater or less degree into the quartzite conglomerate, and some deposits wholly occupy the horizon of the superimposed rocks.

Among the deposits resting upon soap-rock which grades into massive diorite are to be placed many of the deposits of soft ore and some of the hard ores. The masses of soap-rock may follow somewhat closely the lamination of the ore-formation or they may cut across it. In either case the deposit follows along the contact plane, the impervious soap-rock always being below the iron ore and above it the fractured and porous jasper or chert (see Fig. 1). Not infrequently a mass of soap-rock or diorite forms a synclinal trough in which the ore body rests, when the maximum thickness of the ore is likely to be at the lower part of the synclinal (Fig. 5). Sometimes a small dike of soap-rock or paint rock shoots off from the large body and cuts into the ore (Fig. 6). At other times the soap-rock bulges into the ore as though it had been bent into sharp corrugations.

In some cases the first and second classes of deposits approach close to each other and might be mistaken for one continuous deposit of the same character the two occupying opposite sides of a synclinal. This is shown by Fig. 7, which shows upon one side of the synclinal the following section: Diorite grading upward into soapstone, ore, jasper, quartzite-conglomerate. Upon the other side of the synclinal the section is: Jasper, ore and quartzite-conglomerate.

The deposits resting upon dikes of soap rock which follow along or cut across the ore-bearing formation, like those of the second class, are usually soft. They may occur upon one side only of a dike rock, or, when it is vertical or nearly so, upon both sides. When two dikes are not far distant from each other, the whole or part of the space between may be



SECTIONS OF IRON ORE DEPOSITS IN THE MARQUETTE DISTRICT.

deposits at the contact of the quartzite-conglomerate and the ore-bearing formation; (2) deposits resting upon soap rock which grades into massive diorite; (3) deposits resting upon dikes of soap rock which follow along or cut across the ore-bearing formation; (4) deposits interbedded in the jasper or chert. (See Fig. 1, a generalized section of ore-formation.)

The deposits at the contact of the quartzite-conglomerate and the ore-bearing formation are generally hard, and either specular or magnetic, and are sometimes called "specular jasper." One of the largest known deposits of the first class is that at Republic. While the main bodies of ore occur at the contact horizon, the mine maps show a constant tendency to form offshoots, a part of the ore following the banding of the jasper formation, which dips at a steeper inclination than the contact plane. (Fig. 2.) A body may continue in considerable force for some depth, but when it gets far from the contact plane it is apt to die out. At and below the place where the branch strikes off, the main deposit may become somewhat narrower, but in passing downward it often gains its full magnitude, and then a second shoot may start back from the contact plane into the underlying jasper.

Fig. 1 is of course a generalization; as a matter of fact the deposits occur at places along the contact, where sharp subordinate folding has occurred, or where the jasper formation is broken by cross joints, or where a soapstone dike cuts the contact plane, forming a trough, or by a combination of two or more of these phenomena. The last is shown well in the southeast corner of the great Republic deposit, where the curve is abrupt, causing the jasper formation to become sharply plicated and often fractured (Fig. 3), or where there are numerous dikes of soap rock, which usually form one of the boundaries of the ore deposits. The ore deposits do not last long when separated from the soapstone. Upon the east side of the Republic deposit the ore bodies are in chimney-like forms, which often continue for a considerable depth, and which are often rather sharply separated from the banded ore and jasper adjacent (Fig. 4). Though the ore often terminates abruptly, it also frequently grades into

occupied by ore. When a dike is alone and has a flat dip the ore is always on the upper side, that is, in such cases the dike rock is always the foot-wall of the deposit (see Fig. 1). A dike carrying ore may unite with a large mass of soapstone varying to diorite, which also carries ore; then a trough will be formed and the deposit is here apt to become large. In this case we have a union of the second and third classes of deposits. At the locality shown in Fig. 8 the soap-rock grades into diorite and dips south about 45°, constituting the main foot-wall. Standing vertical and striking 20° or 30° away from the foot-wall is a dike of paint-rock or soap-rock cutting across the formation. Resting upon both are ore-deposits, and by their union at the apex of a trough formed by the junction of the two the ore-body is of large size.

No deposits interbedded in the jasper or chert of large size are known; for unless there is soap rock below (when it would fall into a previous class) no impervious stratum is present upon which the ore can collect, unless (and this does not often occur) a layer of the ore-bearing formation itself locally loses porosity.

The ore-bodies that lie wholly within the ore-bearing formation are usually soft, and they may occur at almost any horizon within the iron-bearing formation. Being for the most part at some distance from the contact between the quartzite-conglomerate and ore formation they are commonly within the ferruginous chert rather than in the banded ore and jasper. The ore deposits in longitudinal sections are not horizontal, but generally have a pitch, which in the Ishpeming-Negaunee area is usually to the west and often amounts to as much as 20° or 30°.

The forms, attitudes and relations of the ore deposits render it evident that they are not eruptives. No eruptive would be found in such strange shapes and relations. It is equally certain that these irregular masses of ore are not produced directly by sedimentation. All the facts bear toward the conclusion that the ore is a secondary concentration produced by the action of downward percolating water. When the facts are examined in detail, it is seen that the ore deposits occur at places where circulating waters are sure to be concentrated.

* Abstract of a paper in the *American Journal of Science*.

STATISTICS OF SOUTHERN INDUSTRIAL PROGRESS.—I.

Written for the Engineering and Mining Journal by Prof. Wm. B. Phillips.

The expression "Southern States" must, for the purposes of this series of papers, be considered purely technical, relating to the slave holding States of 1800 to 1860. The following are therefore to be included: Alabama, area, 52,250 sq. miles; Arkansas, 53,850; Florida, 58,680; Georgia, 59,475; Kentucky, 40,400; Louisiana, 48,720; Maryland, 12,210; Mississippi, 46,810; North Carolina, 52,250; South Carolina, 30,570; Tennessee, 42,050; Texas, 265,780; Virginia, 42,450; West Virginia, 24,780; total, 830,275.

West Virginia does not occupy a separate column in the census until

to the winds and the last scattered streamers were hastened in their flight by the shouts of those who hailed the New South arising from the ruins of the Old.

I speak as one who loves the land of his nativity and who would gladly see it outstrip all competitors when I say that under the old régime the history of the last 20 years could never have been written. We were driving in the race of nations with harness as old as the days of Abraham, it was patched and mended in scores of places until the original texture was all but lost. Something had to give way. The strain was too great. What really happened was that the whole thing gave way all at once like the "One-Hoss Shay," and we found ourselves forced to buy a new set or quit. We have the harness now.

In rightly apprehending the changes that have taken place in the South

TABLE I. SHOWING POPULATION OF THE SOUTHERN STATES FROM 1790 TO 1890, INCLUSIVE.

	1790.	1800.	1810.	1820.	1830.	1840.	1850.	1860.	1870.	1880.	1890.	Percentage of increase from 1860 to 1890.	Area square miles.
Alabama.....	Admitted to the Union.....	1819		127,901	309,527	590,756	771,623	964,201	996,992	1,262,505	1,508,073	56.50	51,540
Arkansas.....	" " " " " " " "	1826		14,273	30,388	97,574	209,897	435,450	484,471	802,525	1,125,385	158.50	53,045
Florida.....	" " " " " " " "	1845		.....	34,730	87,445	140,424	187,748	269,493	390,435	178.25	54,240	
Georgia.....	82,548	162,101	222,433	340,987	516,823	691,392	906,185	1,057,286	1,184,109	1,542,180	1,834,365	73.00	58,980
Kentucky.....	73,077	220,955	406,511	564,317	687,917	779,828	982,605	1,155,684	1,321,011	1,648,680	1,854,436	66.66	40,000
Louisiana.....	Admitted to Union 1812	76,556		153,407	215,739	352,411	517,762	628,779	726,915	939,946	1,116,828	77.52	45,420
Maryland.....	319,728	341,728	380,546	407,350	447,040	470,019	583,034	687,049	780,894	934,943	1,040,431	51.55	9,860
Mississippi.....	Admt'd 1817	8,850		40,352	75,448	136,621	375,651	771,623	964,201	1,262,505	1,508,073	55.55	46,340
North Carolina.....	393,751	478,103	555,500	638,829	737,987	753,419	869,039	992,622	1,071,361	1,399,750	1,617,340	62.90	48,580
South Carolina.....	249,073	315,591	415,115	502,741	581,185	594,398	668,507	703,708	705,606	995,677	1,147,161	61.73	41,750
Tennessee.....	35,791	105,602	261,727	422,813	681,904	829,210	1,002,717	1,109,801	1,258,520	1,542,359	1,793,723	270.00	262,290
Texas.....	Admitted to the Union.....	1845		.....	.....	.....	212,592	604,215	818,579	1,501,749	2,232,220	51.02	40,125
Virginia.....	748,308	880,200	974,622	1,065,379	1,211,405	1,239,797	1,421,661	1,596,318	1,225,163	1,512,565	1,648,911*	.....	24,645
West Virginia.....	Admitted to the Union.....	1863		.....	.....	.....	.....	.....	442,014	618,457	760,448	.....	.....
Aggregate.....	1,902,276	2,542,950	3,363,362	4,313,643	5,591,266	6,828,932	8,839,393	10,866,342	12,285,571	16,192,336	19,255,644	77.52	.....
The U. States Percentage in Southern States	3,929,827	5,305,925	7,239,814	9,638,131	12,866,020	17,069,453	23,191,876	31,443,321	38,558,371	50,155,793	62,622,250	99.11	.....
	48.54	47.84	46.51	44.82	43.48	40.16	38.17	34.48	24.33	32.36	30.87	.....	.....

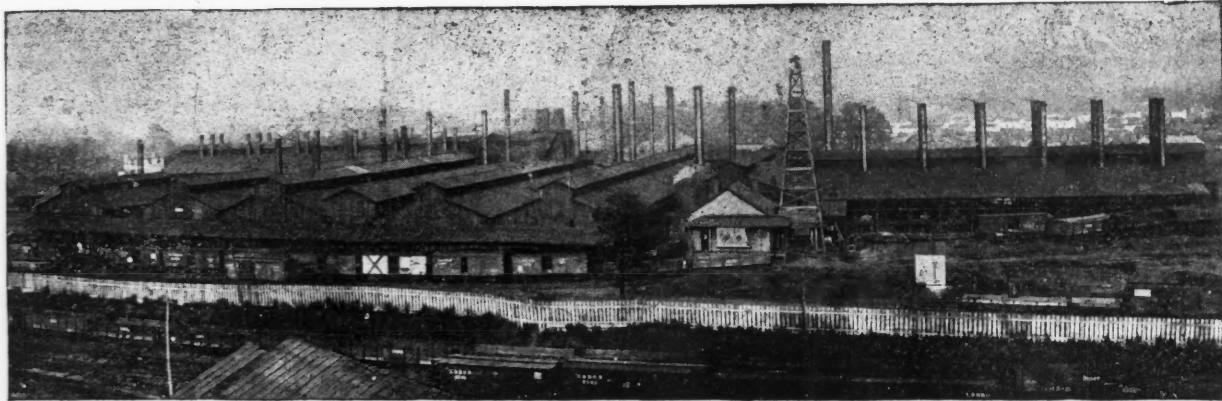
*Including West Virginia.

1870, as it was cut off from Virginia in 1863, *i. e.*, between the eighth and ninth census. The total area of these states is 830,275 sq. miles, or 27.47% of the area of the United States, a territory larger than the British Isles, France, Spain, Portugal, Belgium, the Netherlands, Denmark, Germany and Switzerland.

The first European colony was planted on the shores of North Carolina about the year 1584, and the first child born of European parents in this country was a Southerner, Virginia Dare, born on Roanoke Island, in

mind that she came out of the Civil War completely prostrated. The new structure has in very truth arisen from the ashes of the old.

It will be seen from Table I. that in 1860 the Southern States contained 34.48% of the entire population of the United States, while in 1870 this had sunk to 24.33%. The impetus acquired in manufacturing was also in great measure abated, for in 1850 these States had 15.38% of the total capital invested, in 1860 13.83%, and in 1870 8.33%. Tables II., III., IV. and V set forth the condition of the Southern States as regards manufactures in



BIRMINGHAM ROLLING MILL.

Pamlico Sound, about 1585. Forty years before this De Soto had penetrated into the northern part of Georgia, going as far as the present town of Rome, and sending two of his men, Villabos and Silvera, into what is now De Kalb County, Alabama, on the first prospecting trip for minerals ever undertaken on the American continent by any European. The interest in the mineral wealth of the Southern States, upon which their present wonderful progress is based, extends from De Soto to De Bardeleben, from 1540 to 1892. What other portion of the country can say the same?

This magnificent domain is watered by more than 75 navigable streams, including such thoroughfares as the Mississippi, the Cumberland, the Tennessee, Ohio, Potomac, Red River, Rio Grande, James, Roanoke, Great Pedee, Santee, Savannah, Indian River, Chattahoochee, Alabama, Coosa, Tombigbee and a score or more of others, which, while not so large, yet drain extensive and fertile regions.

It is intersected by 42,989 miles of railway, supplying many of the agricultural and mineral belts with means of rapid transportation.

It is inhabited by 19,255,644 people, and the total value of its manufactures in 1880 was \$445,472,461.

It has not always been thus with the South. Her real progress dates from 1870, when, after recovering in a measure from the "rude shock of arms" and realizing that the old order of things had vanished at Appomattox, she betook herself to the glad task of building up the waste places, erecting a school house in place of the negro quarters and a blast furnace in place of a Catalan forge.

The dark cloud of slavery that had rested with almost paralyzing intensity upon all material development, overshadowing alike the bound and the free, obscuring public policy and private interest, had been blown since 1890, the beginning of the new order of things, it must be borne in

TABLE II.

SHOWING THE CONDITION OF THE SOUTHERN STATES AS REGARDS MANUFACTURES SEVENTH CENSUS, 1850.

1850.	No. of establishments.	Capital.	Value of products.	Hands employed.		
				Male.	Female.	Total.
Alabama.....	1,026	\$3,450,606	\$4,528,876	4,397	539	4,936
Arkansas.....	261	305,015	537,908	812	30	842
Florida.....	103	547,000	668,335	876	115	991
Georgia.....	1,522	5,456,483	7,062,075	6,650	1,718	7,368
Kentucky.....	3,699	11,810,462	21,710,212	19,576	1,900	21,476
Louisiana.....	1,008	5,032,424	6,779,417	5,458	759	6,217
Maryland.....	3,725	14,934,150	33,043,892	22,729	7,483	30,212
Mississippi.....	947	1,815,820	2,912,068	3,046	103	3,154
North Carolina.....	2,663	7,456,860	9,111,050	12,473	2,128	14,601
South Carolina.....	1,430	6,053,265	7,045,477	5,992	1,074	6,066
Tennessee.....	2,887	6,527,729	9,725,608	11,080	959	12,039
Texas.....	309	539,290	1,168,538	1,012	24	1,036
Virginia.....	4,740	18,109,143	29,602,507	25,790	3,320	29,110
Aggregate ...	24,230	\$82,038,607	\$134,915,653	119,921	20,157	138,070
The United States	123,025	\$533,245,351	\$1,019,106,616	731,137	225,922	957,059
Percentage in Southern States	19.68	15.38	13.24	16.40	9.00	14.30

There is an error in this table, for if the total number of male hands in the Southern States be added to the total number of female hands the result is 140,078 instead of 138,070.

TABLE III.

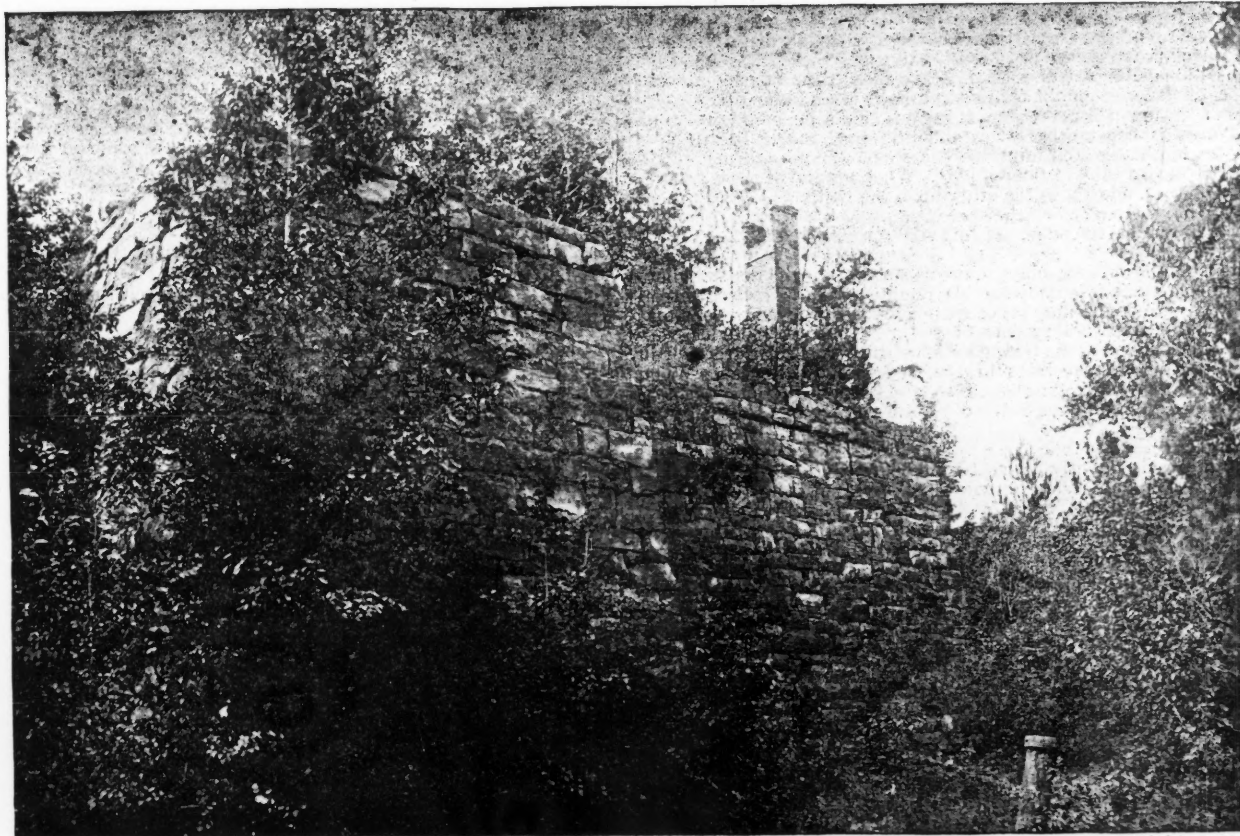
SHOWING THE CONDITION OF THE SOUTHERN STATES AS REGARDS MANUFACTURES, EIGHTH CENSUS, 1860.

1860.	No. of establishments.	Capital invested.	Annual value of product.	Hands employed.		
				Male.	Female.	Total.
Alabama.....	1,459	\$9,098,181	\$10,588,571	6,792	1,097	7,889
Arkansas.....	518	1,316,610	2,880,578	1,631	46	1,677
Florida.....	185	1,874,125	2,447,969	2,297	157	2,454
Georgia.....	1,890	10,390,375	16,925,564	9,511	2,064	11,575
Kentucky.....	3,450	20,256,579	37,931,240	19,587	1,671	21,258
Louisiana.....	1,744	7,151,172	15,587,473	7,873	916	8,789
Maryland.....	3,083	23,494,007	41,735,157	21,930	6,773	28,703
Mississippi.....	976	4,384,492	6,590,687	4,583	192	4,775
North Carolina.....	3,689	9,693,703	16,678,698	12,106	2,111	14,217
South Carolina.....	1,230	6,931,756	8,619,195	6,066	898	6,964
Tennessee.....	2,572	14,426,261	17,987,225	11,582	946	12,528
Texas.....	983	3,272,450	6,577,202	3,338	111	3,449
Virginia.....	5,385	26,935,560	50,652,124	32,606	3,568	36,174
West Virginia.....	No statistics as a separate territory until ninth census.					
Aggregate.....	27,164	\$139,725,771	\$235,201,703	140,102	20,550	160,652
The United States	140,433	\$1,009,855,715	\$1,885,861,676	1,040,349	270,897	1,311,146
Pr'age in S.States	19'32	13'83	12'47	13'48	7'57	12'25

TABLE V.

SHOWING THE CONDITION OF THE SOUTHERN STATES AS REGARDS MANUFACTURES TENTH CENSUS, 1880.

1880.	No. of establishments.	Capital.	Value of products.	Hands employed.			
				Male.	Female.	Youth.	Total.
Alabama.....	2,070	\$9,668,008	\$13,565,504	8,368	842	809	10,019
Arkansas.....	1,202	2,968,130	6,756,159	4,307	90	160	4,557
Florida.....	428	3,210,680	5,546,448	4,594	558	382	5,524
Georgia.....	3,593	20,472,410	36,440,948	18,937	3,619	2,319	24,875
Kentucky.....	5,328	46,813,039	75,483,377	30,949	3,629	2,913	37,591
Louisiana.....	1,553	11,482,408	24,205,183	10,171	1,335	661	12,167
Maryland.....	6,787	58,742,384	106,780,563	46,696	21,700	6,547	74,945
Mississippi.....	1,479	4,727,600	7,518,302	4,887	413	527	5,827
North Carolina.....	3,802	13,045,639	20,096,037	12,818	2,939	2,352	18,109
South Carolina.....	2,078	11,205,894	16,738,008	13,687	1,023	1,118	15,828
Tennessee.....	4,326	20,092,845	37,074,888	19,575	1,196	1,674	22,445
Texas.....	2,996	9,245,561	20,719,928	11,645	116	398	12,159
Virginia.....	5,710	26,968,990	51,780,992	28,779	6,144	5,261	40,184
West Virginia.....	2,375	13,883,390	22,867,126	12,900	346	1,065	14,311
Aggregate.....	43,725	\$251,692,038	\$445,472,461	228,285	43,850	26,186	298,321
The United States	253,852	2,790,372,606	5,369,579,191	2,019,035	531,669	181,921	2,732,625
Pr'age in S.States	17'10	9'01	8'00	11'31	8'26	14'41	10'91



RUINS OF IRON FURNACE DESTROYED DURING THE WAR.

TABLE IV.

SHOWING THE CONDITION OF THE SOUTHERN STATES AS REGARDS MANUFACTURES NINTH CENSUS, 1870.

1870.	No. of establishments.	Capital.	Value of products.	Hands employed.			
				Male.	Female.	Youth.	Total.
Alabama.....	2,188	\$5,714,032	\$13,040,644	7,196	664	388	8,248
Arkansas.....	1,079	1,782,913	4,629,234	3,077	47	82	3,206
Florida.....	659	1,679,930	4,685,403	2,670	20	59	2,749
Georgia.....	3,836	13,930,125	31,196,115	15,078	1,498	1,295	17,871
Kentucky.....	5,390	29,277,809	54,625,909	27,687	1,159	1,790	30,636
Louisiana.....	2,557	18,313,974	24,161,905	23,637	4,210	2,224	30,071
Maryland.....	5,812	36,438,729	76,593,613	34,061	8,278	2,521	44,860
Mississippi.....	1,731	4,501,714	8,154,758	5,500	191	250	5,941
North Carolina.....	3,642	8,140,573	19,021,327	11,339	1,422	861	13,622
South Carolina.....	1,584	5,400,418	9,858,981	7,099	578	464	8,141
Tennessee.....	5,317	15,595,295	34,962,636	17,663	1,089	660	19,412
Texas.....	2,399	5,284,110	11,517,302	7,450	157	3'0	7,927
Virginia.....	5,933	18,455,400	38,364,322	22,175	2,259	2,540	26,974
West Virginia.....	2,444	11,084,520	24,102,201	10,728	287	657	11,672
Aggregate.....	44,571	\$175,599,442	\$354,314,250	195,330	21,859	14,111	231,330
The United States	252,148	2,118,208,769	4,232,325,442	1,615,596	323,770	114,625	2,053,996
Pr'age in S.States	17'78	8'33	8'40	12'09	6'66	12'31	11'26

the seventh, eighth, ninth and tenth census. The complete returns for the last census, 1890, are not yet ready for distribution.

The business of manufacturing has never had from the South the attention it deserves and should have had, but even in this respect the position attained in 1850 and 1860 was undermined by the fierce struggle that swept the country into ruin. In 1850, with a population 38.17% of the whole, she had 19.68% of the total number of establishments, employing

15.38% of the capital, and producing 13.24% of the value. In 1880 she had 17.10% of the number of establishments, employing 9.01% of the capital, and producing 8.00% of the total value, her percentage of the population being at the same time 32.36.

Whether or no the Southern States under the prevailing conditions of a large slave population and the tendency toward purely agricultural pursuits which such population engenders would have continued to advance their manufacturing interests if the war had not intervened, can not be known, but judging from the census of 1850 and 1860 it does not seem that they would. In 1850 they were in a better condition as regards manufacturing than in 1860, for in this latter year with a population 34.48% of the whole they had 19.32% of the number of establishments, 13.83% of the capital invested, and produced 12.47% of the total value, a distinct falling off from the returns of 1850.

The war will account for many things, but it will not account for every thing, and we have to seek further for the cause of the loss between 1850 and 1860, a task beyond the scope of this paper.

The South was comparatively well supplied with railroads in 1860, containing 9,921 miles out of a total of 30,626, or 32.46%. As regards percentage of the total mileage it was better supplied in 1860 than at any time since, for in 1870 it contained 25.07, in 1880, 20.97, and in 1890, 25.85%, the total mileage in this last year being 166,817.41 for the United States.

(To be concluded.)

Mexican Coinage.—For the first half of the fiscal year 1891-92, which is from July 1st to December 31st, 1891, there was coined in Mexico, \$12,258,333 in silver pesos, \$194,314 in silver 10 cent pieces and \$74,387.20 in silver 5 cent pieces, or a total of \$12,526,984.20 in silver. In gold there was coined \$143,020 in 20 dollar pieces, \$13,210 in 10 dollar pieces, and \$950 in 5 dollar pieces, a total of \$163,180. Copper cents were coined to the extent of \$63,887.86, making a total coinage of \$12,754,062.06.

GEOLOGY AND METALLURGY OF THE NEW CALEDONIAN NICKEL ORES.*

By David Levat.†

Nickel is found in New Caledonia as a double hydrated silicate of nickel and magnesia (Garnierite). This silicate is not a product of secondary decomposition, for neither sulphur nor arsenic are found even in the deepest levels of the mine.

It is found as a coating or as striated concretions in the fissures in serpentine, and the mode of its occurrence clearly indicates that it was deposited from aqueous solution, in the same state in which it is now found.

Mr. Pelatan, who is now publishing the "Geology of New Caledonia" found coleopters inclosed in crystals of the green silicate. The nickel silicate, although found in the serpentine which covers nearly the half of the island, and especially predominates in the south, is not disseminated throughout it, but always occurs near or at the contact of the serpentine and red clay (*vasques*) and never in the clay itself. The nature of the *vasques* is the most curious phenomenon of the New Caledonian geology, not alone from their extent, but their importance from the miner's standpoint.

These clays are the product of the hot aqueous decomposition of the serpentine, and their analysis shows that they contain all its constituents, together with Fe, Co., Mn., Ca., etc. Numerous fissures striking northeast, southwest, at right angles to the general direction of the island, have given passage to the metalliferous solutions which were primitively ferruginous and manganiferous. These waters, in traversing the underlying schists, were charged with clay, then chemically acting upon the serpentine, produced fissures or cavities in which the suspended matters are deposited. The sides of these cavities are covered with half dissolved rocks sunken in the clay, which the prospectors call *sugar rock*.

The crystalline diallage, being less attacked than the rest of the rock, forms a sort of skeleton sought for by the miners as an indication of ore. The layers of sediment form strata of various colors depending upon its nature. Cobalt is constantly associated with manganese. In all, however, iron predominates and immense masses of limonite formed of cemented grains crown the overflow of clay. When several of these fissures are near each other, one above the other upon the flank of the hill, there can be seen from the sea, when they are large, a series of spots, black in the center and red at the edge, ranging like stairs, which forms a most characteristic profile.

Chromite is found in these clays, more especially in the South, where the serpentine contains it in considerable quantity. It is called alluvial chromite by the miners because it occurs in rounded and worn grains, but it is not alluvial in the ordinary sense of the word, being a mere local enrichment of the clay. At the Gasconne Mine the serpentines are rich in chromite, occurring in true veins in the undecomposed rocks. When these veins are explored, they are seen to break suddenly off at the contact line of the clay, and pieces of the chromite are found stratified with it at some metres below.

The cobalt conversely is found only in the clay, always associated with manganese and was evidently brought from below in hot solution. The disappearance of the clay is accompanied by the loss of all traces of cobalt. It occurs only as in hydrated oxide, and is free from arsenic and sulphur.

The presence of nickel depended upon a subsequent order of phenomenon; after the production of cavities by the cobaltiferous waters, the shrinking of the clays produced fissures and cracks between the intact face of serpentine and the clay. It was at this point that the nickeliferous waters entered along certain lines to-day clearly established. Not being able to penetrate the clay, and finding a natural passage along the walls of the cavities, the hydrated double silicate was deposited as a *stockwerk* in the cracks, forming, sometimes, a sort of breccia. The mineral is found both on the hanging and foot-wall of the fissures, but more abundantly on the hanging wall, demonstrating that the mechanical destruction of the walls has been the principal factor in the enrichment of the deposit. There is no nickel in the clay itself. Where the nickeliferous water moved for a long time between the wall and clay, fine striæ are found upon the clay.

Method of Working the Deposits.—Underground workings can only be advantageously employed in extracting ore from the hard, unaltered serpentine, the stockwerk deposits being best quarried; for by working *en galerie* false hanging walls deceive the miner. The deposits being situated on or near the summit of hills varying from 300 to 600 metres high, it is easy, by means of providently prepared works, to work a large number of them as quarries during several years.

The work is commenced by removing the red clay, whose admixture with the ore entails serious consequences, for the grains of iron are with great difficulty separated by washing, and consequently appear in the matte produced. Moreover, the clay being very aluminous, renders the silicious ore still more refractory. In order to make a place to dump the clay the mine must be worked in terraces, which, taken in connection with the heavy spring and fall rains, and the difficulty of procuring good workmen, renders the work very expensive at times.

This, says M. Levat, is the most important question in the proper development of the mines.

Sorting and Washing.—After a sorting at the quarry itself, the ore is divided into two classes, viz., *rich*, containing 8% and above of nickel, and *poor*, containing less than that limit. The ore is then carried to the plain below to be washed. The washing is simple, removing only the red clay; if the materials are carried too far, the tailings may contain 4% of nickel. The nickel silicate has the same specific gravity as the serpentine, and lower than that of the iron carried by the clay.

At present no way has been devised for concentrating these ores, and the ore rejected at the quarry, which is considerable in quantity, is of no value, although it contains 3% to 4% of metal. The concentrated ore is transported to the plains below by means of cables.

Metallurgy.—The metallurgical treatment of the New Caledonian nickel ore has undergone many changes before arriving at its present state. It was a new mineral and required new methods of treatment. Garnier's first idea was to fashion its treatment after that of iron, that is to say, by treating it in a blast furnace to obtain a product of crude nickel, which could then be refined. This method was only partially successful; pig

nickel was obtained, rich in metal, but the difficulty in refining it was so great that the method was abandoned.

The method of fusing for matte was then tried, but the high price of fuel and inefficiency of convict labor caused this, too, to be abandoned. At present the ore is smelted in England in water-jacketed furnaces of 25 to 30 tons capacity, salt cake being used as the sulphurizing flux.

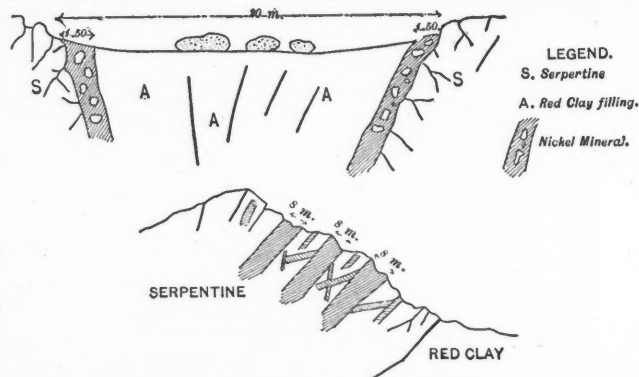
The matte obtained averages 50 to 55% Ni, 25 to 30% Fe., and 16 to 18% S. It contains neither copper nor arsenic.

Refining—Separation of the Iron.—The iron is removed by oxidation in either a reverberatory furnace or in a modified Bessemer converter (Manhe's system) the former being used in England, the latter in France and Germany.

Refining in a Reverberatory Furnace.—Two fusions are necessary, and each consists of two operations, viz., roasting to oxidize the iron, and scorification with quartz. Two tons of matte are treated per twenty-four hours, two tons of coal being used. During the scorification frequent samples are taken in order to arrest the operation as soon as the iron is slagged off, so that nickel may not escape. The slag in any case generally contains from 2 to 2.5% of nickel, and it is added to the first fusion of a second lot as a flux. At the end of the first fusion, the matte contains 2.5 to 3% Fe, at the end of the second, 0.5 to 0.75 Fe. The refined matte should contain at least 16% S. in order that it may be easily pulverized.

Refining in a Bessemer Converter.—The matte is melted in a cupola from which it is run into a converter of a ton capacity and blown with a pressure of about 7.8 lbs. The temperature rises greatly, and silica is then thrown in to scorchify the Fe_2O_3 . If the matte does not contain more than 36% of Fe, the Fe can be totally removed in 1.20 hours. If this amount of iron is exceeded, the bath is skimmed at the end of 25 minutes, and more flux is added, for if the volume of slag becomes too great, the matte refines badly. After a last skimming and when the Ni commences to oxidize, the metal is poured. It contains 0.5% Fe, arsenic, antimony and silver have passed into the slag. The slag contains from 14 to 15% Ni, this richness being caused by granules of nickel being forced into the pasty slag by the boiling of the blast. A part of this nickel is recovered by pouring the slag into pots, the matte settling out, but in any case the slag is also returned to the cupola. Cobalt remains with the nickel.

It would seem feasible to follow the oxidation of the Fe by the oxida-



CROSS SECTIONS OF NICKEL DEPOSITS.

tion of the sulphur, and so produce refined nickel in one operation, but numerous attempts have demonstrated the impossibility of this operation. The nickel oxidizes at the same time as the sulphur; in fact, more easily, and it would appear that a continuous blast only enriches the matte in sulphur. On the other hand, when the iron passes into the slag, the temperature becomes lower, and the combustion of the S, in connection with its affinity for the Ni, does not suffice to balance the cooling produced by the introduction of air. The bath tends to freeze, and this takes place the more readily, considering that the metal, being neither alloyed with carbon or copper, has a higher melting point. The resulting matte contains: Ni (or Ni and Cu), 75.00; S, 24.00; Fe, 0.50; impurities, 0.50.

Roasting the Refined Matte.—The pulverized and sifted matte is charged upon the sole of a large roasting furnace 10 metres long, 2.5 metres wide, and having four doors. These doors, which are all on the same side, enable the workmen to spread the matte to a uniform depth (5 centimetres) and to gradually push it toward the fire; 600 kilogrammes are charged at a time, and the roasting lasts eight hours; when Cu-Ni matte is treated, the operation lasts but six hours. The temperature must be maintained at a dull red until near the end, when it is pushed to a bright red. The result is a mixture of oxide, sulphate and sulphide, the last two being in small proportion, as not over 1% of S should be left. The roasted matte is again pulverized and passed through a finer sieve. The furnace used is broader and shorter than the first; 500 kilos are charged per six hours. The temperature is maintained throughout at a bright red, three tons of coal being used per 24 hours. The resulting oxide is of a grayish green color if pure, black if mixed with Cu. This oxide is a merchantable article, being used by certain makers of alloys. It should not contain over 0.004% S.

Reduction of the Oxide.—This is done in a closed vessel to avoid contact with a sulphurizing gas, and wood charcoal is employed to further insure the purity of the reduced metal.

Molding and Drying the Oxide.—The oxide before reduction is molded and dried in the form in which it is to be delivered to commerce. For some years the nickel has been sold in the form of cubes, 12 to 15 centimetres square, obtained by cutting cakes made by mixing the oxide with water and farina or some similar organic substance. The latter is added to aid the interior reduction, and at the same time leave a little carbon in the metal. In the United States shot is preferred; in France, circular pieces 5 centimetres in diameter, and 15 millimetres thick, and in China, ingots.

Reduction in Crucibles.—Until recently the reduction was made in crucibles containing 50 to 60 kilos of oxide, mixed and covered with fine wood charcoal. The firing is done either in a furnace constructed with niches, or in an ordinary reverberatory furnace. In either case, but a small portion of the heat of the hearth is utilized, and the wear and

* Abstract from Annales de Mines, 2nde Livraison, 1892.

† Formerly director of Le Nickel Co.

tear of the crucibles subjected to constant changes of temperature render the process quite expensive. A crucible does not last longer than five or six operations. Moreover, the heat not being the same throughout the furnace the oxide is unequally reduced.

Reduction in Muffles.—The furnace used is 3.5 metres long and 1.8 metres wide and is open on the two small sides. It is heated by gas, which must pass around it, in order to escape into the chimney.

The closing doors are cased with refractory brick and provided with counter-weights. The iron cylinders containing the oxide enter at the coldest side and are gradually pushed forward to the exit or hottest side, thereby insuring equal heating. Twenty-four hours are consumed in the operation. This process suffices to reduce the oxides of Ni and Cu, and even for pure nickel oxide the reduction is perfect, but the reduced oxide must be heated for four hours at a temperature of 1,100 to 1,200° in order that it may slightly melt and take the consistence and appearance of a metal. Above all it is necessary to reach the beginning of the softening of the nickel. As the required temperature cannot be obtained in the muffle it is necessary to finish the operation in crucibles.

Reduction in Regenerative Gas Furnace.—A marked improvement results from the use of this class of furnace.

A series of refractory cylindrical retorts, closed at either end by movable refractory plugs, occupy the chambers of the furnace, the whole being similar to the Belgian zinc furnace.

The furnace is mounted upon a framework inclosing the regenerating chambers. In a furnace of 22 retorts 1,500 kilogrammes of Ni, or 3,000 kilogrammes of nickel-copper alloys can be reduced per 24 hours. The charge is from 750 to 800 kilos, and is left 10 hours in the first row and 5 hours in the second. Two tons of coal are consumed per 24 hours.

The nickel is either discharged into closed vessels or left to cool in the air. When cool the charcoal dust is separated by sifting from the cubes and grains of nickel and then passed over a magnetic separator, which takes out any fragments of nickel broken from the cubes.

Polishing.—This is the final operation. The cubes are placed in a slowly revolving cast iron drum furnished with interior projections. The cubes or grains in rolling and striking one another quickly become highly polished. Shipments are made in barrels containing 100 kilos.

THE LAKE CHAMPLAIN MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

(Conclusion.)

The excursion on Thursday occupied the whole day. At Lyon Mountain one of the iron mines was visited by some of the party, but the majority spent the time inspecting the operation of a large separating plant. The ore is washed by jaw crushers and rolls and concentrated by jigs. The plant is apparently in very successful operation, holding its own with the magnetic operators. Nearly two hours were spent at the Hotel Ampersand, which is most beautifully located in Saranac Lake, 74 miles west of Plattsburgh.

Our hotel on Lake Champlain was not reached until after 7 P. M., and it was nine o'clock before the session began. The discussion of the preceding evening, "Crushers and Rolls vs. Sturtevant Mill," was continued, and this time the crusher men were represented by Mr. Buchanan, who gave data showing that comparative tests of rolls and crushers with the Sturtevant mill proved that the latter required the greater power. The mill men replied, and it was apparent that the discussion was reaching a point more personal than scientific, when one of the members took the rôle of peacemaker, and showed that contradictory data were of general occurrence in many branches of engineering, and that when one lot of figures showed the superiority of one apparatus over another, and were contradicted by other figures showing the opposite, both sets of figures must be accepted as true in the absence of positive evidence to the contrary, and the conditions studied to obtain light as to the cause of the apparent discrepancy. At present the battle of crushers and rolls versus rotary mills is a drawn one, although it will undoubtedly be reopened in the near future.

Prof. Mason, of Troy, gave a brief lecture on some experimental boiler explosions which he made to disprove the assertions that over-pressure in a boiler might cause a rupture but not a real explosion. Prof. Mason subjected a brass tube closed at both ends and partly filled with water to the heat of a Bunsen burner, and the explosion which followed blew the tube in a hundred pieces, blew out the windows and destroyed part of the ceiling of the room in which the experiment was made. Other experiments showed that when a rupture in a boiler was small, the steam and water might be discharged through it without damage, but when the size of the initial rupture was large enough an explosion would follow, rending the boiler into small pieces.

Mr. Chase's paper on magnetic separators, an abstract of which we have already published, was read at the session. On Friday an excursion was made by boat, lasting several hours, around the northern end of the lake, among the islands. A feature of this excursion, which will long be remembered by its participants, was the presentation of a souvenir of the meeting to a bridal couple who were of the party. Dr. Raymond made the address in his usual happy style.

The final session of the meeting was held at 5 P. M. in the hotel. The proceedings consisted in the presentation of papers by title and passage of resolutions of thanks to our hosts. A complimentary hop was given by the proprietors of the hotel in the evening. The next day, Saturday, the party broke up, but about 50 made the excursion to and through Ausable Chasm in the morning, taking the evening trains and boats southward in the evening.

The meeting was an entire success to the 150 or thereabouts, including ladies, who were present.

A Nickel Removing Solution.—In order to remove a coating of nickel which does not adhere well M. P. Dronier, in *La Metallurgie*, recommends that the article should be plunged in an oxidizing liquid composed of bichromate of potash, sulphuric acid and water in the proportions ordinarily used for batteries. The article should then be taken out more or less quickly according to the thickness of the deposit and washed and, if necessary, repolished.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Interior Department—Decisions of the Secretary.

SCHOOL LAND TITLE—MINERAL LAND—MINERAL PROOFS REQUIRED.

1.—The title to school land passes to the state without patent or certificate, at the date when the grant to the state takes effect, and to except lands therefrom on account of coal alleged to be found therein, it is necessary to show the existence of such mineral in sufficient quantity to add to the value of said lands and justify expenditure for its extraction, and that such fact was known when the grant took effect.

2. Proof of the mineral character of land must be specified and based upon the actual production of mineral. It is not enough to show that neighboring, or adjoining lands, are mineral in their character, and that the lands in controversy may hereafter develop minerals to such an extent as to show their mineral character, but it must be shown, as a present existing fact, that the lands in question are mineral, and this must appear from actual production of mineral, and not from a theory that the lands may hereafter produce minerals.—*Case of Kings County Commissioners, Wash. Terr. v. Alexander et al.* (5 Land Dec., 126) cited.—*In Re State of Colorado and the Trinity Coal and Coking Co. Intervenor.*—[Decision, June 22, 1892.]

PLACER MINING CLAIM—KNOWN GOLD AND TIN LODES—CONFLICTING CLAIMS.

1. A placer entry made for the purpose of securing titles to lodes and veins known to exist in the land so entered is in violation of the law and must be canceled.

2. The Centennial, or Bertha, Uncle Sam, Yankee, Boston, or Baltimore, Portland, Washington, Bangor, Brooklyn, Fox Tail, Modoc Chief, Crow Dog, Lula, O'Brien, Fracturi, Bear Fracturi, Grey Eagle, Dexter, Rosa, Steptoe, Rattler, Chester, Peck Fracturi, Mace, Eureka, Mary Ann and Del Norte lode claims situated in Rawling Mining District, Lawrence County, South Dakota, are in conflict in whole or in part, with the Nigger Hill Consolidated Hydraulic Mining Company.—*Grasfield v. Nigger Hill Consol. Mining Co.*—[Decision June 22, 1892.]

MINERAL ENTRY NOTICE—PRACTICE—APPEAL—INTERLOCUTORY ORDER, ETC.

1. A decision of the General Land Office holding insufficient the publication of the notice on which a mineral entry is allowed and requiring a new publication of the same is not an interlocutory order, but it is the denial of a substantial right from which an appeal will lie.

2. An appeal will not lie from the action of the Commissioner of the General Land Office requiring a claimant to furnish an additional affidavit in support of his entry, but only from his final action in the case upon the refusal or failure of the entryman to comply with said request.

3. If a mineral entry is valid the applicant is the equitable owner of the mining ground and the government holds the title in trust for him.—*BRETEL V. SWIFT* (South Dakota Case)—[Decision, June 28th, 1892.]

RAILROAD GRANT—MINERAL CHARACTER OF LAND.

1. The discovery of the mineral character of land at any time prior to the issuance of a patent therefor effectually excludes such lands from the grant to the Northern Pacific Railroad Company.

2. While it may be true, as contended, that the Circuit Court for the Ninth Judicial Circuit has gone to the extent of holding that the right of the railroad company attaches to mineral lands, unless there are known mines thereon, at date of definite location of the road, yet I am unwilling to accede to the contention that the Supreme Court (U. S.) has so decided.—*NORTHERN PACIFIC R. R. CO. V. CHAMPION CONSOL. MINING CO.*—[Decision June 28, 1892.]

The Patio Process.—The metallurgical efficiency of this ancient process can be readily understood as it is authoritatively stated that from the rebellious ores of Zacatecas, Mexico, some 90% is extracted with a cost not to exceed \$7.50, Mexican silver, a ton. The ores are galena, zinc blende and other sulphides in a quartz gangue.

Sebastine, the Anarchist's Explosive.—Interest in the explosive "sebastine," patented in 1882 by Beckmann, has lately been revived by the exploits of Ravachol in Paris. *La Revue de Chimie Industrielle* devotes a column to a description of it. Its explosive force is considerably greater than that of dynamite, since it generates three times the quantity of gas. The following is the chemical composition of "sebastine": Nitro-glycerine, 50; nitro-cellulose, 10; powdered charcoal, 15; nitrate of potash, 10; bicarbonate of soda, 3; peroxide of lead, 10; paraffin, 2. The nitrate of potash is first mixed with charcoal, and then the nitro-glycerine is poured in drop by drop until the whole is incorporated.

A Compound Magnetometer for testing the magnetic properties of iron and steel has been invented by Mr. G. F. C. Searle. An aluminum wire, 30 ins. long, suspended vertically by a fiber, carries at the top a magnet fixed at right angles to the wire. The lower end carries a light fork across which a fiber is stretched horizontally. A mirror attached to this fiber carries a magnet at right angles to the fiber. The mirror is thus capable of two independent motions. The specimen of iron is placed in a magnetizing coil near the mirror, and the magnetizing current passes also round a coil placed near the upper magnet. The motion of the mirror is observed by the aid of a spot of light. On gradually increasing and diminishing the current, the spot traces out curves of magnetic variation.

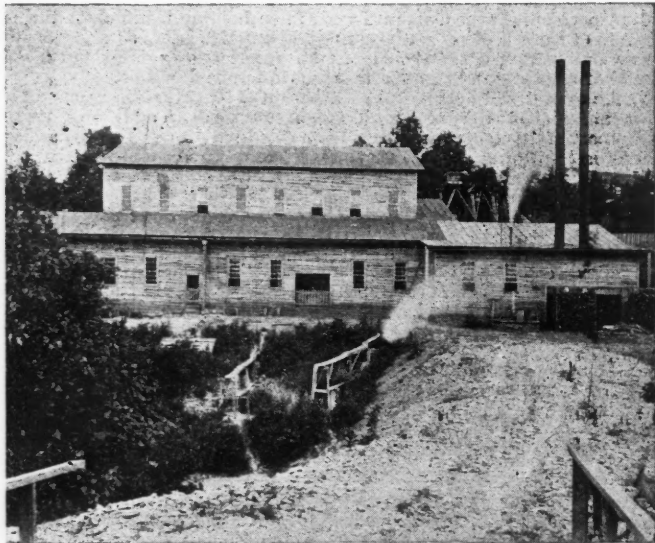
Cobalt in Russia.—The cobalt deposits in the vicinity of Dashkesan, in Southern Elisewetpol, have been exploited for about a year and a half, says the *Chemiker Zeitung*. Recent investigations prove the existence of a number of parallel veins in the same tract of land which carry in groups a smaltine or gray cobalt of great purity. The new find thus demonstrates the correctness of the assertion of the late M. Bernouilli to the effect that the cobalt wealth of the Dashkesan hills would be found to exceed that of any other district. The first adit was opened in the autumn of 1890 in the elevation bounded by the ravines of the Tehalunz and Tutunz streams, and by the time it had reached a length of 65 ft. it had yielded 90 tons of ore. A sinking made at the entrance to the adit, with the view of making another gallery some 35 ft. under the first, yielded lately 14 tons of pure ore.

A SOUTHERN GOLD MINE: KING'S MOUNTAIN, N. C.

Gold mining in the Southern States has never developed any great bonanzas like California or Colorado, but throughout Middle North Carolina, Western South Carolina and Georgia there are and have been a great many mines in operation, of which the public has never heard. They are owned by individuals and not by companies, have no offices in New York or London, but are operated by their owners, who reside upon the properties and who receive handsome incomes from the product of a few stamps or Chilian mills. It was the custom in slave days to work the mines "between the crops," turning the field hands into miners for the occasion. Records of the mint at Charlotte show something of the result of this unskillful and desultory system.

The absence of erosion has left a deep oxidized stratum over these gold fields so that many of them are worked to a depth of several hundred feet before turning into sulphurets, as most of them ultimately do. With the occurrence of sulphurets most of the mining operations ceased, the owner finding it more profitable to open and work at a new place down to water level, than essay deep mining and experiment with machinery capable of reducing auriferous pyrites. In Lancaster County, S. C., and at Kings Mountain in North Carolina, just over the line, there are mines which have been more systematically managed, and have repaid the efforts of their owners by showing value in depth. They are represented by the Haile and Brewer mines in South Carolina, and the Catawba mine at Kings Mountain, N. C. The latter, owing to the death of one of the three partners by whom it has been operated, is now offered for sale, the maps and reports being in the hands of Ledoux & Co., of this city, who furnish the information contained in this article.

The Catawba mine is situated two miles from Kings Mountain, a town of 1,000 inhabitants, 30 miles south of Charlotte and about 12 hours from Washington. It is in a beautiful region, with perfect climate, healthful surroundings, cheap labor (\$1 to \$1.25 per day), cheap fuel and other supplies. The gold mine was discovered on this property in 1829, and was worked by leases to different people up to the war, the gold produced being extracted by the Tom and Rocker and later by Chilian mill, stamps not being introduced until some time after the war. During all of these



THE GOLD MILL AT KING'S MOUNTAIN, N. C.

years the ore was mined at a depth of not over 150 ft. and not over 600 ft. in lateral extension. In spite of the unskilled labor and antiquated methods of amalgamation, the records of the mine show a production of over \$1,000,000. No attempt was made to catch the sulphurets, present to the extent of 2%, and probably no more than one-quarter of the gold could have been saved. For the 20 years succeeding the war little or no work was done beyond the operation of spasmodic leases, and in 1889 the property came into the possession of three gentlemen who determined to thoroughly develop and equip the property. The services of the well known mining engineer, the late Arthur Macy, were engaged to design and erect a stamp mill and to lay out the systematic underground work, and Professor Thies, who has made such a success of the concentration and chlorination of the sulphurets at the Haile, was also retained to report upon the property with a view of introducing his system to handle the sulphurets. In carrying out the recommendations of the experts a 40-stamp mill has been erected, of which 30 stamps are now running, with five extra-wide Frue vanners. The accompanying illustration shows this structure. A large reservoir and stand-pipe have been built, also four shaft houses newly equipped for duty, houses for the workmen, officers, etc., and pumping and other machinery. At this juncture one of the owners died, and a settlement of his estate requires the property to be sold.

The ore has been interesting to geologists as being one of the few instances where gold was apparently carried by limestone, but a further investigation shows that the mass of limestone which constitutes the principal ore body is highly silicified, intersected in every direction by stringers of quartz, to which the free gold adheres, but which, owing to the similarity in color, is not at first recognized by the eye.

The ore body varies from 40 to 60 ft. in width between the walls, and the entire mass is gold bearing. The records of 20,000 tons of the poorest ore show an average yield of \$1.70 per ton of fine gold, but distributed through this mass along the strike of the vein are shutes or lenses of richer ore, mill runs of which show a yield varying from \$4.15 to \$7.66 per ton. Thirteen of these lenses have been located, and vary from 8 to 14 ft. in width, and from 100 to 150 ft. in the direction of the strike.

The general strike of the vein is north and south, and the dip conforms

with the slates which compose the country rock. The working, hitherto, excepting shaft sinking has extended only to a depth of 150 ft., and down to this depth and below the sulphurets have almost entirely oxidized the limestone, more or less decomposed by the action of decomposing sulphurets and acid waters, leaving what is known as soft or brown ore, which requires no stamping, but has simply been washed in a Pennsylvania ore washer, the hard lumps afterward going to the mill, the amalgamation being effected either in the washer or on plates.

The owners claim to be able to demonstrate that since 1889 the average yield of free gold extracted, including both the poorer ore and the mineral from the chutes, has averaged \$4.47 per ton, the average of the chutes being \$6.40 when treated separately. The reports of Mr. Macy, whose unfortunate death was such a loss to the mining profession, may be summed up in the following statement:

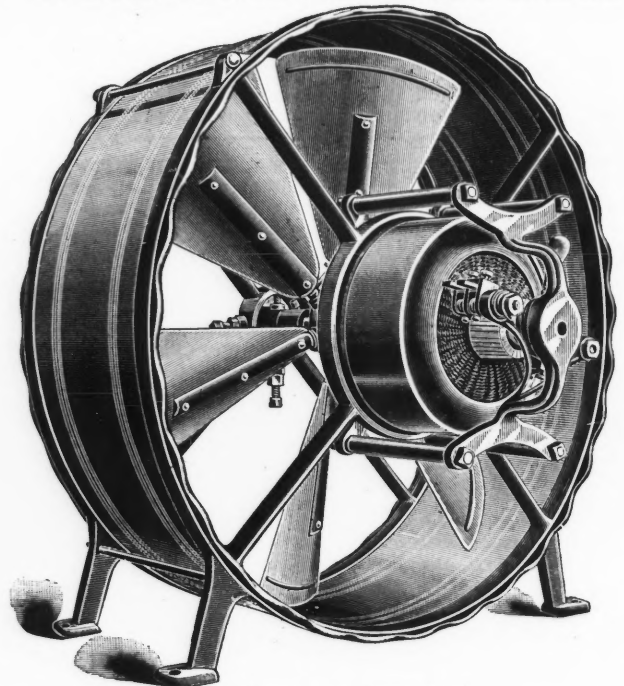
Ore in sight at present, 138,000 tons; estimated value \$8 per ton, say....	\$1,104,000
Cost of mining and milling 138,000 tons, \$3 per ton.....	414,000

Estimated profit.....	\$690,000
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Capacity of the mill and washers, 80 tons per day. The mine is accessible for investigation and well situated for economical working.

THE DIEHL MOTOR AND WING FAN.

Artificial ventilation is much resorted to in the present day, and desirable effects have been more easily attainable by adapting electricity as the motive power than in other ways. The device shown is a Wing disk fan, driven by a Diehl motor. The novelty of the machine is that the motor is connected directly to the fan without intermediate speed reduction. The Diehl motor varies from the ordinary type in the construction



THE DIEHL MOTOR AND WING FAN.

of the field magnets and armatures, the armature revolving around the field magnets instead of between them as is ordinarily the case. The motor is compact in form and is particularly adapted for direct attachment in cases where slow speed is required. The Diehl company has successfully applied its motor to overhead fans.

An Asserted Method for the Separation of Alumina and Iron.—

According to *Le Genie Civil* Professor Beilstein, of St. Petersburg, has recently discovered a new method of separating alumina and oxide of iron. The mixture is dissolved in nitric acid and the solution evaporated to dryness in a water bath. The residue is heated until all smell of nitric acid disappears and is then placed in boiling water and boiled. Then a few drops of sulphate of ammonia are added and the solution is filtered. The alumina passes through the filter as basic nitrate, but the iron remains behind as an insoluble sub-nitrate.

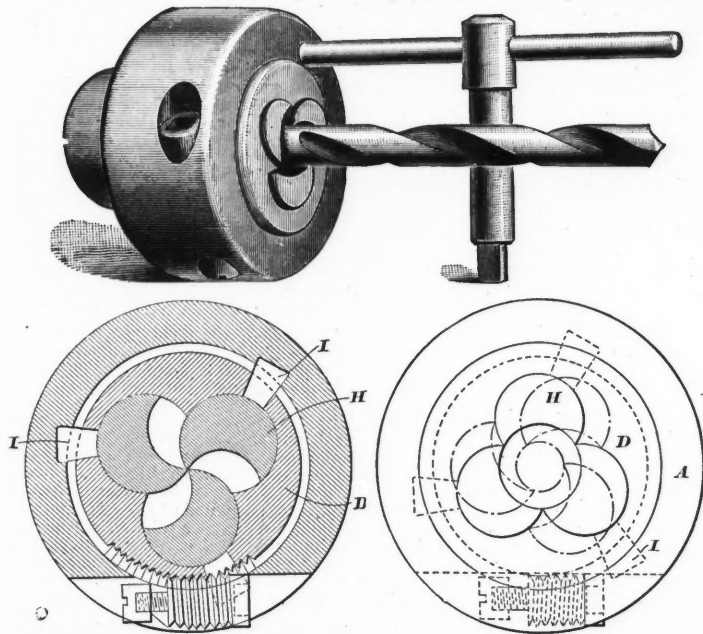
The Structure of Alloys.—At a recent meeting of the Amsterdam Academy of Sciences, says the *Engineer*, Mr. Behrens dealt with the microscopic structure of alloys. Crystallization is a common phenomenon in metals. The least crystalline are pure Al, Cu, Ni, when cast without overheating. Rapid cooling has no other effect than to make the crystals of smaller size. Pure Ag does not always show crystallization, if properly etched. In alloys crystallization is more easy and perfect than in unalloyed metals. When 1 gr. of Cu, alloyed with 2 mgr. Ag, is melted and slowly cooled, it will be found checkered by minute threads of an alloy rich in silver. All types of structure found in crystalline rocks can be reproduced in alloys. The most common is rectangular wickerwork, less common are isolated clusters of crystals (alloys with few crystals of high melting point, as in Zn + 10 per cent. Pt, Cu + 10 per cent Co). Mechanical stress does not destroy the crystalline structure. A fibrous or lamellar structure is set up, corresponding with planes of sliding or shearing in inter-crystalline matter, and under heavy stresses partly due to flattening and stretching of crystals. By annealing, alloys of Cu with Ni can be made to crystallize even as soft iron, thereby becoming even brittle.

FRANCIS' IMPROVED DRILL CHUCK.

We present herewith illustrations of a drill chuck manufactured by Geo. W. Francis, of Reading, Pa.

A good chuck is an important factor in shop practice and nothing is more annoying than a chuck that does not accurately center or hold the tool firmly.

The illustrations show the chuck in perspective and section. Fig. 1 shows the chuck with drill inserted; Fig. 2, a cross section, and Fig. 3, a section with jaws partly open. The chuck is constructed with a shell, A, inclosing a cylinder, D, which is operated by means of a worm engaging with teeth on the periphery of the cylinder, D. The cylinder is bored



longitudinally to accommodate the jaws. Attached to each jaw is a lever or arm, I, which is held at its outer end in a recess in the outer shell; hence a movement of the cylinder either to the right or left rotates the jaws and causes them to open or close as the case may be.

By this peculiar arrangement the stress on the drill shank when in operation tends to tighten the jaws and in reality make the chuck self-gripping. The jaws are held in any position in which they may be by means of a spring ring. The claims made for the chuck are: that it will never slip on account of its gripping construction, this grip being in proportion to the stress; that it is perfect in centering and that it never binds.

FRASSE'S SENSITIVE DRILL PRESS.

The drill shown by the accompanying illustration is particularly designed for use by instrument makers, electrical machinists and tool makers. The construction of the drill is extremely simple, while, at the same time, it retains all the strength and rigidity required in a tool of this description. The tool is designed to be run either by steam or foot power. It also is so constructed that the power may be taken from an overhead



shaft, or from a jack shaft on the floor. This is possible because of the arrangement of the idlers. When power is transmitted from overhead, the idlers are used in the position shown. If the power is to come from below, the bearing bar, carrying idlers, is removed and placed in the pocket below the one in which it is shown in the engraving. The tension of the belt is also arranged by the adjustable idler bearing. The change of idlers from the upper to lower socket allows the delivery side of the idler pulley to be always in a parallel plane with the pulley on the driving spindle.

The idler pulleys are arranged with different bearings, and the one nearest the frame is keyed fast to a small shaft which extends through the

box and is fitted to accommodate a small emery wheel. Thus, the drill has a grinding wheel always at hand for sharpening the drills or grinding small pieces. A rest, which is shown in the illustration, is fastened on the bearing bar and is adjusted by means of a small set screw. The counterbalance for the feed is derived from a spring. The feed lever fulcrums on a toggle bearing, thus the lever is made extremely sensitive. The table is 6 1/2 in. in diameter and has a rise and fall of 4 1/2 in. The spindle is made of the best spindle steel and has a feed of 2 1/2 in. A swing of 4 1/2 in. is measured from the center of the table to the frame. The spindle bearings are all of phosphor-bronze. The drill is particularly arranged for counter-sinking, stops being provided for this work. The drill will work holes from the finest size up to one-half inch in diameter. The principal feature of the machine is the low cost, taking in consideration the grade of work which it will do. The drill complete, with bronze bushings, sells for \$16.50. It is sold by Frasse & Co., 92 Park Row, New York.

PRODUCTION OF GOLD AND SILVER IN THE WORLD FOR 1891.

AS ESTIMATED BY THE UNITED STATES MINT.

	Gold		Silver	
	Kilograms.	Value in dollars.	Kilograms.	U. S. coining val. dollars.
United States.....	49,917	33,175,000	1,814,642	75,416,500
Australasia.....	47,245	31,399,000	311,100	12,929,300
Mexico.....	1,505	1,000,000	1,275,265	53,000,000
Europe:				
Russia.....	36,310	24,131,500	13,847	575,500
Germany.....			180,000(a)	7,480,800
Austria-Hungary.....	2,104(f)	1,398,500	50,603(f)	2,103,500
Sweden.....	88(f)	58,000	4,180(f)	173,700
Norway.....			5,539(f)	230,200
Italy.....	150(e)	100,000	8,108(e)	337,000
Spain.....			51,502(d)	2,140,400
Turkey.....	10(b)	7,000	1,323(b)	55,000
France.....	200(f)	133,000	71,117(f)	2,855,600
Great Britain.....	4(f)	3,000	9,075(f)	377,200
Dominion of Canada.....	2,596(f)	1,666,000	12,464(f)	518,000
South America:				
Argentina.....	123(f)	82,000	14,680(f)	610,100
Colombia.....	5,224	3,472,000	31,232	1,298,000
Bolivia.....	101(f)	67,000	372,666	15,488,000
Chile.....	2,162(e)	1,436,600	72,185(a)	3,000,000
Brazil.....	670(d)	445,300		
Venezuela.....	1,504	1,000,000		
British Guiana.....	1,693(f)	1,125,000		
Dutch Guiana.....	688(f)	444,200		
French Guiana.....	825(c)	548,000		
Peru.....	113	75,000	74,379	3,112,000
Uruguay.....	140(f)	93,500		
Central America.....	226(g)	150,000	48,123(g)	2,000,000
Japan.....	775	515,000	43,282	1,798,800
Africa.....	21,366	14,199,600		
China.....	8,020(f)	5,330,000		
British India.....	3,754	2,495,000		
Korea.....	1,128(f)	750,000		
Total.....	188,531	125,299,700	4,465,822	185,599,600

(a) Estimate of the Bureau of the Mint; (b) estimated the same as officially communicated for 1886; (c) estimated the same as officially communicated for 1887; (d) estimated the same as officially communicated for 1888; (e) estimated the same as officially communicated for 1889; (f) estimated the same as officially communicated for 1890; (g) rough estimates based on exports.

PRODUCTION OF GOLD AND SILVER IN THE UNITED STATES DURING 1891.

AS ESTIMATED BY THE DIRECTOR OF THE MINT.

	Gold.		Silver.		Total Value.
	Fine Ounces.	Value.	Fine Ounces.	Coining Value.	
Alaska.....	43,537	\$900,000	8,000	\$10,343	\$910,343
Arizona.....	47,166	975,000	1,480,000	1,913,535	2,888,535
California.....	609,525	12,600,000	750,000	969,697	13,569,697
Colorado.....	222,525	4,600,000	21,160,000	27,358,384	31,958,384
Georgia.....	3,870	80,000	400	80,517	80,517
Idaho.....	81,270	1,680,000	4,035,000	5,216,970	6,896,970
Michigan.....	3,628	75,000	73,000	94,384	169,384
Montana.....	139,804	2,890,000	16,350,000	21,139,394	24,029,394
Nevada.....	99,169	2,050,000	3,520,000	4,551,111	6,601,111
New Mexico.....	43,779	905,000	1,325,000	1,713,131	2,618,131
North Carolina.....	4,595	95,000	5,000	6,465	101,465
Oregon.....	79,335	1,640,000	290,000	297,374	1,937,374
South Carolina.....	6,047	125,000	500	616	125,616
South Dakota.....	171,731	3,550,000	100,000	129,293	3,679,293
Texas.....	31,444	650,000	375,000	484,848	1,134,848
Utah.....	16,206	335,000	8,750,000	11,313,131	11,648,131
Washington.....			165,000	219,334	548,334
Alabama.....					
Maryland.....					
Tennessee.....					
Virginia.....	1,209	25,000	3,100	4,008	29,008
Vermont.....					
Wyoming.....					
Total.....	1,604,840	\$33,175,000	58,330,000	\$75,416,565	\$108,561,565

The New Explosive, Herculite.—Herculite, says *Iron*, is the name of a new explosive, which, owing to its qualities of slow combustion and safety in handling, is claimed by its inventor, A. Pallé, to be superior to the best of the nitroglycerine compounds. It is a yellowish-gray powder, and is said to be composed of sawdust, camphor, nitrate of potash and several other substances which are kept secret. Experiments conducted in a quarry with the new explosive showed that a shot could not be fired by sparks, flame or detonation. When burning a flame similar to that of dynamite is produced which can only be extinguished with difficulty. In the tests a small quantity of the powder was placed on a stone and struck with a hammer without an explosion resulting. A half-pound charge of compound was inserted in a blast hole about four feet deep, which was then tamped with sand and earth, and the explosive was fired by means of a special igniter. The result was that a block of stone weighing some 30 tons was displaced without being fractured. By the addition of naphtha or ammonia to the ingredients of the powder it can be made quick-burning. The price of herculite is stated to be only six cents per pound.

PERSONALS.

P. Seif, Jr., superintendent of the Lower Union Mills of Carnegie, Phipps & Co., Limited, at Pittsburgh, Pa., resigned on the 1st inst.

Mr. M. R. Hunt terminated his four years' engagement as manager of the Ashland Iron and Steel Company, at Ashland, Wis., on the 1st inst.

Mr. J. B. Haggin, of the Anaconda Mining Company, has visited Three Forks, Mont., for the purpose of examining the ground for the proposed copper refinery.

Hon. Frank Lyman, of Brooklyn, N. Y., who recently purchased the Covington Furnace, at Covington, Va., is preparing to have it remodeled with a view of putting it in operation.

It is announced that Mr. J. H. Ernest Waters has resigned the management of the Sheridan and Mendota mines at Telluride, Colo., owing to personal business interests in Denver and elsewhere.

Mr. John Bogart, ex-State Engineer and Surveyor of New York, has been appointed Chief Engineer of the Rapid Transit Commission, an office which had been vacant since the death of the author of the scheme of an electric underground rapid transit railroad, Mr. William E. Worthen.

Mr. William G. Raymond, C. E., of San Francisco, Cal., has accepted the chair of geodesy, road engineering and topographical drawing in the Rensselaer Polytechnic Institute, Troy, N. Y. Mr. Raymond is a graduate of Washington University, and was formerly instructor in civil engineering in the University of California. He has had varied experience in all kinds of railway work and has lately been engaged in general engineering in San Francisco. Prof. W. LeConte Stevens will return to this country in August to take the chair of physics in the same institution.

Governor Pattison, of Pennsylvania, has sent out to the following gentlemen credentials entitling them to seats in the second National Mining Congress, which will convene at Helena, Mont., on July 12th, and continue in session until the 16th, as delegates from Pennsylvania. They will receive no pay, and will pay their own expenses: The Hon. Eckley B. Coxe, Drifton; Thomas A. Bradley, Lilly, Cambria County; James White, Houtzdale; Elmer H. Sawall, Wilkesharre; John J. Bradigan, Shenandoah; Patrick Blewitt, Scranton; Thomas Lynch, Greensburg; William McMurtree, Ashland; William Walker, Mayfield, Lackawanna County.

Capt. John W. Plummer, at present General Manager of the De Lamar Mining Company, Limited, and of the Elkhorn Mining Company, Limited, has won his suit against the Granite Mountain Company, of which he was formerly the superintendent, a decision for \$30,000 being given in his favor on June 30th. Capt. Plummer brought suit to recover \$37,000, claiming that the money was advanced to the company to protect it in a wood contract, and that it was to be returned to him if, upon investigation it was found that his action in making the contract was without collusion, but the company never made the investigation. The jury awarded \$30,000, being \$1 per cord, which he had paid.

OBITUARY

James Sinclair, president of the Tuckahoe Marble Company, died in this city of apoplexy on the 1st inst. Mr. Sinclair was born in Edinburgh, Scotland, Nov. 19th, 1812, and after receiving a thorough mathematical education, learned the trade of stone-cutting, in which he became so proficient that before he attained his majority he was placed at the head of a large force of men employed in constructing the Liverpool docks.

Mr. John H. Snyder, at one time superintendent of the Albany Iron Works, Troy, N. Y., died on the 26th ult., at St. Louis, Mo. While superintendent of the Albany Iron Works he had supervision of the rolling of the plates with which Ericsson's monitor was built. He was the inventor of a number of railway devices, and after leaving Troy he was superintendent of the Tredegar Iron Works, Richmond, Va.

SOCIETIES.

The subject for discussion at the regular meeting of the Engineers' Club, of Cincinnati, held in June, was that of a new water supply for the city of Cincinnati, which was appropriate at this time on account of the election to be held soon to vote on an appropriation for the purpose and the new water-works commission to be appointed. Papers on the subject were prepared by Col. Latham Anderson, G. Bouscaren, M. D. Burke and John W. Hill, of Cincinnati, and by Edward Flad, of St. Louis, in addition to which Messrs. Hosea, Whinery, Baldwin, Harper, Ewing, Mathewson and Punshon took part in the discussion. Several prominent citizens, not members of the club, were present and were much interested in the proceedings.

INDUSTRIAL NOTES.

Belfont Furnace, at Ironton, O., blew out on the 1st inst. for repairs. Operations will be resumed about Sept. 1st.

It is reported that the Pennsylvania Steel Company, at Steelton, Pa., intends to erect four additional open-hearth furnaces.

The Diamond saw-mill of Smith & Richardson, at St. Paul, Minn., was burned to the ground July 3d. The total loss amounts to \$70,000.

The Helmbacker Forge and Rolling Mills, of St. Louis, Mo., closed down on the 2d inst. on account of the refusal of the part of the proprietors to sign the Amalgamated scale.

The works of the Penn Iron Company, Limited, of Lancaster, Pa., shut down on the 30th ult. for a month. Three hundred hands are thrown out of work temporarily.

The Maryland Steel Company, of Sparrow's Point, Md., has been awarded the contract for the material required in the construction of the elevated railway running from Baltimore to Lake Roland, Md.

The Hawley Salt Works, of Warsaw, N. Y., were burned, with the exception of the south grainer house and office, on July 2d. The works were built in 1885 at a cost of \$50,000. They will be rebuilt.

The Le Clair Steel Company, of Belleville, Ill., has been incorporated, with a capital stock of \$50,000, to manufacture nails, merchant-iron, and other manufactures. The incorporators are James C. Waugh, C. W. Stanley and W. M. Switzer.

The employees of the Lookout Rolling Mill at Harriman, Tenn., have made a demand for a better scale of wages on perhaps 200 items of iron work. The employees are members of the Amalgamated Association of Iron Workers, and they threaten to strike unless their demand is complied with.

The Hocking coal operators, representing 15 companies, held a meeting July 5th to discuss the differences between miners and operators. The chief point in difference is the price to be paid for outside labor. The miners claim that the operators have not lived up to their agreement of June, allowing \$2 per day for this work. On account of this 2,000 are striking. The meeting resulted in nothing definite being done.

At the York Farm Tunnel, near Pottsville, on the Lehigh Valley Railroad, in the month of June, in a single heading 333 ft. of tunnel was finished complete, including the ditch. Ingersoll-Sergeant drills were used exclusively. No Sunday work was done, and miners' safety lamps were used. The foregoing is a clean and remarkable record as it occurs in hard rock, and in the general course of work—that is, the drive was not a special one for which any special preparation had been made.

The Winona high wagon bridge has been completed. The cost of the structure is about \$100,000. It was built by the Chicago Bridge and Iron Company. The total length of the bridge, including the Minnesota and Wisconsin approaches, is 1,755 ft. It is built entirely of iron and steel, of the cantilever style, and consists of four spans varying in length from 200 to 360 ft. At the highest point over the channel it is 72 ft. above low water mark, while the highest span reaches 118 ft. The work of construction was begun about the middle of last September, and the painting was completed June 28th.

The strike at the Pottsville Iron and Steel Company's rolling mills at Pottsville, Pa., has ended. The strikers went out on July 1st, 1890, and their places were filled with non-union men. Several days ago the officers of the Amalgamated Association declared the strike off. A committee notified William Atkins, president of the company, that the men were ready to accept the company's terms. Mr. Atkins signified a willingness to give the majority of them employment again. Each man will be required to make a separate application for work. About 250 men went out on a strike at the time.

For the first time since the Amalgamated Association organized, the Iron Manufacturers' Committee this morning addressed its delegates in their convention, advising them to accept a sweeping cut in wages from every iron worker represented. The Manufacturers' Committee went to the Turners' Hall at 11 o'clock, and for an hour and a half talked to the delegates on the necessity, from their point of view, for a wage reduction. This afternoon the delegates discussed the scale, but no conclusion was reached. The Tin Plate Workers' Committee met a committee of manufacturers this afternoon to discuss the wage question. The joint committee was still in session at 11 o'clock to-night. There is no change in the situation at Carnegie's. The workmen have until June 24th to decide on the question. If not signed then the plant will close down.

Messrs. E. J. Lewis and W. S. Hamilton, of the Canadian Pacific Railroad, started July 7th for China to introduce the Westinghouse air brake system on the Imperial Railway. They will spend ten days in Japan on a similar mission, and on Aug. 15th they will leave for Tien Tsin, China. They will be the first Americans to run locomotives in that country. The only men who work at railroading there are

English. The Imperial Railway is the only railroad in China, and only 120 miles of it is in operation. This railroad will be extended at the rate of 100 miles per year, the laws of China prohibiting the building of more than this number of miles of railroad in a year. The general manager of the Imperial is Mr. Petchick, who is the only American in the company. It is the intention of Mr. Petchick to Americanize the road as rapidly as possible, the American system being superior to the English. One master mechanic, a bridge builder, civil engineer, and a telegraph superintendent will follow Lewis and Hamilton next spring, all from the Pennsylvania Railroad.

The New York Iron Company shut down their furnace at Black River Falls, Wis., on July 3d. The furnace has been running for nearly six years, and has been making an average of about 25,000 tons of pig iron annually and something like 100 men have been employed. For some time the managers have felt that in other localities they might work to better advantage financially, as the freights were a great obstacle, their freight bills amounting to from \$90,000 to \$125,000 annually. An effort was made by the citizens there to raise enough money to make a thorough search for ore, but they have so far been unable to raise a sufficient amount. This company was given \$12,500 in cash and 20,000 acres of land as a bonus for locating there.

The construction of a 20,000,000-gallon filtering plant for Philadelphia has been authorized. The general conditions with which the filtering plant must comply are as follows: 1. The bed shall not be less than 4 ft. in depth and may be composed of sharp sea sand, sea sand and coke or prepared quartz. 2. The maximum rate of filtration will be 2½ gallons to 1 sq. ft. of filtering surface per hour. 3. Not more than 3% of filtered water shall be required in washing the plant. 4. All odor, color, and impurities in suspension must be removed from the water; the albuminoid ammonia in the filtered water must not exceed 0.10 part per million, nor free ammonia 0.015; the number of colonies of microbes in the filtered water must not exceed 100 per cu. cm.; none of the coagulant or other purifying agent shall be left in the water.

The new dam across the Colorado River at Austin, Tex., will raise the river 60 ft. above its low water mark. Mr. J. T. Fanning, Mem. Am. Soc. C. E., and Consulting Engineer for the city of Austin, states that the river above the dam has a drainage area of 40,000 square miles, and that in times of flood from 200,000 to 250,000 cu. ft. of water per second will pass over the crest of the dam. No dam in existence, Mr. Fanning states, in a recent report to the Austin Board of Public Works, has to pass a volume of flood water, over so great a height, which approximates to the above. Mr. Fanning recommends a change in the section of the dam in order to avoid the sheer fall of the water. The dam is being built by the city of Austin to develop power to operate its water and electric lighting plants, and for manufacturing purposes. The dam will be 70 ft. high and 1,125 ft. long and will set back water for some 25 miles. It is being built of masonry, and was described and illustrated in "Engineering News" of July 11th, 1891.

The engineers of the Construction Department of the World's Fair have recognized the many benefits to be derived from the use of electricity, and from the first decided upon employing it to run the machinery used in the work of construction, as being the only perfect agent to perform the work as expeditiously as the shortness of the time at their disposal demanded. They have installed in the Fair grounds a perfect electrical power transmission plant—one in which the conditions are of a peculiar nature on account of the long distances separating the apparatus, and the fact that this machinery is being constantly shifted from place to place as it is required. The lines had, therefore, to be erected to satisfy any call for power from any particular spot in the grounds.

The buildings of the Fair, which are to be wonders of the world for the time being, are built of wood covered with staff, which will give to them the appearance of imposing marble edifices. The framework of the buildings is of iron. The major part of the machinery, therefore, consists of saw-mills to cut the lumber, and hoists for raising into their lofty positions the immense girders, trusses and ponderous beams. In addition, there are molding machines, planing machines, and pulverizers for the clay. The presence of the electric motors for operating the saw-mills insures the absence of fire, from the danger of which the employment of steam engines is no guarantee.

The entire plant consists of the generators, the line and the motors, together with the various accessory appliances needed for the successful and economical operation of the electrical apparatus. The current of 500 volts is generated from two 100-K. W. compound wound Edison generators, of the Edison street railway type, helmed direct to two high speed engines. The duplication of the generating apparatus was decided upon in order that the machines should be continually supplied with power, and the chances of a total breakdown obviated, one generator being capable of supplying the entire demand for a short time in case the other should be disabled. The "temporary" station in which the

dynamos and engines are located is so substantially constructed that the term is almost a misnomer. The same may be said of the pole line carrying the lines and making a complete circuit of that portion of the grounds in which the motors are located. It is of first-class construction and of the best material. The high standard of insulation of the wires is always maintained, each circuit being subjected to rigid daily inspection and tests.

In the Manufacture and Liberal Arts Building—the largest structure in the Exposition, which covers an area of 30 acres—one of the saw-mill plants is erected. This consists of a saw sharpener, band and cut-off saws, a rip saw and a boring machine. This compact outfit is run by a 12-K. W. Edison shunt wound machine belted to a line shaft. In the United States Government Building is another saw-mill plant run by a 15-Kilowatt Edison motor. There is still another in the Mines and Mining Building and one in the Horticultural Building. In this last named building is an electric hoist operated by a 20-K. W. Edison motor fastened to the same frame as the base of the hoist. The hoist is of the double drum form, with two winch heads, and can be used to raise two separate weights at once, while at the same time the winch heads can be used to drag material into position. It is now used to raise the immense trusses and purlins of the dome of this building, and has proved eminently satisfactory. In the Transportation Building a huge derrick has been erected for raising the trusses into position. It can be rolled to any requisite point and has a 20-Kilowatt Edison motor erected in its base frame. In this building as well as in the Agricultural Building are other electrically operated saw-mill plants.

The Exposition Building, facing toward the lagoon and ornamented on the exterior with Corinthian pilasters 42 ft. high, has another saw-mill plant. This building has been especially arranged with a view to electrical illumination at night, which in effect will be unequalled.

Here, too, is the large clay pulverizer, belted to a 12-K. W. Edison motor, which drives it at a speed of 1,200 revolutions a minute. In the Machinery Hall, the Illinois State Building, the Fisheries Building and Woman's Building are other mills and planers.

Each motor is operated by means of an ordinary starting switch and rheostat and main line switches in series with each motor. Protection is afforded by suitable fusible cut-outs, and the motors are also sheltered from dust, dirt, rain and accident as far as possible. These machines are let to the contractors by the Exposition managers, the charge for their use being based upon the average daily maximum load, gaged by suitable measuring instruments. As promised by the engineers, the result of the adoption of electricity has proved entirely satisfactory, and the advocates of the portable steam engine and boiler have been compelled to acknowledge defeat. The motors have responded to every call made upon them even to the extent of sustaining a heavy overload for a short time.

The entire plant is leased from the Edison Company, and is to be returned in the same good condition as received on the 1st of January, 1892.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or supplies of any kind will notify the Engineering and Mining Journal of what he needs, his "Want" will be published in this column, and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their address at this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

Goods Wanted at Home.

- 2,715. A set of well-drilling tools. Florida.
- 2,716. 10,000 ft. 10-in. wrought iron pipe. Virginia.
- 2,717. A 10-H. P. marine engine. North Carolina.
- 2,718. Twenty-five tons 16 to 20-lb. T-rails, fit to relay, with splice plates, bolt nuts and spikes to complete the same. Virginia.
- 2,719. Prices on the following pipe: 1,000 ft. 10 in.; 2,500 ft. 8 in.; 6,000 ft. 6 in.; and 7,000 ft. 4 in. Kentucky.
- 2,720. A boiler and engine, 15 to 20 H. P. North Carolina.
- 2,721. An engine, boiler, dynamo, feed-water heater and shafting. South Carolina.
- 2,722. A stand-pipe, 16 ft. diameter and 100 ft. high. Kentucky.

2,723. A 20-H. P. engine, center crank, and a 25-H. P. boiler. Arkansas.

2,724. A No. 3 planer, matcher and molder, a 24-in. resaw, a cut-off saw, a 22-in. grist mill, 20 ft. 1 15-16 in. shafting and 4 pulleys. Arkansas.

2,725. Rubber belting, 50 ft. 10 in., 4 ply; 100 ft. 8 in., 4 ply; and 50 ft. 6 in., 4 ply. Arkansas.

2,726. Machinery for grinding rice chaff; a large number of hay cutters, principally for hand power, a few for steam power. Florida.

2,727. Feed-cutters of every description for hand and steam power. Florida.

GENERAL MINING NEWS.

ALABAMA.

Cherokee County.

(From an occasional correspondent.)

This county is really nearly in the center of the mineral regions of Georgia and Alabama. Although brown hematite iron ore is the most plentiful and, in fact, has been the only mineral which has received any attention until recently, yet prospecting has resulted in the discovery of some very valuable bauxite banks in this vicinity. From these discovered near Rock Run shipments were made last fall, winter and spring averaging about 75 tons a day, and the banks are still being worked. In the same locality several other banks have been opened sufficiently to show the existence of this mineral in paying quantities and of a good quality. This mineral is also found near Rome, Ga., and Cave Springs, Ga., a few miles from here. At present shipments are being made from banks about 10 miles from Rome. Of the quantity of this mineral no estimate can be made at present because, except in the two banks I have mentioned, no development work has been done, and in those the work so far has been merely surface operations or stripping, which have resulted in showing the surface area of the deposits, but no work to prove the depth of them has yet been attempted. Of the brown hematite iron ore banks, the deposits, so far as work has been prosecuted, may be said to be inexhaustible. The Baker Hill and State Line banks, owned by the Tecumseh Iron Company, have been worked the most extensively and systematically of any in this section. From the Baker Hill alone from 5,000 to 7,000 tons a month have been shipped during the past year to the Tennessee Coke Furnaces at South Pittsburg, Dayton and Cowen. This ore shows an average analysis from 50 to 57% metallic iron. It is too high in phosphorus for use as car-wheel iron, but the ore from State Line bank, belonging to the same company, is used at the Boss Furnace at Rock Run for car-wheel iron, and produces as good a quality as any southern ore. The product from this furnace is used at the Boss Car-Wheel Works at Fort Wayne, Ind. The Dike's ore banks, owned by the Boss Company, are worked continuously and the product used at their furnace. But the deposits of ore sufficiently low in phosphorus for car-wheel iron are not so extensive in this county as in some other portions of Alabama and Georgia. Indeed, this has been the principal reason why, with three charcoal furnaces in the county, two have been idle for some time past. But the deposits of ore high in iron and averaging 0.5 in phosphorus are very numerous and extensive through the mountains in this section. The largest deposits so far as proved by actual work are the Baker Hill, Wirtz Hill, Laney, and Bluffton, in the southeast corner of the county.

ARIZONA.

Yavapai County.

Hillside.—Dr. H. A. Warner, who purchased this mine, as announced in a previous issue of this paper, will put in a 100-ton plant if a suitable process can be found to satisfactorily work the ore. It is high grade, much of the ore running \$100 a ton.

Yuma County.

Tabor Mining and Milling Company, Vulture.—The Tabor group of mines has been sold to this company, which was recently incorporated under the laws of Colorado, with a capital stock of \$5,000,000. Active work will soon begin under the management of the new company.

Vulture.—Since the uncovering of the vein of ore on this property a few weeks since, says the Tombstone "Prospector," about 600 ft. from the old workings, ore has been steadily taken out, and there are now several tons on the dump. Ten stamps of the old mill are to be started up at once.

CALIFORNIA.

Mono County.

Bulwer Consolidated Mining Company, Bodie.—The latest official weekly letter from this property says: "We are stopping out ore from the south drift from No. 5 upraise above the 200 level. Are opening a stope from main south drift, 200 level. Also preparing to open a stope at top of No. 6 upraise. Have hauled to the Bodie and Monon mill 145 tons of ore. Commenced to crush ore on the 24th ult."

Bodie Consolidated Mining Company, Bodie.—In the Bodie Consolidated mine the ore in the face of the north drift from east cross-cut No. 1 on the 550

level is about 6 ins. wide. The ore in the upraise from this shaft shows no change.

San Luis Obispo County.

A mining excitement is reported from the northern part of this county. J. L. P. Smith, an old Grass Valley miner, has prospected the new ground, and reports that a 20-ft. vein has been traced and located nearly four miles along the easterly side of Pine Mountain. Samples of the ore assayed in San Francisco are said to show a value of from \$68 to \$100 per ton. The vein matter is yellow, rotten quartz, encased in a granitic country rock, and the ore very much resembles that of the Cruikshank mine, which yielded largely a few years ago. It contains large quantities of sulphurets. Pine Mountain was once famous for its quicksilver mines.

COLORADO.

Boulder County.

Spencer-Simpson, Lafayette.—This coal mine has been sold to the United Coal Company for \$19,000 by J. H. Simpson, who assigned the lease held by himself and relatives and L. Spencer to the company. The Spencer-Simpson mine is one of the most productive of the group of Lafayette and Louisville properties. Messrs. Simpson and Son took a 30 years' lease from J. B. Foote at 12 cts. royalty for every ton produced. This lease has about 27 years to run.

Clear Creek County.

Lamartine, Idaho Springs.—Steady development work goes on at this property. According to the Idaho Springs "News," only enough shipments are being made to pay expenses.

Conejos County.

Merrimac Consolidated Mining Company, Platoro.—After a year and a half of idleness this company has resumed work upon its property. When the mine shut down in December, 1890, the main shaft was down 278 ft. and three levels had been started, but owing to difficulties between members of the company work was suspended. The Merrimac has a good streak of high grade ore in the shaft and in the lower drift and it is reported will begin to ship shortly.

Eagle County.

Ben Butler.—The main feature of the past month's work has been the straightening and completing of the main incline. Although the cost has been considerable, yet it will be of great value to the property, as now three times the ore they could formerly can be hoisted. The Wolverton incline has been advanced 25 ft., and shows a larger body of ore. From the heading of this incline the upraise has been started in order to get at the ore bodies in the Reynolds incline, which have not been worked on account of the expense in getting at them. This portion of the property is proving very productive. Further up 10 tons of high grade ore have been taken from the Carson stopes. No. 3 shaft has been sunk 7 ft., showing very large bodies of free milling ore and plenty of shipping ore. Sinking in No. 2 shaft has been at the rate of 2 ft. per day. The bottom of this shaft shows an abundance of high grade ore, native gold and silver being met with often in sorting the ore. This shaft also shows large bodies of free milling ore. All other portions of the mines are looking well. Twenty-two men are working, 15 of that number on ore. The mines are now producing 10 tons of shipping ore and 20 tons of free milling ore per day. The shipping ore is high grade, and four-fifths of the present value is gold.

El Paso County.

Pharmacist Mining Company, Cripple Creek.—It is reported that assays made from the two carloads of ore sent out from the Pharmacist mine gave returns of 58 8-10 oz. in gold per ton. The company will make another shipment shortly.

Lake County.

A. Y. & Minnie, Leadville.—According to the Leadville "Herald-Democrat," in the month of May something like a total of 1,400 tons of ore, carbonates and sulphides inclusive, were produced at those claims and consigned to the smelters in the vicinity. In June this amount was increased to 300 tons of sulphides and about 1,400 tons of carbonates, or a total production of about 1,700 tons. The carbonate ores are mined from the so-called Sellers raise in No. 2 chute, and the sulphides are found in the big stope of No. 3 chute.

Comstock.—A good strike of gold ore is reported in the Comstock lode in the Twin Lakes mining district. This property is in the immediate vicinity of the famous Gordon mine.

Latonia Mining Company.—Mr. Gabriel Sturn, of Cincinnati, O., has sold to this company, for a consideration said to be \$100,000, the Gold Field, the Reliable and the Gold Crown lodes in the California and Alicante mining districts.

La Plata County.

Mr. O. P. Posey, of the well known firm of Crawford & Posey, stated lately to a representative of the Denver "Republican": "We are putting up a copper plant at Durango with a capacity of 200 tons per day, to treat copper ores in an entirely different manner from any now in use in Colorado. Red Mountain, where our mines are situated, is full of copper ore largely mixed with gold and sil-

ver. We will open up a class of mines which it will be impossible to operate under the existing smelting conditions. There has never been a market here for ores running high in copper and low in gold and silver. What we propose to do is to make a copper smelter that will be able to extract all the copper from the ores we treat as well as to save all the gold and silver the ore may contain. The process we will use is that which has proven so successful in the Parrott Works at Butte City, Mont. We have secured the metallurgist who put in the Parrott plant and he will have charge of the putting in of our plant and will operate it. There will be two marked improvements in our smelter over those now in use in the State, namely, the use of the O'Hara process of roasting the ore and handling mechanically instead of by hand, and the introduction of the converter system. The location of the smelter is favorable to its success. In the vicinity there is an abundance of coal of a superior quality and to be had cheap. We are on the line, so to speak, between the mineral and the agricultural belt, and the commodities of living can be procured at small cost, so that we have exceptional advantages of securing cheap labor. The construction of our plant is well under way. All the contracts have been let. The walls are up, the machinery has been shipped, and it is hoped to have the smelter in full operation by Oct. 1st. The ores from our Red Mountain mines will run about 20% copper, in connection with gold, silver and baser metals, and it is our confident expectation that the enterprise will work a revolution in the treatment of copper ores in Colorado."

Ourray County.

Advices from Ourray state that the Revenue tunnel is now into the side of Mount Sneffles over 6,000 ft. and progressing at the rate of 12 ft. per day. The Virginus vein, it is expected, will be encountered this fall.

Park County.

Advices from Fairplay report that the Weston and Hock Hocking mines in Pennsylvania mining district, which started work a short time ago, have struck 2½ ft. of high grade sulphure ore and a 2-ft. vein of lead assaying 65% silver and 35% lead. The Lucky Queen mine in the same district has shipped one car of ore from the recent strike. There are 5 ft. of ore which, according to the mill-run, runs 125 oz. silver. This property is owned by O. M. Yocom, of Fairplay, and C. E. Newton, of Park.

Summit County.

Shipments of ore and concentrates from Breckenridge for the month of June amounted to 46 carloads, aggregating 699 tons, being the largest amount ever shipped from that point in any one month; making for the year since Jan. 1st 3,177, against 2,805 for the same period last year, a gain for 1892 of 372 tons.

FLORIDA.

Marion County.

(From an Occasional Correspondent.)

General Notes.—The Stranathan Company is the only one of the ten companies near Anthony that has shipped any rock since the Peninsular Company sold its property, and this company is the only one that has drying machinery in operation. The amount of rock that has been washed by the other companies that have begun operations aggregates about 1,500 tons. The Slate Rock Company, which stopped mining about three months ago, will resume work again in a few weeks.

J. W. Roberts Phosphate Company and Knott Bros. Company.—These companies are arranging to try the experiment of drying the Anthony rock by "burning," the method so commonly employed in the boulder region and by South Carolina companies, and have piles of rock almost ready to fire.

Phosphate Company of France.—This company has recently ordered from the W. T. Adams Machine Company, of Corinth, Miss., a 100-H. P. automatic steam engine, two 60-H. P. boilers in battery, and two double log washers, to be delivered within 40 days of the date of the order. This company bought out the Peninsular Company about a year ago, and having recently completed the work of thoroughly pitting its 1,000 acres of land, will begin at once the erection of a plant of 200 tons daily capacity.

The Central Florida Phosphate Company.—This company, under the management of Prof. E. T. Cox, has just received its engine and boiler, and other machinery is expected to arrive in a few days. It expects to be able to set its machinery in motion before the first of August.

IDAHO.

Boise County.

Elmira Mining Company.—Two large steam boilers have been received by this company at Banner, one for the mill and one for the Wolverine hoisting works. As soon as the latter is in position, so that the heavy flow of water can be kept out, work will be resumed at sinking the shaft from the 500 to the 600-ft. level.

Muddy Mine.—Work is progressing well in the 1,500-ft. tunnel running to cut this group of mines

at Grimes Pass. It is in over 600 ft. and an air compressor and Ingersoll drills have been received. As soon as they are in position the work will progress more rapidly.

Washington Mine.—The water is below the 200-ft. level in this mine, in Gambrius district, and a force of miners has been put to work. As soon as repairs are made in the tunnels and slopes the extraction of ores will commence and the mill will resume crushing.

Owyhee County.

Blaine Tunnel.—The tunnel is now 1,264 ft. in length and continually getting longer. Some distance back the tunnel left the main ledge to avoid water, and followed a stringer of quartz. This stringer is now turning back to the ledge again and a good shoot of ore is expected to be opened soon.

Trade Dollar.—In No. 3 tunnel the ledge is 4 ft. wide, 12 ins. of which assay \$616.20. Drifting is being done and the ledge is widening as depth is gained, says the Idaho "Avalanche." Back 50 ft. from the present face chambering is being done preparatory to sinking a winze 200 ft. The ledge at this point is 5 ft. wide of free milling ore of an average value of \$40 per ton. The west cross-cut from this tunnel is now in 20 ft. and is still in quartz and quartzite. Above, the main body of ore lies on the west side of this quartzite, while below it is on the east side. This cross-cut is expected to open a good body of ore on the west side in the lower workings. The grade for the mill is nearing completion, and work on the walls has been commenced. A force of carpenters are preparing the frame.

Venus.—The cross-cut is now in 600 ft., and is breaking into the hanging wall of the ledge, several streaks of clay and quartz having been cut within the last few feet, which show well in gold. The stringers cut show the same character of ore as found above.

Shoshone County.

Bunker Hill & Sullivan Mining Company.—About 300 men are now at work. In addition to this 70 more men are employed in and about the mill and other outside works, says the Spokane "Review." The mill is running steadily, handling about 400 tons of ore per day, and about 70 tons of concentrates are shipped daily. The improvements to the tramway made during April seem to have removed the difficulties that were formerly the source of so much trouble, and everything is now working very smoothly.

Coeur d'Alenes.—On Canyon Creek the Poorman and Tiger at Burke have 200 men employed, says the Spokane "Review." The greater part of this number is composed of members of the Miners' Union. On the Helena and Frisco about 60 non-union men are engaged. The mill is working well. The Gem has 80 men at work. About 25 tons of concentrates per day is the result of the work of the mill. The Granite mill is expected to resume operations in a very few days. About 60 men are now working in the mine. The Custer is simply doing a little development work; but it is expected to resume work in a month. At Mullan the Morning mine will not commence work until after the completion of the new mill and tramway. These works will occupy four months in construction. After this time the mine will be worked steadily through the winter. On the Hunter a small force is making an upraise from the lower to the middle tunnel. This will require about three months. The mill will not begin work until the upraise is completed.

Coeur d'Alene District.—The strike has developed no news for the past two weeks, and no change can be expected in the present monotonous situation until after the hearing before United States Judge Beatty, says the Anaconda "Standard." At present the Miners' Union has everything its own way at Mullan, and it seems to be generally understood in that camp that no scabs need apply. The situation at Mullan at the present time is as stated, but this order of things is almost reversed at Wardner, the other end of the district, where there are 400 non-union men at work and new men arriving almost daily. At Burke and also at Gem it is about a stand-off. The Tiger and the Poorman people employ union men, although they reserve the right to employ whom they please, but both properties are worked by shafts instead of tunnels, as nearly all the other mines in the district are, and they must have miners who understand the business. It is evident that the Mine Owners' Association are not going to quit the fight, and although the Tiger and Poorman people made an amicable arrangement with the union, and the Hunter and the Morning mines at Mullan will probably make a similar arrangement, yet it is pretty certain that all of these companies are still members of the association and are putting up their share of the expense necessary to continue the war.

KANSAS.

Cherokee County.

During the week ending July 2d the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,314,930; rough ore, pounds sold, 1,469,950; zinc ore, pounds sold, 630,000; lead ore, pounds sold, 167,980. Sales aggregated a total value of \$10,962.

MICHIGAN.

Gold.

Ropes Gold and Silver Mining Company.—An assessment of 25 cts. per share on its capital stock has been called by the directors of this company. There have been several months when poor rock was the only kind encountered, and the bullion yield has fallen off.

Copper.

Lake Superior copper mine products for June, so far as the same have been reported, are:

	1891.	1892.	Dec.
Quincy (tons).....	500	569½	69½
Franklin	190	203	13
Atlantic	226	214½	*11½

* Increase.

Allouez Mining Company.—The diamond drill will soon be started in the exploratory work of the Allouez. A pit is now being sunk to strike the conglomerate vein of the Calumet.

Calumet & Hecla Mining Company.—This company has purchased the interest of the Detroit & Lake Superior Smelting Company in the smelting works at Lake Linden and now owns it entirely.

Calumet & Hecla Mining Company.—As one of the results of the agreement of the copper producers to restrict their production, the Calumet & Hecla people will close down three and possibly five of their smelting furnaces. This will throw about 60 men out of work. President Agassiz, Vice-President Livermore and Consulting Engineer Leavitt were at the mine last week.

Franklin Mining Company.—Fire was discovered in the Franklin at the 25th level in shaft No. 5, July 3, but was extinguished before any damage had been done.

Hancock Mining Company.—The report that the Quincy Mining Company is negotiating for the purchase of the old "Highland" smelting works, built several years ago by the Detroit & Lake Superior Smelting Company, with the intention of adding rolling and wire mills to the plant, has been feebly denied by the officers of the Quincy, but still it is evident that there is some truth in it.

Huron Mining Company.—The mine is reported to be showing well in copper just now, the tributors having succeeded in opening some good paying ground; the force has been increased to 75 men, and the stamp mill has been started full time running night and day, says the Ontonagon "Miner."

Osceola Mining Company.—Opechee shaft, now sinking from the 22d to the 23d level, is passing through an unusually rich vein, says the Torch Lake "Times." The 23d level will be reached this month, and only for the delay caused by the strike it would now be down, with drifting both north and south started.

Peninsula Copper Mining Company.—A writer in the Calumet "Conglomerate" says: "The Peninsula is paying the lowest wages of any mine in the county, and its cost sheets for the last few months have shown a cost as low as \$1.46 for the treatment of one ton of rock. This includes breaking in the mine, stamping and dressing and delivery at the mine. The average cost is a trifle over \$1.50."

Quincy Mining Company.—The new rock house and engine house combined at the North Quincy is going up rapidly. The new boiler house will contain eight boilers, each containing 52 3/4-in. flues 16 ft. long. Four of these are steamed up and the others are in place, says the Calumet "Conglomerate." A new hoist from E. P. Allis & Co. has arrived and will be put into the new stone engine house which is ready for it. It resembles the hoist at Tamarack No. 2. They are doing some hoisting at this shaft now.

Tamarack, Jr., Mining Company.—Quite an improvement has recently been going on at Tamarack, Junior, says the Houghton "Gazette," the drifts south of No. 1 looking very well. A drift is in a short distance on the lode, found some time ago, both north and south. The lode is found to be 8 ft. wide and rich in copper.

Iron—Marquette Range.

Lake Angeline.—The wooden flume that is to take the water from the big pump at Lake Angeline is being constructed and placed in position. This will take a couple of weeks to complete, after which the pumping will be started. The water in the lake has been lowered 5½ ft. by the open trench through the outlet. A launder 30×48 ins. is being built out into the lake from the ditch. Mr. B. C. Howell, who is the patentee of the pump, has the contract and expects to empty the lake inside of 60 days. The pump when in operation will throw 1,440,000 gallons of water an hour. Mr. Howell's contract only calls for "draining the lake." The deepest water is 46 ft. It is claimed that there is not less than 25,000,000 tons of ore lying under this little lake. The water that now flows into the lake from the mines is to be discharged elsewhere by the companies when the large pump begins work. The pump is situated on a strong raft that is hauled over, and is built in a very substantial manner. The boiler is set in solid brick work, and the raft and machinery will answer the purpose of keeping the lake dry for years to come.

Iron—Menominee Range.

Chapin Iron Company.—At the Chapin the daily product now runs from 2,500 tons to 3,000 tons and

the daily shipments to 5,000 tons. Nothing of a remarkable nature occurs, and the work runs along very smoothly. A few men have been added here and there where it was thought best to push a section, and the policy of the present owners and management seems to be the holding of the working force and product at the most economical point, says the Norway "Current."

East New York.—There has been a sinking of the surface in the vicinity of No. 1 shaft. Ore has been mined beneath this on three levels, and the timber had been robbed from some of the workings in this portion of the mine. The extent of surface broken may have been larger than was looked for, but no more damage was done than to partly close a cross-cut that has been since opened up. No. 2 shaft is the one to which the ore will come in future. In the 280-ft. level, to the north, they are cutting ground thought to be the capping of a new lens. A reduction of royalty on second-class has just been secured, it now amounting to 20 cts. per ton. On the first-class they pay 30 cts.

MISSOURI.

Jasper County.

Electric Lead and Zinc Company.—This company is composed of a syndicate of St. Louis capitalists, and is under the personal management of Mr. S. O. Hemenway. The company first secured some mining lots on the Empire Zinc Company land, and commenced development, and at a depth of 50 ft. opened up a large deposit of lead. The shaft was continued on down to a depth of 90 ft., where a run of zinc ore was cut. At 50 ft. a level was started on the lead ore, and there are now almost 600 lin. ft. of drifts from this level, all of which are in the lead ore. In fact, it is the most extensive deposit of lead that has been opened in this district. Capt. Hemenway has had an electric light system put in the underground workings, so that every part of the workings are perfectly illuminated. This property is called the Daisy, and the company have just completed a large ore dressing plant, so that the present output of 60,000 lbs. of lead will be largely increased. The next property of the company is 21 acres on the Oswego Mining Company's land, where they have sunk seven prospect shafts, and this present week will commence drifting on ore. Then the company have 40 acres on the Rex. M. & S. Company land, where they have been prospecting by drilling, and according to the drill cuttings they have proved up lead ore from a depth of 70 to 80 ft., and cut a run of zinc ore at 93 ft. They will sink a large development shaft at or near the point of drilling, and continue the prospecting of other portions of this 40-acre tract.

(From our Special Correspondent.)

Joplin, July 4.

There was a general activity among the mine operators throughout the entire lead and zinc belt last week. There was a heavy output of ore, and the sales were fully up to the average. The zinc ore market opened strong at the beginning of the week, but the price declined at the close. The average price paid at Webb City, Carterville and Zincite was \$25, while at Joplin the average was \$24 per ton. Lead ore advanced 75 cts. per thousand from the previous week, and closed at \$24. Following are the sales from the different camps: Joplin mines, 1,530,990 lbs. zinc ore and 347,380 lead, value \$26,409; Webb City mines, 493,420 lbs. zinc ore and 83,920 lead, value \$7,833.15; Carterville mines, 2,318,590 lbs. zinc ore and 147,360 lead, value \$33,658; Zincite mines, 206,690 lbs. zinc ore and 4,850 lead, value \$2,693.60; Carthage mines, 91,450 lbs. zinc ore, value \$1,185; Oranogo mines, 64,200 lbs. zinc ore and 34,920 lead, value \$1,445.15; Wentworth mines, 40,000 lbs. zinc ore, value \$470; Burch Center mines, 16,000 lbs. zinc ore, value \$192; Galena, Kan., mines, 630,000 lbs. zinc ore and 167,980 lead, value \$10,962. District's total value, \$84,847.90. A party of capitalists from St. Joseph and Kansas City made a visit to Joplin during the week with a view of making a personal investigation of the mining resources, and while here closed a deal for the purchase of one-fifth of the stock of the Rex. Mining and Smelting Company. This is one of the most important deals that has been made in Joplin this year. The purchasers have also secured a one-fifth interest in the now noted 1,000-acre tract. We are informed by Mr. Saml. I. Smith, the vice-president of the company, the capital stock will immediately be increased to \$1,000,000, and that \$100,000 will be set aside for the purpose of building a smelter on the northeast corner of the land. The Kansas City F. S. & M. and Missouri Pacific railroads have recently extended their lines to this land, and will now run spurs to the point selected for the smelter.

American Mining Company.—This property is located on the Rex. M. & S. Company land, and includes 40 acres, and is operated by Mr. F. M. Sharp. Five months ago, when the company took a lease on this 40 acres, it was a barren waste of prairie. Mr. Sharp selected his location from the surface topography, and commenced drilling with a view of testing the formation. This soon proved up lead and zinc deposits at different points. Then five development shafts were sunk and a thorough system of exploration work commenced which has proved the continuity of the ore deposits. The company then

put up a large steam plant, and are now finishing up a complete ore dressing and concentrating plant, which, according to contract, is to be in running order by the 15th of this month. At one point in the underground workings the miners encountered almost a body of zinc ore in boulders which will weigh from 50 to 500 lbs.

MINNESOTA.

Mesaba Range.

Total ore shipments from Ashland to June 30th were 664,547 tons, of which the various mines furnished tons as follows: Norrie, 134,540; Aurora, 100,453; East Norrie, 68,522; Ashland, 67,915; Tilden, 81,480; Iron Belt, 34,446; Brotherton, 31,157; Sunday Lake, 25,609; Newport, 27,517; Anvil, 1,696; Comet, 5,184; Carey, 13,040; Fabst, 18,556; Windsor, 6,131; Colby No. 2, 20,698; Montreal, 11,821; Palms, 19,673. Shipments for the week ending June 30 were 93,368 tons.

Cincinnati Iron Mining Company.—The entire property of this company, consisting of 320 acres of land, has been leased to Mr. Henry P. Barbour et al., of New York. Mr. Barbour has agreed to mine 150,000 tons per year from the three forties which adjoin the Biwabik and the two forties which adjoin the Shaw; to explore the remaining forties, and if ore is found to mine 10,000 tons per annum from each. The royalty paid is, says the Mesaba Range "News," 55 cts. per gross ton. The lease is to run 19 years, with privilege of removal. It is said that 19 years, with privilege of renewal. It is said that Oliver, Jr., of Oliver Bros. & Phillips, of Pittsburg, very large consumers of ore. The Mesaba Range "News" gives the following estimate for the cost of a ton of this ore placed in Cleveland: Mining, 50 cts.; royalty, 55 cts.; rail freight to ore docks, 75 cts.; lake freight to Cleveland, \$1, and insurance and commission, 16 cts., a total of \$2.95 per ton.

Iron—Vermillion Range.

The Vermillion Range will break its record this year by over 300,000 tons of iron if the present rate of shipment is maintained, says the Ishpeming "Daily Press." For a week the Duluth & Iron Range Road has been hauling from 20 to 25 trainloads daily, each load consisting of about 500 tons of ore. It is expected that this rate will be continued all the season of navigation, or at least until November. The Chandler mine, which last year shipped 300,000 tons, will this year send forward 600,000, while the Minnesota Iron Company will increase its business about a hundred thousand. At the Chandler a steam shovel is used to load the cars from the stockpile.

MONTANA.

W. O. Wheeler, in charge of the United States Assay Office in Helena, in his report to the Director of the Mint for the year 1891, has the following on the mineral output of Montana for that year: The product of the precious metals in the State of Montana for the calendar year 1891 was approximately: Gold, 139,870.842 fine oz.; value, \$2,891,386.89. Silver, 16,349,066.43 fine oz.; value, \$21,138,186.31. Copper, 112,763,420 lbs.; value, \$14,377,336. Lead, 28,253,500 lbs.; value, \$1,229,027. Value of deposits at the Assay Office in Helena from Montana for 1891: Gold, 56,206.045 standard oz.; value, \$1,045,692.26. Silver, 24,572.67 oz.; value, \$21,603.02. Total value, \$1,067,295.28.

Coal—Cumabar Field.

Horr Coal and Coke Company.—The work on No. 4, a drift abandoned some time ago, has been resumed, and about 75 tons of coal per day are now being taken out of this drift.

Deer Lodge County.

Bland Mining and Tunnel Company.—This company is operating on several ledges near Philipsburg. The tunnel is now in 105 ft., cutting a vein of good ore 6 ft. in width, says the Philipsburg "Mail."

Puritan.—The machinery for the Puritan mine has arrived and the mine is now in active operation. An electric light plant will be added to the equipment of the mine, and the electric lights will be placed underground as well as on the surface, and will greatly facilitate the work of development. It is the intention of the owners to ship one carload each day. As the ore assays from 75 to 200 oz. in silver to the ton, these shipments will amount to a large sum each week, says the "Daily Inter-Mountain."

Jefferson County.

Boulder Smelter.—The Boulder smelter is now ready to receive sulphide ores, carrying silver and gold; or iron pyrites in excess of silica, the latter class of ore being preferred, says the Butte "Inter-Mountain." The Boulder smelter reduces the ore by the new process, which is similar to the process employed at the Toston smelter. By this process the ore is reduced to an iron-copper matte and is claimed to be the best method of treating this character of ore. The starting up of this smelter will be a great benefit to the leasers and mine operators of Butte and vicinity, as it opens a market for a class of ores not wanted by the Butte smelters.

Daphne.—A 3-stamp mill is being worked on this mine, a mile and a half above Corbin. A cross-cut level 350 ft. to the vein has been run. The vein is

4 ft. wide, the ore being pyrites of copper with 60 to 80 oz. of silver to the ton. Ore is being tested at the Boulder smelter.

Obelisk Mill.—The Obelisk Mill at Basin was compelled to shut down last week owing to the wash-outs on the railroad preventing the company from obtaining a supply of fuel.

Sirius.—This mine, in the Cataract district, is a very promising property, says the Boulder "Age." It has been worked almost entirely by leasers, who have just completed a 650-ft. tunnel, striking the ore body in the face of the tunnel from 2 to 10 ins. thick, with about 2 ft. of concentrating ore. The shipping ore nets \$25 a ton. The hauling to Wickes costs \$4 a ton.

Lewis and Clarke County.

(From our Special Correspondent.)

Sapphire and Ruby Company, of Montana, Limited.—A. B. Wood, general manager of this company, has been in San Francisco recently for the purpose of purchasing three hydraulic giants and other apparatus for use at the mines. For some time he has had a force of men engaged in cutting a canal 8 miles long in which to conduct the water, and to date this work is about half completed. Considerable of the 8,000 acres, owned by the company, was mined for gold in the early days, and as plenty of water will be available Mr. Wood is sanguine of the financial success of the company he represents. He reports that the 40,000 to 50,000 carats recently sent to London have been cut and have readily sold as high as \$50 a carat. This latter price for choice sapphires.

Napa County.

(From our Special Correspondent.)

Napa Consolidated Quicksilver Mining Company.—A dividend, aggregating \$10,000 for the quarter, was paid to-day; also an extra dividend for the same amount.

Meagher County.

Ingersoll Mine.—Work has been resumed on this mine, which has laid idle for some time. Ten men are now working, drifting north on the Moulton lead and south on the Queen of the Mountains lead. An upraise is being made in a body of ore in the same lead.

Moulton Mining Company.—It is reported that this company will soon resume work on the shaft. The ore body has been continuous throughout the drift in the 300 ft. level and of a high grade. Large bodies of ore were encountered continually while drifting. The last strike is considered the best and is very encouraging to the owners of the property. A body of ore 20 in. wide and assaying 900 oz. in silver was struck in the last few days.

Queen of the Hills Mining Company.—The electric plant which the Thomson-Houton company has been putting up on the Queen of the Hills was tried on June 1st, and worked to the satisfaction of those who put it in, says the Neihart "Herald." Sinking on the shaft will commence immediately, 18 men being employed, 6 on a shift. The question of building a mill to treat the ore is still undecided. The company will ship ore to Butte, and the tests there made will determine whether or not a mill will be erected.

Queen of the Hills Mining Company.—This company has for some time been considering the advisability of putting in a mill to work their ores, reports the Helena "Independent." The company has run in a tunnel the distance of 1,400 ft., and has in sight a body of ore which is estimated to contain from 30,000 to 50,000 tons. This is low grade averaging 30 oz. of silver to the ton, and will not pay to mine and ship away to be treated. Wallace D. Pinkston, of the Western Iron Works, Butte, made a thorough examination of the mine. He took with him when he left 200 lbs. of the Queen ore for the purpose of testing and finding if the ore was dry milling or not. Mr. Pinkston claims this ore ought to be mined and worked in the mill at a cost not to exceed \$12 per ton. If the Queen decides to let him build them a mill that gentleman tells them the cost of a 20-stamp mill will not be more than \$35,000, and that will cover every expense.

Silver Bow County.

Anaconda Mining Company.—On Thursday, June 30th, 190 cars of ore were received at the Anaconda works from Butte. This is the biggest shipment on record, and represents 3,800 tons of ore loaded in one day.

Anaconda Mining Company.—The Anaconda Company has invited bids for 1,000,000 ft. of shafting timber, and will sink a number of its 18 shafts to greater depth, while the product is being curtailed 50%. In this way the company's men will be kept employed during the lean period.

Colorado Smelter.—The repairs of the Colorado smelter occasioned by the recent fire are nearly completed, says the Daily "Inter-Mountain." Owing to the increasing quantity of ore now being taken from the Gagnon, Star West, Caledonia and National mines, it was found necessary to enlarge the calciners at the works, and to this end an addition is being built to the east end of the building, and the roofs of the calcining sheds are being raised. When the repairs are completed, the smelter will be fully able to handle all the ores from the company's mines and a large quantity of custom ore also.

NEVADA.

Elko County.

Following are the latest official letters from the Tuscarora mines:

Belle Isle Mining Company.—West cross-cut 250 level extended 6 ft., cutting a small vein giving good assays; south drift same level extended 10 ft., showing spots of good ore; upraise on the east vein 350 level extended 12 ft., with no change.

Coptis Mining Company.—The seam ledge continues to produce high grade ore. A drift north of main west drift and same level exposes quantities of \$30 ore. The mill finished crushing on about the 26th.

Navajo Mining Company.—North intermediate drift above the 350 level has been extended 15 ft. and is still showing some good ore in the face.

Nevada Queen Mining Company.—Second level: South drift from No. 3 east cross-cut advanced 15 ft. in porphyry; stopes above this drift have an opening of 120 ft., with good ore all through; stopes from No. 1 chute in the east vein are opened up 90 ft.; ore varies in width from 1½ to 6 ft.; extracted during the week 72 cars first-class ore, battery assay \$267 per ton, and 684 cars second-class, average \$28 per ton. Third level: Stopes from south intermediate show 18 ins. of ore, some of which is high grade.

North Belle Isle Mining Company.—The west cross-cut, 400 level, extended 24 ft.; expect to cut the vein within the next 20 ft.; rock very hard in the face; the stope from the No. 1 upraise, south 500 level, shows some very good ore and is being extended to the south, following the ore which is stretching out in that direction.

Esmeralda County.

Mt. Diablo.—Work was resumed on July 1st at this mine after a shut-down of eight months. Regular ore shipments will be made to the company's mill at Sodaville.

Lincoln County.

Pioche Consolidated Mining and Reduction Company, Pioche.—The No. 3 Meadow Valley shaft has recently been opened and active work is being done. About 15 men are employed cleaning out old drifts and in spiling from the cross-cut on the 10th level on the Mazeppa vein to connect the Mazeppa shaft. Recently rich lead ore was encountered, which in early days was considered too base for milling. The last assays from the ground opened run from 40 to 50% lead and from 400 to 500 oz. silver. A force of men has also been put at work on the old Lightner—or Raymond & Ely—shaft to re-timber and put it in good working order. It is possible that the company may conclude to start active work on the property. In such case a large and modern mill will be built to treat the ore, of which a great deal is in sight. In driving east on the 1,300 level of the Yuba a fine body of lead ore was encountered over 300 ft. from the shaft. Recent assays have run over 40% lead and 120 oz. in silver to the ton. An upraise has been started which is now 20 ft. above the level, and the ore has widened out from 6 in. to over 3 ft. This is considered important, as it is virgin ground clear to the surface, and the ore found is in an entirely new and heretofore undiscovered ore chute, and the principal workings of the mine lie to the west of the shaft. The smelter has been treating the old Bristol slag and putting through, with a low grade zinc ore from the Yuba, from 80 to 90 tons daily.

Manager John E. Eames, of this company, says the Pioche "Record," states that while the properties of the company are not being worked as extensively as might be wished, yet what work is being done is daily proving up new and rich bodies of ore. The Pioche smelter has been running for the past 50 days, and at a handsome profit to the company. Most of the ores treated at the smelter on this run are the ores which were taken out in the development of the different mines. No effort has been made to make a large tonnage, especially from the company's own properties. All the ore smelted from the old Day mine has been drawn from the over-production of the last few months, and although the mine is practically closed down, there are still over 3,000 tons of ore in the bins ready for shipment. Probably the largest producer in the district is the Yuba. Only such ore as has been taken out in development has been shipped to the smelter, but from this ore there has been a net profit of over \$20,000 during the last 30 days, and the mine in every particular is improving, both in grade, quantity and the amount of ore in sight, the last mill-run netting over \$200 to the ton.

Storey County—Comstock Lode.

Consolidated California & Virginia Mining Company.—Following is the latest official weekly letter from the mine: "There have been extracted from all parts of the mine during the week 998 420-2000 tons of ore, which were shipped to the Morgan mill, the average value of which, per car samples, was \$25.95 per ton. The average assay value of all the ore worked at that mill during the week, 980 tons, was \$23.41 per ton per battery samples. There were worked at the Vivian mill during the week 230 tons of ore, the average assay value of which, per battery sample, was \$18.68 per ton. Bullion shipped to Carson mint, assay value, \$17,034.22. Bullion

shipped to the company's office in San Francisco, assay value, \$1,534.98."

Hale & Norcross Mining Company.—This company has received a check for \$2,813.15, that being the amount of money taken from the treasury of the company by the defendants in the Fox litigation to pay their lawyers' fee. The company was justly entitled to receive back the money. The latest official weekly letter from the superintendent says: "Of the ore remaining in the orehouse at the time we ceased extraction, there has been shipped to the Brunswick mill 416 850-2000 tons; average railroad car samples of same, \$16.72. The last shipment cleaned the orehouse completely. Average battery assay for the week, \$12.70."

Occidental Consolidated Mining Company.—The latest official weekly letter says: We have extracted from the 350, 400 and 450 levels 180 tons of ore of the average value of \$26.71, as per car samples. Milled during the week 182 tons of the average value of \$23.10 as per battery samples. The Zadig drift from the Sutro tunnel has been extended 23 ft.; total 661 ft.

Potosi Mining Company.—The latest official letter says: We have extracted and sent to the mill 495 1100-2000 tons of ore; milled during the week, 455 tons; on hand at mill, 120¾ tons; average battery assay, \$28.08; average car samples, \$26.09; sent to Carson mint, 397 lbs. of crude bullion.

Savage Mining Company.—The latest official weekly letter from this mine says: "We have hoisted 613 cars of ore from the 950, 1,100, 1,400 and 1,450 levels. Shipped to the Nevada mill 525 tons and milled 525 tons; average car sample assay, \$26.01; average battery assay, \$21. Bullion yield for the week, \$7,843.50. Shipped to the United States mint at Carson bullion of the assay value of \$9,736.40. From the 16-ft. floor of the 500 level ore stopes the west cross-cut is advanced 43 ft.; face continues in quartz of low value. From the 7-ft. floor of the 950 level the west prospecting drift is advanced 59 ft., and 10 ft. back from its face the drift passed through a 2-ft. stratum of fair-grade ore. On the 1,100 level the west prospecting drift from the 14-ft. floor was advanced 17 ft.; face is in softer porphyry and stringers of quartz. The joint upraise with the Gould & Curry Company from the Sutro tunnel level is now advanced 120 ft. on the slope; top is in quartz giving low assays. We have started a winze from the north drift, 1,500 level, to meet this upraise; this winze is now down 16 ft. We expect to connect it with the joint upraise from the Sutro tunnel the latter part of the coming week."

(From our Special Correspondent.)

Affairs on the lode have been very quiet during the past week, and the weekly reports have been, as usual, destitute of any enlivening information. The following is the weekly statement of ore hoisted from Comstock mines and milled, with the car and battery assays, bullion shipments, etc.:

Mine.	Tons hoisted.	Car sample assay.	Tons milled.	Average bat. assay.	Bullion product for week.	Bullion shipped.
Con., Cal. & Va...	998	\$25.95	980	\$23.41	\$	\$33,233.75
Hale & Norcross	416	\$16.72	416	\$16.72	...	\$1,534.98
Occidental	182	\$23.10	182	\$23.10	...	
Overman	495	\$28.08	455	\$26.09	...	
Potosi	495	\$28.08	455	\$26.09	...	\$397
Savage	613	\$26.01	525	\$21.00	\$7,843.50	9,736.40
Yellow Jacket	...	...	...	...	...	...

* To date on June account, \$67,589.63.

† Worked at Vivian Mill.

‡ Shipped to S. F.

§ This week's working will exhaust the accumulated ore in the bins.

|| Crude bullion.

¶ Cars.

** No report.

*** Overman extraction temporarily suspended.

This week the Associated Press spread abroad what is actually a lie. Under the heading "The Charges were False," it was stated that Inspectors Whitehead and Leech had arrived from Washington to inspect the United States mint at Carson on charges made by San Francisco mining men. It went on to say that the Inspectors left Carson the same night after reporting every department in excellent condition, with no discrepancies of any kind, and that Superintendent Wright had been warmly complimented on his general management. Messrs. Whitehead and Leech, to begin with, are not "inspectors," but simply United States Examiners. They did not examine the Carson mint on charges made by San Francisco mining men, but simply in the discharge of their ordinary duty, it being usual at the end of the fiscal year to examine the coin and bullion on hand at the various mints, and see that all is in order after making due allowance necessary for wastage. They did not report "every department" in excellent condition for the simple reason that it did not fall within the line of their duty to delve into the archives of the mint.

Belcher Mining Company.—The outlook encourages the hope that the good ore found may yield bullion sufficient to save stockholders an assessment.

The ore found below the 300 level continues good for width and quality, and the Brunswick mill was to have started up on the 1st inst.

Overman Silver Mining Company.—The repairing work which has interfered with work is completed, and this week shipping ore to the mill will recommence.

NEW MEXICO.

Horseshoe.—The Knott and Noel mill at Malone is running steadily on ore from this mine and making regular shipments of bullion and concentrates. The vein shows 2½ ft. of ore which runs \$46 per ton, and alongside is 5 ft. of lower grade ore which runs \$25 per ton.

Grant County.

Advices from Silver City report that the rainy season has commenced, and many mills which have been idle for weeks on account of scarcity of water will be started up soon. None of the mills there has been in operation for several weeks, and it is not probable that more than two will be started before the end of the summer. The Manhattan mill has been in operation only a few days this year, and it will not be started again for several months. The Pacific mill will be started as soon as water can be obtained to run it, and the Flagler works will be started in about a month. The Bremen mill has been idle for about three months, and will probably remain so for the rest of the year. Work is progressing on the new part of the Colchis mill, but it will not be ready for operation much before the end of the year. The total daily capacity of these plants is between 400 and 500 tons of ore.

According to the correspondent of the New York "Sun" there has been a very marked falling off in the production of gold and silver in this county this year. Last year Pinos Altos was the leading gold-producing camp in New Mexico, but this year the mines there have produced less than half as much gold as they did from Jan. 1st to July 1st, 1891. The collapse of the Mountain Key and Aztec companies reduced the production considerably in the camp, and litigation has prevented the operation of other mines. The low price of silver has had its effect on the silver camps, and the outlook for silver miners is anything but encouraging. The silver output of this county this year will be the smallest for fifteen years.

Anson S., Silver City.—This copper smelter has been closed down, and will not be blown in again, it is announced, until about the 1st of September. Nothing is being done at the mine except to keep the water pumped out. The last run was one of the shortest ever made by this smelter.

Maud S., Silver Creek.—Operations have been entirely suspended on this mine and mill, and there is said to be very little doing in the camp. The mill is nearly completed, and the manager of the company which purchased the mine about three months ago expected to have the mill in operation early in July.

Texas, Central.—A carload of ore from this mine, in the Central district, has just been taken to the smelter at El Paso, Tex. The first grade ore is said to run 230 oz. in silver and 1 oz. in gold, and the second grade runs 121 oz. in silver and about half an oz. in gold. The mine has been developed to a depth of 90 ft.

Lincoln County.

North Homestake, White Oaks.—At the 18th level in this mine in drifting, after having passed through the original body of ore from which over \$200,000 has already been produced, the level was being continued to intersect some old workings, when at a distance of 12 ft. from the original ore chute a new body of ore was struck which shows a breast 10 ft. wide. The lower levels of the mines are at 50-ft. intervals. At the next level, No. 18½, the ore was tapped again and lies apparently almost perpendicular and parallel to the body of ore which has proved so profitable to this mine. At level No. 19½ this new strike was again reached, showing the continuation of the ore chute, "in sight" for the 150 ft. between levels Nos. 18 and 19½.

PENNSYLVANIA.

Coal.

Burnside, Pottsville.—This colliery, the breaker of which was destroyed by fire Jan. 19th, has resumed operations. A new and improved breaker, capable of preparing for market 200 cars of coal per day, takes the place of the destroyed structure.

Delaware, Lackawanna & Western Railroad Company.—This company has begun the development of its extensive coal lands at Hanover. Workmen are now busy sinking the first shaft, and as soon as this one is opened up work will probably be begun on another. One or two breakers will also be immediately constructed, it is said, and hundreds of men and boys will be given employment. The new shaft that is now being sunk is situated on the breast of the hillside between the Lehigh Valley Railroad and the Central Railroad of New Jersey tracks, a quarter of a mile below Hanover Station on the Central Railroad. Operations are in full swing and are in charge of Superintendent Carey, formerly of Kingston. A track for bringing in supplies has been laid from the Central Railroad main line of the Nanticoke branch.

Philadelphia & Reading Coal and Iron Company.—An order was issued on the 1st inst. at the Pine Forest Colliery of this company, near St. Clair, reducing the miners' wages 50 cts. a yard and 10 cts. per wagon. The men thus affected had just been rejoicing at an advance of 2% when this set-back came.

SOUTH DAKOTA.

Lawrence County.

Deadwood & Delaware Smelter.—The smelter is daily in receipt of large quantities of ore from different parts of the Hills, says the "Pioneer." Among the mines that are shipping their product to this institution are the Iron Hill, Calumet, Hayes, Spokane, Maggie and others. Work on the new slide is almost completed, and it is thought that the new plant will blow in about July 12th.

Golden Reward Mining Company.—The semi-monthly clean-up of this company for the last half of June amounted to \$22,572. This is the largest yield yet from these works for a fifteen days' run, and is attributed to the fact that an average of 10 tons of ore a day more than usual was reduced. The works are running satisfactorily. The new building for an enlarged cooling floor is inclosed and will be completed within a week. The coming 15 days' operations will be made with but two harrels instead of three, as the shell of one has worn through and the machine will be rebuilt, requiring two weeks. The capacity is being gradually increased.

Horseshoe Mine.—This group of mines has been purchased by T. H. White, says the Black Hills "Times." He will commence at once upon a shaft to be sunk 300 ft. He recently purchased a large hoisting outfit with a 50 H. P. engine, and work will be started in a few days putting machinery in shape.

McGee & Daegling Reduction Works.—The reduction plant which was erected by McGee & Daegling last winter and which has been closed down for several months, will start about the 25th, says the Black Hills "Daily Times." The reason of the close down was for the purpose of putting in a larger cast iron vat, which is the receptacle into which the ores according to the McGee process are changed from refractory to free milling either by steam, which is introduced by perforated steam pipes coiled about its sides, or by intense heat from a fire below. The vat, owing to its size, was not procurable ready made, and had to be made to order. The vat is enameled so as to prevent corrosion; was cast in 12 sections, each weighing 600 lbs. It is 10 ft. in diameter and has 1,800 ft. of coiled pipe for the transmission of steam, and is so arranged that in case heat instead of steam is to be applied to ores, it can be done by stopping up the steam holes by plugs for the purpose. The machinery will arrive this week and be placed in position immediately and the plant started. The plant will be of 30 tons daily capacity, and capable of handling twice that amount by a few additions which will be put in later when everything is running smoothly.

Victoria Lode.—An important discovery of lead ore has been made on this lode. The ore is a quartzite and carries considerable lead and some gold in a refractory state.

Pennington County.

Welcome Mining Company.—The Welcome Chlorination Works are running smoothly. The percentage of precious metals saved is higher than any similar plant in the country, and those interested are elated over the result, says the "Pioneer." Mr. Dennes is superintendent and Mr. Langruth, formerly with the Golden Reward Works, is the chemist.

UTAH.

Box Elder County.

Garfield Mining Company.—The tunnel on this mine, in Gibb's Canyon, north of Brigham City, is 1200 ft., and in the face shows a 5-ft. vein of good ore. It is said, reports the Brigham "Bugler," that the company has made arrangements to erect reduction mills about five miles north of Brigham City.

Juab County.

Bush Copper Placer Mining Company.—The new mill being erected, this property will be in readiness to begin operations on or about the 10th of July. The boiler and engine are ready for the water and the owners of the property have succeeded in getting the water down to the mill for the working of their hydraulic apparatus.

Bullion-Beck Mining Company.—It is the intention, says the Salt Lake "Herald," to treat the third-class dump at the Mammoth mill. There are thousands of tons in that dump which will keep the mill busy for some time to come.

Peru.—This mine, recently purchased by New York parties, is being worked by two shifts. This property adjoins the Yorkville on the north and is considered by mining men to be promising, being on the same vein system as the Keystone, Retribution and Yorkville. A shaft is to be sunk 300 ft. and an engine to be placed at once. R. V. Tone has been appointed superintendent of the work.

Young Mammoth Mining Company.—This mine is located a mile and a half of the C. W. B. group.

The shaft is down 150 ft., where an ore body 6 ft. wide has been cut that averages 17% copper, 17 to 18 oz. in silver and \$10 in gold to the ton.

Salt Lake County.

Keystone Mining Company.—Little is being done, except sinking the new shaft to the 700 level and laying the foundation for a new plant. The stonework and timbering for the foundation of the new building is in course of construction, and the machinery is on the ground. Development so far shows the property to be good, says the Salt Lake "Journal." When the 700 level is reached it is probable they will keep on down with the shaft until it is deemed best to resume shipments.

Summit County.

Copper at Snake Creek.—The Kimball Bros. et al. have developed their copper property until it now shows a ledge 50 ft. wide, running 13% copper, says the Park City "Record." It carries a few ounces of silver and some gold.

Daly-West Mining Company.—The three-compartment shaft is down 800 ft., and it will be sunk 400 ft. farther before drifting for the vein is commenced. The mine will be drained by the Ontario tunnel.

Glencoe Mining Company.—The mill is running steadily. About 60 tons of crude ore per day is being put through. An air compressor has been ordered, and expected to arrive in a few days.

Rosscamp and Glenn Mines.—A rock crusher has been purchased, jigs have been put in place, and now a large water-wheel, 12 ft. in diameter, is being built. The owners expect to secure a marketable ore by the jiggling process, and propose to test the matter. They have also purchased a small engine. They are now drifting on the vein and the ore is steadily improving in quality.

Utah County.

Butterfield Tunnel.—The Butterfield tunnel is in a distance of 300 ft. and is being driven ahead by a full force. The work of placing the machinery is now, and will be until everything is in position, one of the principal orders of the day with the company, says the Salt Lake "Tribune." The air compressors are in position and the air pipe is made and ready to send from the shop to the tunnel.

Sioux Mining Company.—This company has commenced the erection of a 50-ton daily capacity cyanide mill in Provo, says the Salt Lake "Mining Journal."

WASHINGTON.

Okanogan County.

A new mining district, called the Cory, is being organized on the Similkameen River, and a canvas town has sprung up, says the Tacoma "Journal." The ore of the camp is free milling, and some assays run as high as \$350 to the ton. A rich pocket has been struck in the Gold Finch mine, on Palmer Mountain, Okanogan County, 130 miles north of Coulee City. The Rainbow group of mines, on Palmer Mountain, has been bonded for \$105,000, one-tenth of which has been paid.

Empire Mining Company.—An extensive body of ore has been opened in this company's mine on North Palmer Mountain, near Loomiston, says the Spokane "Chronicle." The ledge is 6 ft. wide between walls, and a drift of 80 ft. along the vein shows the ore to have an average value of \$42 per ton in gold. An incline shaft has been sunk 100 ft. on the lode and a tunnel is being driven along the vein.

Stevens County.

Galena Mining Company.—The new concentrator, with a daily capacity of ten tons, is in operation, and the mine is producing that amount of ore daily, says the Spokane "Spokesman." The main shaft has reached a depth of 50 ft. and shows a good hand of ore. Two tunnels are being driven each way on the lode, which is from 4 to 7 ft. wide. The ore is low grade, averaging from 70 to 80% lead and 10 oz. of silver to the ton. Seven men are employed and the number will be increased as the mine is opened out and stoping ground is made.

WEST VIRGINIA.

All the coal miners of the Wheeling district struck on the 2d inst. for the Columbus scale, which the operators refuse to sign. Over 400 men are out.

WYOMING.

The following excerpts from the Hay Creek coal fields, Wyoming, are from a letter of Prof. Jos. Hemingway to the Deadwood "Daily Pioneer": "The coal field is situated in township No. 54 north, range 61, Crook County, Wyo. Hay Creek coal may very properly be classed as bituminous, and not lignite—or even lignitic. Its outcrop may be seen at an elevation of some 40 ft. above the creek in the bluffs constituting the Hay Creek Valley. Geologically it would appear to be a Triassic or Jura-Triassic coal seam—when considering the position of the 'Dakota group.' While considerable prospect work has been done in two of the openings, the writer, as yet, has been unable to discover any definite fossils, which would define its true geological horizon. No pains have been spared to form a true estimate of the character and commercial value of this particular coal seam. The thickness of the seam in the Larrabee tunnel, which is down to the distance of 500 ft., is 6 ft. 1 in. The tunnel is now in the solid coal, and not affected by the inferiority

of outside croppings. The other openings, two in number, and owned by the Hay Creek Coal Company, do not present so favorable an appearance at the face of the tunnels, but in justice it may be stated the latter two openings are standing in the outcrops of the coal, and the maximum thickness cannot be looked for until the solid coal is reached. The seam was found to be perfectly free from 'dirt' or 'slate-hands,' from the roof to the floor. The undercutting is very friable. Analytically, the proportion of carbon to bituminous matter, together with the small percentage of ash, render this an ideal steaming coal. It is a 'free burning coal' in the broadest sense, requiring but little skill as a firer to secure from every shovelful complete combustion. From the evidence it is conclusive that the country lying north of the Larrabee openings and also of the Hay Creek Company openings is underlaid with coal. From investigations made at the face of the tunnel I am drawn to the conclusion that the cost of production would be much less than at the Newcastle mines, which are situated 50 miles due south of Hay Creek. The difference in the cost of production of these two respective and distinct seams may be accounted for through two peculiarities, first, the Hay Creek seam is devoid of those heavy 'bands of bone,' 'nigger head,' 'black jack' or 'splint,' which in a great measure prevents the Newcastle coal from being both undercut and blasted; second, there is a soft 'hand' or 'streak' near the roof of the Hay Creek coal bed. This feature causes the roof and the coal to be practically separated and will diminish the resistance in 'short forcing' to such an extent that a 'blast' carefully located 'on the solid' would dislodge the coal without the expense of undercutting."

Laramie County.

Cheyenne.—The foundations of the new smelter at this place have been laid and the work of construction will shortly commence. The contract was given to the Colorado Iron Works. Mr. T. German, who built the furnaces at the Omaha & Grant Smelter, will, it is said, superintend the construction of those at Cheyenne. The smelter is intended for the special treatment of the low grade ores of Wyoming.

FOREIGN MINING NEWS.

CANADA.

Ottawa.

The recently discovered nickel mines in the Lake of the Woods region are attracting considerable attention abroad and bringing many strangers to the district. The outcrop of this property occurs on the face of an escarpment bordering on the lake, and is over 200 ft. in width. The lode is traceable for a distance of twelve miles northwest. Arrangements have been made with a Milwaukee party for putting a diamond drill on the property of Charles Moore, four miles east of Rat Portage and three miles north of the Canadian Pacific Railway. The outcrop there is about 60 ft. in width, and is nearly solid pyrites of iron, the associate metal of nickel.

MEXICO.

Durango.

Gurney Mining and Milling Company.—During the week the steamer "Siquil" arrived in San Francisco from Altata, Mexico, with 500 tons of silver ore, valued at \$100,000, from the Madrugada mine. This mine is one of a group of seven owned by the Gurney Milling and Mining Company, located at Topia. Large quantities of valuable ore are extracted from these properties each month, and heretofore it has been shipped to Europe for reduction. Arrangements have now been made, however, for a series of monthly shipments to Selby's Reduction Works in San Francisco. It is hoped and believed that this is the first step made toward the diverting of Mexican ore, hitherto shipped to foreign ports, to American reduction works.

Lower California.

(From our Special Correspondent).

The Santa Rosalia del Carmen, comprising a section four miles square, has been purchased by an English syndicate which, it is said, is prepared to expend a large sum in developing the copper deposits. Messrs. Richardson, Francis & Mock, ore dealers, of Swansea, are behind the enterprise, and J. L. W. Mock, one of the sons of the Swansea firm, was sent out to expert the property. The tract is in the heart of the cupriferous region, and has been worked by rude Mexican methods sufficiently to establish its value. August Derre, a mining expert, of San Francisco, placed the property on the market, and final instructions are being awaited before proceeding to open the mine. The Rothschilds and Mirahands, the Paris bankers, have sunk \$5,000,000 in developing the region. The tract which Mr. Derre and his confreres secured on option was known as the Boleo grant, and was, in English measurement, about 21 sq. miles, save that in the center was a grant known as the Santa Rosalia del Carmen, about 4 sq. miles. The French company purchased the Boleo grant for \$1,000,000, and began the erection of the immense works now operating at Santa Rosalia, the port of that region. Five 80-ton smelters were built, and three of them are now operating and producing 20 tons of copper bullion daily. Yaqui Indians are employed in preference to

Mexicans, and 4,000 of them are now steadily employed. Three years ago the Santa Rosalia del Carmen grant was placed on the market, and a syndicate formed with a capital stock of £250,000. When the French Copper Syndicate came to grief negotiations ceased, and the scheme was held in abeyance until it was revived a few months ago.

Monterey.

The San Pedro mine is now shipping large quantities of fluxing ore to the Monterey smelters. This is one of the best mining properties in close proximity to Monterey, and is particularly valuable as a fluxing ore, being entirely free from zinc. It is one of the old Spanish mines operated centuries ago, and the ruins of ancient smelters are found at the base of the mountain. A new tunnel 600 ft. below the old shaft has been cut to a distance of some 700 ft., tapping the main ore body, from which side tunnels branch out into the veins. A tramway has been laid to all parts of the tunnel, and the ore is conveyed to the surface in tram-cars. A cable tramway down the mountain side has also been constructed, and the ore is lowered to the wagon road as fast as it is brought to the surface. The output of this mine is 100 tons of ore per day. The owner of the mine, Joaquin Maiz, has expended \$200,000 in the development of the property. The new mines recently opened up in Old Rosario vein, near Salinas, this State, are being worked with renewed energy, and shipments of ore to the Monterey smelters will soon commence. The product of the new mines is a low silver-lead fluxing ore, carrying a high per cent. of iron.

Hidalgo.

The four tunnels in Pachuca district, projected and commenced over three years ago by W. B. Murdoch, have lately been visited by J. H. Thompson and W. G. Hooper, two engineers sent for that purpose by a syndicate in England. They made a thorough examination as to the tunnels and sinking of the Santa Gertrudis, El Bordo, El Christo, San Rafael, Pabellon, El Barron, Zorra, and San Ignacio mines, besides inspecting at El Chico the mines of the Aurora Company, also Santo Tomas and La Perla, the latter owned by Don Marcial Islas and others. This visit satisfied the gentlemen, it is said, of the practicability of the tunnels when driven, should they retain the rights under which they were started. The three tunnels on the Pachuca side of the mountains are to be each about five miles long, while the fourth, commencing from the Rio Amajac, at the base of the mountains on the opposite side from Pachuca and over 2,000 ft. below it, will be 12 miles long. The tunnels will intersect over 100 known mines, many of them among the richest in Mexico, and at depths from 1,000 to 4,000 ft. It is only a question of a short time when the water in the silver mines of Pachuca and Real del Monte will almost prevent their being worked, at least profitably, except through the medium of the Murdoch tunnels, to build which foreign capitalists are favorable, but only on the condition that the Government grants privileges and benefits commensurate with the great advantages and profit they afford mines intersected and drained by them.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, July 8th.

Heavy Chemicals.—The usual midsummer dullness reigns supreme in this market. The glass factories are shutting down for the customary "hot spell" vacation, and there is but little trading in carbonated soda ash and alkali. Indeed, all chemicals on the list are quiet and nothing of interest can be reported of any. Prices are altogether unchanged from last week, and we repeat our quotations: Caustic soda, 70%, 2.95@3.10c.; 74%, 2.97½@3.12½c.; 76%, 3.12½@3.25c.; 77%, 3.12½@3.25c. Carbonated soda ash, 48%, 1.55@1.60c.; 58%, 1.47½@1.52½c. Alkali, 48%, 1.55@1.60c.; 58%, 1.47½@1.52½c. Sal soda, English, 1.05@1.10c.; American, 1@1.12½c. Bleaching powder, 2.15@2.20c. on the spot, according to quantity.

Acids.—The past six months have seen considerable activity in the acid market. The causes which have led up to this satisfactory state of affairs have been mentioned in this column at various times. Briefly stated, we may say that the good business in acids during the first half of 1892 has been due principally to the fact that while the production has decreased, the consumption has increased. Prices on the whole show but little change. In the case of chamber acid, it is claimed that the price is firmer and that \$8 has been refused for fair-sized orders, manufacturers declining to sell below \$9. We quote: Acid per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60@2, according to quality; muriatic, 18°, 80c.@\$1.20; 90c.@1.10; 22°, \$1@1.25; nitric, 40°, \$4; 42°, \$4.50@4.75; sulphuric, 85c.@\$1.10; mixed acids, according to mixture; oxalic, \$7.25@7.75. Blue vitriol is quoted all the way from \$3.25@3.50; alun, lump or ground, \$1.55@1.80. Glycerine for nitro-glycerine, 11½@12½c., according to quality and quantity.

Brimstone.—The market for brimstone is quiet but higher. Quotations for best unmixed seconds are \$24.25 for shipments, and \$25 for spot. Best unmixed thirds are held at \$1 less.

Fertilizers.—This market is quiet and dull. During the past week, owing to a holiday, there has been but little trading, and nothing of special interest has occurred. Dried blood is firmer, owing to light stocks. Fish scrap is also scarce and higher in price, owing to the smallness of the fish catch this season. The other chemicals show no change of any kind whatever. Our quotations this week are: Sulphate of ammonia, \$2.85 for bone goods and \$2.90@2.95 for gas liquor. Dried blood, \$1.90@1.95 per unit for high grade and \$1.80@1.85 for low grade. Acidulated fish scrap, \$13.50 f. o. b. factory; dried scrap, \$23.50. Azotine, \$1.80@1.85. Tankage, \$17.50@21, according to grade. Bone meal, \$22.50@23.50.

Double Manure Salts.—Quotations are as follows for lots of from 10 to 50 tons ex-vessel New York: 48-53%, \$1.13½@1.23½; 90-95%, \$2.13@2.23½.

Kainit.—There is no change to report in this article. Prices remain: \$8.75 for invoice weight and \$9 for actual weight, New York and Philadelphia.

Muriate of Potash.—There is nothing new to report of this article. The market continues quiet. During the week there were sales of 150 tons. Arrivals for the same time aggregated 200 tons. Prices remain as fixed by the syndicate, to wit: Fifty-ton lots or over, New York and Boston, \$1.81½; Philadelphia and Baltimore, \$1.84; Southern ports, \$1.86½.

Nitrate of Soda.—This market is quiet but rather firm. Quotations are \$1.70 on the spot and \$1.72½ to arrive.

Messrs. Mortimer & Wisner, the well known nitrate brokers of this city, send us the following interesting statistics:

	1892.	1891.	1890.	1889.
	Bags.	Bags.	Bags.	Bags.
Imported into Atlantic ports from West Coast S. A. from Jan. 1, 1892, to date...	406,219	318,845	391,565	257,103
Imported into Atlantic ports from Europe.....	.....	18,802	.....	.....
Stock in store and afloat July 1, 1892, in New York.....	77,457	74,540	59,846	60,860
in Boston.....	1,000	2,000	.....	1,600
in Philadelphia.....	.....	.....	.....	.....
in Baltimore.....	6,500	2,000	1,400	13,050
To arrive, actually sailed.....	136,000	210,000	.....	.....
Visible supply to Oct. 1, 1892.....	220,957	288,540	.....	.....
Additional charters....	110,000	200,000	461,800	318,500
Total supply, when shipped.....	330,957	488,540	523,046	394,010
Stock on hand, Jan. 1, 1892.....	53,585	36,454	22,009	87,043
Deliveries past month.....	84,785	31,259	77,088	44,950
Deliveries since Jan. 1 to date.....	374,847	297,561	351,728	270,136
Total yearly deliveries.....	.....	634,207	673,679	546,589
Prices current July 1, 1892.....	1'70c.	1'95@2c.	1'70c.	1'90@1'95c.

Liverpool.

June 29.

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

Our Market for heavy chemicals is, if anything, slacker than ever, attention at present being apparently devoted to the parliamentary elections. As for quotations, the only change to report is a reduction in price of chloride of potash, other articles being nominally unaltered.

Soda Ash.—The Alkali Company is declining to quote for any position to the end of the year, except for small barrel orders for special markets. Quotations are therefore quite nominal as follows, viz.: Caustic ash, 48%, £5 5s. 3d. per ton; 57-58%, £6 7s. 6d. per ton; carb. ash, 48%, £5 9s. 9d. per ton; 58%, £6 12s. 9d. per ton; ammonia ash, 58%, £6 7s. 6d., all net cash.

Soda Crystals are dull at nominally £3 7s. 6d. @ £3 10s. per ton less 5%, when possibly a shade under the lower figure might be accepted for a good order.

Caustic Soda is quite neglected, and quotations are nominally as follows, viz.: 60%, £9 2s. 6d. per ton; 70%, £10 5s. per ton; 74%, £11 5s. per ton; 76%, £12 5s. @ £12 10s. per ton, all net cash. For parcels under 10 tons, 5s. per ton extra is charged. Nothing offering on this market for shipment to your side.

Bleaching powder scarce and steady at £7 15s. to £8 per ton net cash for hardwood for all quarters except United States and Canada.

Chlorate of potash is weak and the "Union" has reduced the price to 6½d., less 5% for prompt and 6¼ per pound for forward delivery. Resellers could probably be found at from an ¼ to ½d. per pound under these quotations.

Bicarb. soda is selling to a fair extent at £6 15s. per ton, less 2¼% for one hundredweight kegs, with usual allowances for larger packages.

Sulphate of ammonia is better, there being less pressure to sell on the part of the holders. On the spot the nearest values are £10 3s. 9d. @ £10 5s. per ton for good grade of 24% and £10 7s. 6d. @ £10 8s. 9d. per ton for 25%, both in double bags, less 2¼% f. o. b. here.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Deadwood, Dak., Pittsburg, St. Louis, London and Paris, see pages 46 and 48.]

NEW YORK, Friday Evening, July 8, 1892.

Last week has been one of great dullness at the mining exchange. Usually when there is a holiday in the early part of the week the volume of business is small, and trading is of a desultory nature. Add to this the invariable dullness of midsummer and a fair idea may be gained of the mining market just now.

Trading in the Comstock stocks has been devoid of features during the past week. We note sales of 100 shares of Best & Belcher at \$1.95; 300 shares of Bullion at 80c.; 100 shares of Chollar at 95c.; 3,000 shares of Comstock Tunnel stock at 12@13c.; 150 shares of Union Consolidated at \$1.15; 200 shares of Consolidated California and Virginia at \$3.85 to \$3.90; 200 shares of Crown Point at \$1.20; 120 shares of Hale & Norcross at \$1.45; 100 shares of Savage at \$1.50; 100 shares of Sierra Nevada at \$1.10; 150 shares of Yellow Jacket at \$1.

There was a sale of 100 shares of Eureka Consolidated at \$1.90.

Of the California stocks Belmont is reported officially to have been traded in to the extent of 1,400 shares at 38@40c., and Brunswick Consolidated, 2,400 shares, at 14@17c. Hollywood appears this week with sales of 2,000 shares at 2c. Of Mono there was a sale of 100 shares at 30c.

Standard Consolidated was rather quiet during the week; sales amounted to 200 shares at \$1.50. The company's receipts for the month of June amounted to \$19,700. The expenses for the same time were \$14,500, showing a net profit of \$5,200 for the month. On June 30th the company had a surplus of \$50,000.

Of the Colorado stocks, Breece shows sales of 200 shares at 35c. Enterprise was dealt in at the New York Stock Exchange during the week; sales aggregated 300 shares at \$5.25@5.35. Leadville Consolidated was neglected, only 100 shares being sold at 14c. Of Little Chief, 200 shares changed hands at 26c. There was a solitary transaction of 100 shares of Robinson Consolidated at 40c. Small Hopes shows sales of 500 shares at 90c.

Of the Black Hills stocks there were sales of 300 shares of Father de Smet at 30c., and 300 shares of Sullivan Consolidated at 98c.@\$1.

Horn Silver this week shows sales of 400 shares at \$3.30@3.45. The latest information from this property is to the effect that its new shaft has opened the ground so as to be worked on all levels, from the first to the 11th, and good ore is being extracted from all of these levels. A large country is being opened to the north of the old workings. On the 700-ft. level a drift is being run northward, and it has now penetrated over 1,100 ft., and it is opening up a large amount of ore. This level or drift will be 1,500 ft. in new ground. Last year the property sent to market about 26,000 tons of ore. There is enough ore blocked now to keep the miners busy for some years.

For the first time in many months Silver King was traded in at the Consolidated Stock and Petroleum Exchange; a sale took place this week, of 100 shares at 50c.

Phoenix of Arizona this week shows transactions of 500 shares at 50c.

According to the official sales lists El Cristo was dealt in to the extent of 1,170 shares at 45c.

Santa Fe, which had not been traded in for a long time, this week shows a sale of 200 shares at 12c.

Boston.

July 7.

(From our Special Correspondent.)

The demoralized state of the ingot copper market and the holidays combined have made this about the dullest week for copper stocks of the season. There is no encouragement to buy stocks, and there is not much chance to sell them, consequently the market steadily declines as holdings are thrown over, and prices rule in the buyers' favor. Boston & Montana continues on the down track, selling from \$37¼ to \$35, with recovery only to \$35¼ in the later dealings.

Butte & Boston declined to \$11, with last sale at \$11¼. The company's mines are opening very satisfactorily, and underground work continues while the surface works are being rebuilt.

A meeting of the stockholders of the Butte & Boston Company was held yesterday to vote on the issue of \$2,500,000 in bonds. The Davis Estate, holding 90,000 shares, would not consent to the bonding, and so meeting was adjourned to 18th inst. at Boston.

Only 5 shares of Calumet & Hecla changed hands the past week at \$272. This stock holds remarkably firm under existing circumstances, and there is very little of it offered, holders seemingly being content to hold it for better prices in the future.

Osceola is the only stock on the list which shows an advance over last week, selling up to \$29½ and

reaching to \$29 only. The product for the six months ended June 30th shows an increase of 148 tons over last year, notwithstanding the strike in June. It is stated that the ore is running much richer than it did a year ago, and the cost of production is less.

Tamarack continues to rule heavy, declining on small sales from \$160 to \$156.

Tamarack, Jr., sold off to \$35 again. It is stated at headquarters that the prospect is quite as promising as Tamarack, Sr., was at the same stage of development. Should we have an active copper market the stocks would probably be in quick demand at present prices.

Centennial sold at \$9 1/2 for 50 shares only, same as last week.

Franklin held steady at \$12 1/4 ex-dividend, with no pressure to sell at that figure.

Atlantic declined to \$9 1/2 for 300 shares, a small lot selling at \$9.

Wolverine sold at \$2 for 50 shares, which is 3/4 in advance over last sale, June 15th.

Santa Fe sold at 10c.

The silver stocks were entirely neglected.

3 p. m.—Centennial declined this p. m. to \$9. Kearsarge sold at \$11 1/4, a decline of 3/4. Balance of list unchanged.

Chicago. July 6.

(Special report by Horace M. Johnson.)

Mesaba Range Mines.—Aurora, \$10; Birmingham, \$10; Buckeye, \$25; Biwabik, \$22.50; Cincinnati, \$3; Champion, \$10; Cosmopolitan, \$20; Chicago, \$12; Columbus (fee), \$7; Duluth, \$10; Great Northern Mining Company, \$7; Great Northern I. & S. Co., \$1.35; Keystone, \$10; Kanawha, \$10; Lincoln, \$12; Lake Superior, \$3.50; Licking, \$7.50; McKinley, \$25; Mesaba Mt., \$14.50; Mallan, \$1.35; Mountain Iron, \$55; Minneapolis, \$12; New England, \$10; Ohio, \$30; Shaw, \$6; Twin City, \$10.

Gogebic Range Mines.—Aurora, \$8.75; Ashland, \$48; Anvil, \$3.50; Brotherton, \$2.25; Germania, \$7; Gogebic I. Synd., 10c.; Iron Belt, \$2.00; Montreal River, \$8; Metropolitan, \$75; Minnewawa, 50c.; Odanah, \$15; Pence, 50c.; Section "33," \$6.50.

Marquette Range.—Champion, \$60; Cleveland, \$18; Jackson, \$100; Lake Superior, \$45; Pittsburg & Lake Angeline, \$160; Republic, \$20.

Vermillion Range.—Chandler, \$45; Minnesota Iron, \$80.

San Francisco. June 30

(From our Special Correspondent.)

Some idea of the depressed condition of the mining stock market may be formed from the fact that seats in the San Francisco Stock Board have recently been sold as low as \$2,500. In the old days seats sold for \$40,000.

Business this week has been so dull that Pine street determined to adjourn from Thursday until Tuesday, the 5th, and have a holiday. The fluctuations in prices of the Comstocks have not been large, and the hopeful ones allege that bottom prices have been about reached. Consolidated California & Virginia sold to-day for \$3.37; Ophir for \$1.50; Mexican for \$1.40; Union Consolidated for 90c., and Utah Consolidated for 5c.

In the middle group of Comstocks prices have shown an advance on those ruling a week ago. Best & Belcher sold to-day for \$1.65; Chollar for 75c.; Gould & Curry for 70c.; Potosi for 55c., and Savage for \$1.45.

Of the South End and Gold Hill stocks Belcher has been quite active, the sales to-day aggregating 1,700 shares at an average price of \$1.25, a 5c. advance on the week's trading. The balance of the list sold as follows: Alta at 20c.; Bullion at 50c.; Challenge at 50c.; Con. Imperial at 5c.; Con. New York at 30c.; Crown Point at 80c.; Caledonia at 20c.; Justice at 15c.; Kentuck at 15c.; Overman at 65c.; and Yellow Jacket at 85c.

The Bodie stocks have continued very quiet, Bodie Con. being quoted at 15c. and Bulwer Con. at 35c.

Of the Tuscaroras, Belle Isle has sold as low as 5c.; Navajo for 5c.; Nevada Queen for 45c.; North Commonwealth for 15c., and North Belle Isle for 15c. In each and every case the sales have been so light that a price has been obtained and that is all. The Quijotoa stocks have been left severely alone.

SAN FRANCISCO, July 8.—(By telegraph.)—The opening quotations to-day are as follows: Best & Belcher, \$1.88; Bodie, 15c.; Belle Isle, 10c.; Chollar, 80c.; Consolidated California & Virginia, \$3.70; Eureka Consolidated, \$2; Gould & Curry, \$1.10; Hale & Norcross, \$1.35; Mexican, \$1.60; Mono, 40c.; North Belle Isle, 5c.; Navajo, 10c.; Ophir, \$2.40; Savage, \$1.45; Sierra Nevada, 95c.; Union Consolidated, \$1.05; Yellow Jacket, 90c.

PIPE LINE CERTIFICATES.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

Opening.	Highest.	Lowest.	Closing.	Sales
July 2.....				
4.....				
5.....	53 1/2	53 1/4	53	36,000
6.....	53	53	52 3/4	12,000
7.....				
8.....	52 3/4	52 3/4	52 3/4	9,000
Total sales in barrels.....				54,000

ASSESSMENTS.

COMPANY.	No.	When levied.	D't'nc't in office.	Day of sale.	Amt per share.
Alta, Nev.....	42	June 18	July 26	Aug. 16	.15
Belcher, Nev.....	44	May 17	June 21	July 12	.25
Blue Bird, S. Dak.....	8	June 10	July 11	July 30	.000 1/4
Bodie Con., Cal.....	14	June 20	July 22	Aug. 22	.25
Bullion, Nev.....	38	May 24	June 28	July 19	.25
Challenge Consolidated, Nev.....	11	May 16	June 20	July 12	.25
Chollar, Nev.....	33	May 28	July 7	July 27	.50
Comm'wealth, Nev	8	June 16	July 21	Aug. 18	.10
Cons. N. York, Nev.	8	June 28	Aug. 2	Aug. 23	.10
Cons. St. Gothard, Cal.....	5	June 9	July 14	Aug. 4	.05
Gould & Curry, Nev	11	June 7	July 12	Aug. 4	.25
Himalaya, Utah.....	69	June 13	July 13	Aug. 13	.00 1/4
Mexican, Nev.....	45	May 16	June 21	July 12	.25
Norway, Utah.....		Dec. 24	Feb. 1	July 21	.02
Ophir, Nev.....	58	June 3	July 7	July 27	.50
Overman, Nev.....	64	May 19	June 22	July 11	.30
Ruby Bell, S. Dak..	11	June 13	July 14	July 30	.000 1/4
Sierra Nevada, Nev	102	June 11	July 13	Aug. 2	.25
Siskiyou Cons., Cal..	4	May 4	June 17	July 18	.01 1/4
Summit, Cal.....	12	May 20	June 27	July 29	.05
Yellow Jacket, Nev	51	May 0	June 14	July 18	.25

COAL TRADE REVIEW.

NEW YORK, Friday Evening, July 8th.

Statement of shipments of anthracite coal (approximated for week ending July 2d, 1892, compared with the corresponding period last year.

Regions.	July 2, 1892.	July 4, 1891.	Difference.
	Tons.	Tons.	
Wyoming Region....	578,911	410,940	Inc. 166,671
Lehigh Region.....	142,533	117,076	Inc. 25,487
Schuykill Region....	311,924	225,743	Inc. 86,181
Total.....	1,033,098	753,759	Inc. 279,339
Total for year to date	19,638,238	18,374,237	Inc. 1,264,001

PRODUCTION OF BITUMINOUS COAL for week ending July 2d, and year from January 1st.

EASTERN AND NORTHERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	Year.
Phila. & Erie R. R.....	1,176	44,559	52,354
Cumberland, Md.....	79,763	1,084,298	2,125,454
Barclay, Pa.....	3,426	102,075	92,377
Broad Top, Pa.....	7,654	288,491	255,279
Clearfield, Pa.....	66,621	1,930,935	2,081,543
Allegheny, Pa.....	24,695	620,047	666,082
Beach Creek, Pa.....	43,721	1,271,653	1,180,897
Poconatas Flat Top.....	51,332	1,152,177	1,251,529
Kanawha, W. Va.....	53,071	1,234,482	1,192,772
Total.....	331,459	8,448,717	8,898,467

WESTERN SHIPMENTS.

	1892.		1891.
	Week.	Year.	Year.
Pittsburg, Pa.....	24,909	656,888	530,273
Westmoreland, Pa.....	29,680	819,986	916,956
Monongahela, Pa.....	13,831	289,830	295,936
Total.....	68,420	1,766,704	1,707,165
Grand total.....	399,879	10,215,421	10,605,632

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending July 2d, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 101,869 tons; year, 2,807,105 tons; to corresponding date in 1891, 1,728,392 tons.

Anthracite.

There has been an air of quietness about the anthracite coal trade since the rise in prices came into effect on July 1. Not that there is any decrease in the demand, but there is an air of serenity which it is difficult to explain. There is not the slightest endeavor on the part of consumers to combat the Reading combine. It is not to be wondered at that anthracite holds its own for household sorts, for freedom from smoke in a residential city is worth a few dollars extra a ton; but the supineness of manufacturers is inexplicable. As far as can be seen at present, it is likely that the price of anthracite will be raised another 25 cents all round in August or September, most probably the latter, and that the prices will remain at that level until next spring. We believe that the State laws are quite powerless against the combine, and that the only possible interference can come from a law specially passed for the purpose. Such a course as the enactment of a special law would only be resorted to in extremities, and with the present prospect for the future of prices such an interference is out of the question.

We are always told that for cleanliness there is nothing to compete with anthracite, and it really does not seem that the existence of engines working by the explosions of gas or petroleum vapor is not known in many quarters. There are extremely efficient petroleum engines new on the market working up to a brake horse power of 15, which consume only 3/4 pint of petroleum per brake horse power hour. This is just as cheap as a steam engine working at the remarkably low consumption of 3 lbs. of bituminous per brake horse power hour with the coal at \$2.50 per ton; in addition there is no boiler to keep up and only half the attendance is required. Then gas engines working up to 300 brake horse power can

be obtained, and these can be driven by water gas prepared from steam and coke. The expenditure of fuel is here from 1 to 1 1/4 lbs. per indicated brake horse power per hour, including the coke used in the gas producer, and that used for raising the steam. Installations of engines and plant of this character are no more expensive than steam engines and brakes of large power, and their consumption is less. They use coke made from bituminous, or it is possible also to make gas from petroleum. In any case these gas and petroleum engines should now be adopted whenever possible, and they will prove serious rivals to anthracite.

Bituminous.

The bituminous coal trade is in a very indifferent situation and is commonly reported to be in as poor and disorganized a state as has been known for some time. The cause of this disorganization is chiefly the troubles with the carriers and at present there does not seem to be any prospect of brighter days. The expectation that there would be an increased demand for bituminous in consequence of the further raising of the prices of anthracite have not yet been realized.

Boston. July 7.

(From our Special Correspondent.)

As I intimated last week there has been very little buying this week. Dealers are well stocked as a rule, yet there are few who have not had the opportunity. Since the advance in prices has taken place very few have had the heart to buy, although they have felt all along that prices were bound to advance as long as the coal market is in the hands of the present combination.

We quote f. o. b. New York: Stove, \$4.50; egg, \$4.20; free broken, \$3.90; chestnut, \$4.40. There is very little buying to note. Dealers here are very well stocked. We quote: Clearfield, \$3.15; Georges Creek, \$3.45@3.50.

Freight rates are steady in most instances. From some ports they are inclined to be easier. This is especially true of rates from Baltimore. Rates on large vessels from that port will probably be made at 75 cents shortly.

We quote: From New York to Boston, 60@65c., from Philadelphia to Boston, 70@75c.; from Baltimore to Boston, 80@c.—; Newport News to Boston, 70@c.—.

In a retail way there is practically nothing doing. Dealers have not advanced prices yet, but are very apt to any day. The trade is anxiously awaiting the decision of the committee appointed to consider the matter. It is stated by a man high in the councils of the committee that prices are very likely to be advanced fully as much as the recent advances made by the combination.

We quote: Stove, \$6; nut, \$6; egg, \$5.75; furnace \$5.50; Franklin, \$7.25; Lehigh egg, \$6; Lehigh furnace, \$6.

Chicago. July 7.

(From our Special Correspondent.)

The situation has changed little since a week ago. The expected advance has materialized and has been productive of an unusual amount of profanity from the public. There is a little more inquiry from the country in a wholesale way, that is, it is more general, but so far it is only inquiry. Actual orders are still slow and are evidently of a hand to mouth character, being much influenced by the uncertainties of the outlook and the strict enforcement of demurrage charges by Western roads, which prevent country dealers from placing their full orders at present time. The Board of Education opened bids July 5th for supplying the schools with fuel during the coming season. They varied from \$5.75 to \$6.10 for grate and from \$6.12 1/2 to \$6.50 for the smaller sizes, delivered by steam to the school buildings. We certainly fail to see how the inside prices are in accordance with the rulings in regard to prices as recently made in New York for this market, and would seem to indicate that there was too much profit in those figures for the companies to maintain their adherence thereto. At least that is how the dealers look at it in the West. To the credit of the Philadelphia & Reading, be it said, that the higher quotations were made by them. The lower prices were made by individual companies and jobbers, evidencing the lack of good faith on the part of some of the shippers.

Retail trade is only fair and the policy being pursued by the sales agents will unquestionably drive the business into the extreme latter end of each month, while there is danger of monthly advances being made. Consumers will wait each month for the action of the sales agents, then rush to their dealers and want orders filled a few days before the new prices take effect, placing everybody at a disadvantage, from the producer to the consumer. To illustrate: Last month coal was delivered to domestic consumers as late as 12 o'clock at night in order to get under the wire in time. The advance in the Western market was 25 cents on all sizes. Vessel coal is coming forward quite freely and docks are filling up rapidly.

Bituminous coal is active in the way of contracts and legitimate business for steam purposes, but in other respects it is quiet, though better on the whole than most shippers will admit even for the dog days. The improved condition of the country roads has much facilitated this class of trade. Prices are very elastic on all grades of soft coal.

Coke is very quiet and will most probably continue to so during the heated term.

Quotations are: \$4.65 furnace; \$5.05 foundry

crushed; \$5.40 Connellsville; West Virginia, \$3.90 furnace, \$4.10 foundry; New River foundry, \$4.75; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are at the following rates: Lehigh lump, \$6.50; large egg, \$5.60; small egg, range and chestnut, \$5.85. Retail prices per ton are: Large egg, \$7; small egg, range and chestnut, \$7.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are; Pittsburg, \$3.15; Hocking Valley, \$3; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.35.

Pittsburg. July 7.

(From our Special Correspondent.)

Coal—The market since our last has undergone no particular change; the leading markets are all well stocked. The amount of coal along the Mississippi from Cairo to New Orleans has been estimated at 800 barges; a barge contains 13,000 bushels. A sudden rise on the 5th of July enabled the coal men to send out a small fleet; to Cincinnati, 1,948,900 bus.; Louisville, 1,410,000 bus.; total, 3,358,900 bus. A large falling off was perceptible in interior shipments by rail, especially to the Mahoning and Shenango valleys, caused by the closing of the furnaces. The lake trade is reported very brisk and would be larger, provided there were more cars.

Connellsville Coke.—Shipments have been active exceeding those for some weeks past. Coke operators are watching the iron scale trouble, which, if signed, will make a prosperous business for the balance of the year. The plants of the Frick Company in blast made five days. The Southwest Coal and Coke Company made six days, and so did the McClure Company at all of their ovens in blast. The Rainey ovens worked five days at all their plants except Elm Grove, which made six days. The Junita works ran full six days; while the balance of the Cockeran plants made only five days.

The Independent operators all got in a six days' run. The shipments for the week aggregate 119,430 tons; increase over preceding week, 6,624 tons. Shipments to Pittsburg, 1,955 cars; points east of Pittsburg, 1,680; points west of Pittsburg, 2,950 cars; total, 6,585 cars. Western shipments dropped 210 cars, while Eastern shipments have increased 330 cars and shipments to Pittsburg and river points increased 198 cars. While the newspapers talk of companies opening up new fields of coal and building ovens to manufacture their own coke, the old-time operators don't appear to take much stock in such statements. Prices are nominally unchanged.

METAL MARKET.

NEW YORK, Friday Evening, July 8th, 1892.
Prices of Silver Per Ounce Troy.

July.	Sterling Exch'ge.	London. Pence.	N. Y. Cents.	Value of sil. in \$1.	July.	Sterling Exch'ge.	London. Pence.	N. Y. Cents.	Value of sil. in \$1.
2	4.88	40 3/4	88	.680	6	4.88	39 1/2	87	.672
4	4.88	40 3/4	H	....	7	4.88	39 3/4	86 3/4	.670
5	4.88	40 3/4	87 3/4	.677	8	4.88	39 1/2	87	.672

No new feature has presented itself in the silver market the past week. About 400,000 ozs. have been shipped this month on London orders, but the demand for silver is not large, and orders for some days past have been quite limited.

Silver Bullion Certificates.

	Prices.		Sales.
	H.	L.	
July 2.....	.....	.....	.....
July 4.....	.....	.....	.....
July 5.....	87 3/4	.....	1,000
July 6.....	87 3/4	.....	20,000
July 7.....	87 3/4	.....	5,000
July 8.....	87 3/4	87 3/4	40,000

Total sales \$66,000
The United States Assay Office at New York reports the total receipts of silver for the week to be 72,000 ounces.

Gold and Silver Exports and Imports at New York.

	Exports.		Imports.	
	Week ending	Since Jan. 1.	Week ending	From Jan. 1.
Gold.....	\$3,709,800	\$43,557,342	\$16,993	\$6,279,229
Silver.....	664,275	11,545,131	637,756	828,146
Totals... ..	\$4,374,075	\$55,102,473	\$54,732	\$7,107,375

The gold shipped this week will probably not amount to over \$800,000.

In our issue of last week we gave as a probable reason for continued gold shipments the fear on the part of foreign holders of American securities that free coinage would be adopted by the United States. That this statement had a reliable basis is shown by the fact that on July first the Senate passed a free coinage bill by a vote of 27 to 25. This action on the eve of a monetary conference with foreign nations to establish the status of silver is absolutely incomprehensible. However, there is

at present not the slightest probability of the passage of any free coinage bill and there is a certainty that if one were passed by the two houses the President would veto it. Consequently no apprehension need be felt by even the most timid financier. The Western pro silver papers do not hesitate to describe the passage of the bill as an amusing game of politics. A peculiar feature of the bill as passed by the Senate is that all the silver bullion now held by the United States would have to be coined as soon as possible. This would give the mints so much work that the producers of silver could not get their product coined for at least two years. The only practical outcome of the bill so far has been a fall in the price of silver bullion.

The outward movement of gold has probably nearly reached its end and in a short time importations of gold may be expected. For many years past gold has been exported during the first half and imported during the second half of the year. More-over the excess of our exports of merchandise over imports has never, in the history of the country, been as great as at present, consequently there is a heavier balance than usual in our favor to be settled probably in gold. Although our financial centers have been somewhat disturbed over recent shipments, there is nothing to show that the gold export of this year will reach an extraordinary figure.

The exports of gold for the first six months of the present year have been but \$43,557,342 against \$70,460,403 for the same period of 1891. Lastly, the exports of merchandise have never attained such proportions as at present. For the 12 months ending April 30, 1892, the excess of exports over imports was \$179,496,514.

As at present the amount of American securities in Europe must be comparatively small and this large sum must for the most part be paid in gold. Consequently during the fall a large importation of gold may reasonably be looked for.

Domestic and Foreign Coin.

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

	Bid.	Asked.
Mexican dollars.....	\$.68	\$.69
Peruvian soles and Chilean pesos.....	.65	.67
Victoria sovereigns.....	4.90	4.93
Twenty francs.....	3.90	3.93
Twenty marks.....	4.75	4.78
Spanish 25 pesetas.....	4.79	4.81

Copper.—Even with the holidays intervening since writing our last report things have succeeded in assuming a rather more unpleasant aspect, and while the market for Lake is generally 1 1/2%, there have been some small lots sold by second hands at 1 1/4% and even down to 1 1/8%, which does not hold out promise of any stronger feeling under the surface than above. Casting copper has also gone off to 10% @ 10 1/2%, and Arizona pig to 9 1/2% @ 9%, with hardly any demand for any description.

The foreign market has ruled quite steady for prices here will have to decline much further to admit of exports, and closes at \$44 1/2. 6d. @ \$45 for spot and 10c. higher for futures. Manufactured sorts we quote as follows: English tough, \$46 10s. @ \$47; best selected, \$49 @ \$49 5s.; strong sheets, \$54 @ \$54 10s.; India sheets, \$52 @ \$52 5s.; yellow metal, 5 1/2d.

The exports of copper from the port of New York during the past week were as follows:

To Hamburg.....	Copper Matte.	Lbs.	
S. S. Virginia.....	1,382 bags	161,499	\$10,000
To Liverpool.....	Copper Matte.	Lbs.	
S. S. St. Enoch.....	3,121 bags	331,453	\$20,000
S. S. City of Chester.....	210 "	40,135	2,000
S. S. Buffon.....	1,922 "	297,031	15,000

Tin has remained quite steady here; in fact, when day before yesterday the London market declined about £1 this market here did not alter, so that at last it is getting a little nearer the parity of that abroad. Closing prices are 21 for spot, 21 for July, and 21 25 to 21 50 for the balance of the year. The London market opened at £99 10s. @ 15s. for spot and £98 7s. 6d. @ 15s. for futures and on Wednesday had dropped to about £97 7s. 6d., and closes to-day at £97 17s. 6d. @ £98 2s. 6d. for spot, and £97 2s. 6d. @ 5s. for futures.

Spelter is about the same as last week, possibly a trifle easier, at about \$4.85 for July, and \$4.75 for August and later. London has declined 5s., closing at £21 11s. 3d. for good ordinaries and 2s. 6d. higher for specials.

Lead is weaker, there being but small purchases made by consumers. It turns out that the recent buying was done on speculative account, and the parties having now been filled up, being none too strong at best, the market will be left to recede. London closes at £10 10s. @ 11s. 3d. for Spanish lead, and about £10 12s. 6d. for English.

Chicago Lead Market.—The Post-Boynton-Strong Company telegraph us as follows: "Since our last report the market has been very strong, and sales will amount to some 300 tons at 4 1/2c. At the close the price is unchanged and the inquiry is good."

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: Lead is very strong with spot and July delivery very scarce and with none to be had below 4 1/2c. August and September lead can be had quietly at 4 7/8c.

Antimony remains without alteration. Cookson's at 14 1/2c., L. X. at 12 1/2c., and Hallett's at 11 1/2c.

Nickel is the same as last week, viz., 60c @ 62 1/2c.

IRON MARKET REVIEW.

New York, Friday Evening, July 8, 1892.

The Carnegie strike is attracting a great deal of attention here. On Wednesday real hostilities began by the repulse of a corps of detectives who tried to land from a steamer at Homestead to take care of the mills. In this encounter some 20 lives were lost and a great deal of damage done to property. In opposition to those who said that a satisfactory settlement would be brought about, we have always said that this strike would be war to the knife. The men are so much inflamed that they will stop at nothing, not even the destruction of the mills by dynamite nor the assassination of Mr. Frick.

Pig Iron.—The following tables give the estimated output of the blast furnaces for the week ending Saturday, June 25th, 1892, and for the first 25 complete weeks of the year 1892 up to and including June 23d, together with the output of the week ending Saturday, June 24th, 1891, and for the first 25 complete weeks of the year 1891 up to and including June 22d, 1891:

ESTIMATED OUTPUT OF BLAST FURNACES FOR WEEKS ENDING JUNE 25TH, 1892, AND JUNE 24TH, 1891.

	Anthracite.		Coke.		Charcoal.		Total.	
	No. of fur-naces in blast.	Output in gross tons.	No. of fur-naces in blast.	Output in gross tons.	No. of fur-naces in blast.	Output in gross tons.	No. of fur-naces in blast.	Output in gross tons.
1892..	78	34,400	141	123,000	46	11,400	265	173,800
1891..	92	36,900	126	99,700	45	10,600	263	147,200

ESTIMATED OUTPUT OF BLAST FURNACES IN 1892 AND 1891 FOR FIRST 25 WEEKS UP TO JUNE 23D AND JUNE 22D, RESPECTIVELY.

	Anth'cite.		Coke.		Charcoal.		Total.	
	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	Gross tons.	
To June 23d, 1892.	923,000	3,421,900	267,500	4,622,100				
To June 22d, 1891.	945,500	2,136,400	276,500	3,357,500				

As has been anticipated in the Eastern market for for some few weeks now the Thomas Iron Works have lowered their schedule rates by a dollar all round, so that their prices now stand as follows: No. 1 X Foundry, \$15; No. 2 X Foundry, \$14, and Gray Forge, \$13.50, tide water. As this firm follows the market, and does not make it, the action shows that they recognize the fact that other makers have been selling at cut rates for some time, and for the same reason the action has had no discernible effect on the market.

The market exhibits the same weakness which has been characteristic of it for years, and shows a sign of over-production. The strike at Pittsburg has not had any effect yet here on the markets. The buying at present is from hand to mouth, and consumers have an idea that prices will go still lower. We think that some producers will cut their prices below those fixed by the Thomas company. If so, many of them will have to give up the manufacture of pig on account of it not paying them at the price, and, consequently, the rate of production will be checked. The price at present ruling for No. 1 anthracite pig iron is the lowest known for 20 years, and was not reached even in the period of depression of 1873.

Spiegeleisen and Ferro-Manganese.—There are no transactions to report in the market. The nominal price of 80% ferro-manganese is given as \$59.

Steel Rails.—Perhaps of all the branches of the iron trade, steel rails show the best form just at present. We hear of several fairly large orders, that have come to hand at Eastern mills during the week and mills generally are fairly well employed. One order is for 10,000 tons for the Georgia Central Railroad. Prices continue \$30 at mill and \$30.75 tide water.

Rail Fastenings.—There are very few transactions to report in rail fastenings, in fact the market is very dull. Prices are as follows: Fish and angle plates 1 5/8 @ 1 6/8c at mill; spikes 1 40 @ 2c; bolts and square nuts 2 50 @ 2 70c; hexagonal nuts 2 70 @ 2 80c. delivered.

Merchant Iron and Steel.—This market continues quiet and prices remain the same as follows: Mushet's special, 48c; English tool steel, 15c net; American tool steel, 6 1/2 @ 7 1/2c; special grades, 13 @ 18c; crucible machinery steel, 4 75c; crucible spring, 3 75c; open hearth machinery, 2 2c; open hearth spring, 2 50c; tire steel, 2 25c; toe calks, 2 25 @ 2 50c; first quality sheet, 10c; second quality sheet, 8c.

Tube and Pipe.—The trade in this department continues regular and quiet, and prices are unchanged. The ruling discounts are as follows: Butt, black, 57 1/2%; butt, galvanized, 47%; lap, black; 67%; lap, galvanized, 55%; boiler tubes from 3 in. to 6 in., 60%; above 6 in. and below 3 in., 55%.

Structural Material.—The largest order received by Eastern mills this week is that for 5,000 tons for the Bellefontaine bridge on the St. Louis, Keokuk & Northern R. R., obtained by the New Jersey Steel and Iron Company. We hear of several orders for beams having been given out during the past few

days. There is not much being done in plates and bars. The strike of the Housemiths' Union is proceeding, but as yet it has had no effect on the market for structural material. Prices are as follows: Beams, 2'25@2'65c.; angles, 1'85@2'10c.; sheared plates, 1'90@2'10c.; tees, 2'40@2'60c.; channels, 2'35@2'50c.; universal plates, 2@2'10c., bridge plates, 2@2'10c. on dock.

Buffalo. July 7.
(Special report by Rogers, Brown & Co.)
(Buffalo Pig Iron Market.)

Some good sized contracts ranging from 500 to 1,000 tons have been placed during the week, together with carload and 100 ton lots. The prices are low, but the tonnage is quite large. Lake Superior charcoal still continues to attract more or less attention among buyers. It is so difficult to say just what the market is on account of special prices made on the merits of each sale that we continue to quote as during the past few weeks, though in many cases prices quoted might be shaded. No. 1 X Foundry Strong Coke Iron Lake Superior ore, \$15.75; No. 2 X Foundry Strong Coke Iron Lake Superior ore, \$14.75; Ohio Strong Softener No. 1, \$15.75; Ohio Strong Softener No. 2, \$14.75; Jackson County Silvery No. 1, \$18; Jackson County Silvery No. 2, \$17; Lake Superior Charcoal, \$16.50; Tennessee Charcoal, \$17; Southern Soft No. 1, \$14.65; Alabama Car Wheel, \$19; Hanging Rock Charcoal, \$20.50.

Chicago. June 7.
(From our Special Correspondent.)

The difficulties in the iron and steel interests in Pittsburg will not affect employees of rolling mills further west, and certainly not the Illinois Steel Company's rail mills, as they have an agreement with their men by which either side has the right to give six months notice of a change affecting the wage scale. The officials of the steel company have taken advantage of this clause in their contracts with their employees, and have given notice that the present scale is to expire Dec. 31, 1892. In iron circles the lockout and strike accompanied by violence at Pittsburg occupies much attention and is the general theme of discussion as to its probable effect on the general market. It is the consensus of opinion here that the contest will be of short duration, and that the men will have to succumb to the inevitable. In a general way the market for crude iron has been rather quieter than the week preceding, but on the whole a very fair volume of business has been transacted, about equally divided between Northern and Southern cokes and Lake Superior charcoal, contracts in many cases being made to cover requirements from six to twelve months. Some local makers have sold for deliveries during 1892 at current rates. This feature goes to prove that producers have absolutely no hope for improvement in values. Indeed, some furnace men are of opinion that the crisis affecting pig iron interests is at hand, and that the next 60 to 90 days will demonstrate what the prices will be for the next twelve months. Some look for a further reduction, and that after that it will be the survival of the fittest. With few exceptions finished material is in moderate demand, and on some specialties values manifest hardening tendencies.

Pig Iron.—The market was characterized by a certain amount of quietness as compared with the previous week, partly accounted for by the approach of the National holiday and partly by the heavy buying during the past month. There were, however, some very fair sales of Lake Superior charcoal iron; one agency alone closed contracts for nearly 4,000 tons for scattered deliveries, none of them at less than \$1,650, and some at higher rates. The position of manufacturing charcoal iron has been greatly improved on account of the recent transactions and they are now in good shape. The malleable iron syndicate has, not as yet made its purchases for the Chicago makers, but will probably close before middle of month. A few 500 to 1,000-ton orders were placed for local coke iron running through next year, and were straight sales without contingencies. Several large lots of Southern soft iron were booked at concessions from our inside figure, furnaces being compelled to sell to meet interest charges. Ohio softeners are in moderate demand. The pig iron market here will be but slightly, if in any way, affected by the labor troubles east of us.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.50@17; Lake Superior coke, No. 1, \$14.50@15; No. 2, \$14@14.25; No. 3, \$13.75@14; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15.50@16; American Scotch, \$17@17.50; Southern coke, foundry No. 1, \$14.75; No. 2, \$14.25; No. 3, \$13.75; Southern coke, soft, No. 1, \$13.50; No. 2, \$13.10; Ohio silveries, No. 1, \$17; No. 2, \$16.50; Ohio strong softeners, No. 1, \$17; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$20@21.

Steel Billets and Rods.—Billets are in good inquiry, and some large orders entered at \$24.50. These figures are firm. Rods are in excellent demand and price steady at \$34.50.

Structural Iron and Steel.—Contracts for a large bridge across the Missouri have been placed, upward of \$500,000. Some orders for low priced beams have not been filled and there is less competition, as indications are that prices will advance; some mills are already refusing orders at current rates. There is an immense amount of work in sight. Regu-

lar quotations, car lots f. o. b. Chicago, are as follows: Angles, \$1.80@2; tees, \$2.20@2.30; universal plates \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.05@2.25.

Plates.—Local demand is improving, as nearly all the boiler shops are running full handed; the strike, however, has not been declared off, though the men have evidently lost it. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$2.75@3; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.00; boiler rivets, \$4.00@4.15; boiler tubes, 2 1/2 in. and smaller, 57 1/2%; 7 in. and upward, 67 1/2%.

Merchant Steel.—Numerous season's contracts were closed last week, and during the next 10 days many more will be booked. Tool steel is in fair demand and agents say there may be some delay in mill shipments by reason of the shut-down. We quote: Tool steel, \$6.50@6.75 and upward; tire steel, \$2.10@2.20; toe calk, \$2.40@2.50; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.75@1.80; open hearth machinery, \$2.40@2.60; open hearth carriage spring, \$2.25@2.30; crucible spring, \$3.75@4.

Galvanized Sheet Iron.—Business is limited as stocks are lighter in agents' warehouses with mill shipments slow on standard sizes, and discounts are higher at 70 on mill lots, and 67 1/2 off on Juniata, and 67 1/2 and 5% off on charcoal from warehouse.

Black Sheet Iron.—Prices are much firmer and some mills refuse to enter orders for early shipment. Quotations are firm at 2'85@2'90c. basis of No. 27 Chicago, for delivery before July 1st. Steel sheets are 10c. higher. Dealers quote 3'10@3'20c. from stock same gauge.

Bar Iron.—Contracts and orders in a small way; 100 to 300 tons are more numerous and prices are higher. Mills in this district now quote 1'60c. with half extras, and milling manufacturers, on such as they call, accept 50c. to \$1 a ton more. Warehouse prices are steady at 1'70@1'80c.

Nails.—Steel cut nails are in some demand at \$1.60 base Chicago; jobbers report a quiet business at the same figures from stock. Wire nails are dull at \$1.70 in mill lots, and orders are filled from store at same price.

Steel Rails.—Demand is light, but there is a good inquiry, and as there is no trouble with the mills in this section all orders are promptly taken care of. Quotations remain steady at \$31@32. Small orders for track supplies are more active at \$1.70 for iron or steel splice bars; spikes \$2.05@2.15 per 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

Scrap.—In the absence of business prices are entirely nominal. No. 1 railroad, \$15; No. 1 forge, \$14; No. 1 mill, \$10.50; fish plates, \$18; axles, \$21; horseshoes, \$16.50; pipes and flues, \$7; cast borings, \$6.50; wrought turnings, \$9; axle turnings, \$10.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$10.60; coilsteel, \$14; leaf steel, \$15; tires, \$15.

Old Material.—There is very little doing and consumers are unwilling to offer more than \$17.50 and holders ask \$18 for old iron rails. Steel rails are quiet at \$12.50@13.50 according to length and condition, and car wheels hold their own at \$15 for round lots and \$15.50 for small quantities.

Philadelphia. July 7.
(From our Special Correspondent.)

Pig Iron.—The talk to day in iron circles is that the market is upon the eve or dawn of a reaction; so far as appearances go there is nothing in it. Prices are extremely low, demand sluggish, consumption light, stocks heavy, makers anxious to sell. If there is anything else in the market it does not appear. The talk about a reaction is all very nice, but has no perceptible basis at present; most of the mills are idle, undergoing repairs. There is, of course, a certain hopefulness for better conditions, growing out of the probability of a prolonged suspension in the West, but as there are probabilities of an adjustment of difficulties there it is too soon to hope for a continuous improved demand that would grow out of any Western suspension. The Thomas Iron Company have finally announced their drop; it has been anticipated for two weeks. Forge iron is very weak all through the East; some sales have been made at \$13.

Steel Billets.—An unexpected strengthening of prices has taken place in billets. It is, of course, due to the possibility of an improving demand and diminishing supply from other markets. There are certain large consumers in the market who would like to purchase large blocks of billets for summer and fall, but they are hanging back. No very large sales are likely to be made just now because makers are asking higher prices, and buyers know there is not the strong basis for improvement. Quotations, \$25@25.50.

Merchant Iron.—There is a general improvement in the demand for merchant bar; the extremely low quotations have all been withdrawn; mills are undergoing repairs. Prices have been advanced on common iron from 1'60 to 1'65 in large lots for prompt delivery. This improvement may be deceptive, but there is a great deal of iron wanted, and if there should be much of a suspension in the West, our mills here will have all they can do.

Sheet Iron.—The sheet iron demand is looking up also, but buyers, as a rule, are pretty well supplied, and this week's business has been light.

Pipes and Tubes.—A few more orders have been

taken for pipes of small diameter. Tubes are very active.

Skelp Iron.—Makers of skelp are now canvassing the country for Fall business, but as yet have not picked up any large orders.

Plate and Tank Iron.—There is a firmer feeling in the market for plate, tank and structural. The increase in business is but trifling, but correspondence is in progress which looks to the placing of a goodly number of large orders. Prices have been advanced about \$1.50 on large lots per ton. The improvement is due to the prospect of scarcity. Quotations for tank plates, 1'80; flange, 2'70 for iron, and 2'40 for steel.

Structural Material.—There is a general improvement in inquiry and prices are said to have advanced, but this is merely in prospect. A few more builders have hurried in and placed orders, but the large buyers are in no haste. One order for universal plate was placed yesterday at 1'85, and an order for beams at 2c.; tees, 2'20.

Steel Rails.—Business quiet; quotations \$30. One or two large orders have just been placed in the South. Rumors are rife of the placing of large orders before the end of this month, but the people who are posted do not care to be quoted.

Old Rails.—Old rails are very dull; quotations nominal.

Pittsburg. July 7.
(From our Special Correspondent.)

Iron and Steel.—Business since our last has been very much restricted, sales being confined to limited amounts. Makers, generally, are handling business contracted some time ago; hence there is very little new business going on. The uncertainty as to what is ahead has the effect of stopping activity in most branches of the iron business. In spite of the slight encouragement that comes from decreasing stocks, the pig-iron market is still ruled by a competitive spirit and pushes the better day still further into the future.

Eastern producers are reported to be in a temper to give their Southern competitors a further sample of Northern cut prices, the Lehigh district leading in this move, as it did in the early spring, when Southern aggressions became too pronounced. The effect of cuts already made in the East, together with the low prices at which Virginia irons are being offered, has made competition in the West from Southern furnacemen especially keen.

A leading Eastern dealer has this to say: "Buyers of crude material are not placing orders for any quantity in excess of immediate wants, awaiting the outcome of the next few weeks in anticipation that a decreased consumption during the coming two months may result in closer competition among the furnaces and a probability of better terms being obtained. Prices are now so low that it is difficult to see where Eastern producers can make further concessions in view of present cost of production, except in the matter of extending deliveries further into the future. When buyers insist on their favorite brands full figures must be paid, but there is no difficulty in obtaining good grades of iron at terms a little more favorable than was the case some weeks back." The labor question continues to depress the iron and steel market; until that matter is satisfactorily arranged business will be confined to actual wants.

Monday being the 4th of July no business was transacted. Wednesday the riot was started at Homestead, which caused a suspension of business so far as transactions were concerned. The result is we have only a limited amount of transactions to record. Prices show no change over last week. Until the labor troubles are settled sales will be few and far between.

The scale question is still unsettled. The fourth meeting between the iron men and the Amalgamated Association is now in session. Their meetings are held with closed doors; their proceedings are not to be made public. The Homestead fight resulted in a number of deaths on both sides.

Coke Smelted Lake and Native Ores.

1,000 Tons Bessemer, August, Sept.,	\$14.00 cash.
1,000 Tons Bessemer, July, to December	14.25 cash.
750 Tons Grey Forge, July	12.75 cash.
500 Tons Grey Forge, August, September	12.75 cash.
500 Tons Bessemer City Furnace	14.15 cash.
300 Tons Open Mills	12.00 cash.
300 Tons Grey Forge	12.65 cash.
100 Tons No. 1 Silvery	16.75 cash.
50 Tons No. 3 Foundry	13.50 cash.
50 Tons No. 2 Foundry	14.00 cash.
50 Tons No. 1 Foundry	15.00 cash.

Charcoal.

150 Tons Warm Blast	17.50 cash.
50 Tons Cold Blast	36.00 cash.
50 Tons No. 3 Foundry	18.75 cash.
25 Tons No. 2 Foundry	20.00 cash.

Steel Slabs and Billets.

1,000 Tons Steel Billets, July, August	23.00 cash.
500 Tons Steel Slabs	23.25 cash.
500 Tons Steel Billets	23.30 cash.
200 Tons Steel Billets	23.00 cash.

Muck Bar.

300 Tons Neutral	24.75 cash.
200 Tons Neutral	24.75 cash.
100 Tons Neutral	24.75 cash.

Ferro-Manganese.

100 Tons 80%, New York	59.00 cash.
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Spelter.

175 Tons Spelter	4.75 cash.
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Steel, Skelp.

350 Tons Wide Grooved	1.45 cash.
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Steel Wire Rods.

250 Tons American Fives, September	32.00 cash.
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Old Steel Rails.

300 Tons Old Steel Rails	15.50 cash.
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NEW YORK MINING STOCKS QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stocks Quotations, including columns for Name and Location of Company, dates from July 2 to July 8, and Sales. Dividend-paying mines are on the left, non-dividend-paying on the right.

*Ex-dividend. +Dealt at in New York Stock Ex. Unlisted securities. †Assessment paid. ‡Assessment unpaid. Dividend shares sold, 3,470. Non-dividend shares sold, 16,920. Total shares sold, 20,390.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing company names and prices from July 1 to July 7, with sales figures.

Dividend shares sold, 4,411. Non-dividend shares sold, 3,225. Total shares sold, 7,636.

COAL STOCKS.

Table of Coal Stocks, listing company names and prices from July 2 to July 8, with sales figures.

Total shares sold, 191,869.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, listing company names and closing quotations from July 1 to July 7.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Main table containing two columns: 'DIVIDEND-PAYING MINES' and 'NON-DIVIDEND PAYING MINES'. Each column lists mine names, locations, capital stock, shares, and assessment/dividend details.

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$11,000,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ††† This company acquired the property of the Raymond & Ely Company, which had paid \$3,075,000 in dividends. †††† Previous to this company's acquiring Northern Belle, that mine declared \$2,400,000 in dividends, against \$425,000 in assessments.

STOCK MARKET QUOTATIONS.

Aspen. July 2. The closing quotations were as follows: Agnes C., Argonaut Juniors, Aspen Deep Shaft, Aspen Contact, Best Friend, Bimetallio, Bushwacker, Carbonate Chief, Empire Champion, Justice, Little Annie, Mollie Gibson, Nolan Creek, Park, Mamie & Queen, Pontiac, Sheep Mountain S. & M. Co., Snuggler, St. Joe & Mineral Farm, Yellow Boy.

Baltimore, Md. July 6. COMPANY. Bid. Asked. Atlantic Coal, Balt. & N. C., Big Vein Coal, Conrad Hill, Cons. Coal, Diamond Tunnel, George's Creek Coal, Lake Chrome, Maryland & Charlotte, North State, Silver Valley.

Pittsburg, Pa. Prices biggest and lowest for the week ending July 7:

COMPANY. H. L. Allegheny Gas Co., Bridgewater Gas Co., Chartiers Val. Gas, Columbia Oil Co., Consigne Mining Co., Consolidated Gas Co., East End Gas Co., Fisher Oil Co., Forest Oil, Hazlewood Oil Co., Hidalgo Mining Co., La Noria Mining Co., Luster Mining Co., Mansfield C. & C. Co., Manufacturers Gas Co., Nat. Gas Co. of W. Va., N. Y. & Clev. Gas Coal Co., Ohio Valley Gas Co., Pennsylvania Gas Co., People's Natural Gas Co., People's N. G. & P. Co., Philadelphia Co., Pine Run Gas Co., Pittsburg Gas Co., Red Cloud Mining Co., Silvertown Mining Co., South Side Gas Co., Sterling Silver Mining Co., Tuna Oil Co., Union Gas Co., Washington Oil Co., W'moreland & Camb., W'beeling Gas Co., W'house E. Light, W'house Air Brake Co., W'house Brake Co., Ltd.

Deadwood. July 2. Bid. Asked. Bullion, Caledonia, Calumet, Cambrian, Carthage, Cora, Deadwood Terra, De Smet, Double Standard, Elk Mountain, Emmett, Equitable, Florence, Golden Reward, General Merritt, Harmony, Hester A., Homestake, Hermit, Iron Hill, Isadorah, Maggie, Monitor, Rainbow, Retriever, Rose-Hannibal, Ruby Bell, Ruby Wilkes, Seabury-Calkins, Silver Queen, Spanish R., Stewart, Tornado, Troy, Uncle Sam.

St. Louis. July 6.

The closing quotations were as follows:

Adams, Colo., American & Nettie Colo., Bi-Metallic, Mont., Central Silver, Elizabeth, Mont., Granite Mountain, Mont., Hope, Little Albert, Montrose Placer, Colo., Mickey Breen, Pat Murphy, Colo., Silver Age, Silver Bell, Small Hopes, Colo., Yuma, Ariz.

Helena, Mont.

(Special report by SAMUEL K. DAVIS.) Prices biggest and lowest for week ending July 2:

H. L. Bald Butte (Mont.), Benton Group, Mont., Bi-Metallic, Mont., California (Castle), Mont., Champion (Oro Fino), Mont., Combination (Phillips'), Mont., Copper Bell (Cataract), Mont., Cornucopia, Mont., Cumberland (Castle), Mont., Elizabeth (Phillipsburg), Mont., Florence (Neibart), Mont., Fourth of July, Wash., Glengary (Butte), Mont., Helena & Victor, Mont., Ingersoll, Mont., Iron Mountain (Missoula), Mont., Jersey Blue (Butte), Lone Pine Consolidated, Moulton, Mont., Polaris (Beaverhead Co.), Mont., Poorman (Coeur d'Alene), Idaho, Queen of the Hills (Neihart), Southern Cross (Deer Lodge), Mont., Whitlatch Union & MacIntyre, Yellowstone (Castle), Mont.

Foreign Quotations.

London. June 25.

Highest. Lowest. Alaska Treadwell, Amador, Cal., American Belle, Colo., Appalachian, N. C., Can. Phosphate, Can., Colorado, De Lamar, Idaho, Dickens Custer, Idaho, Eagle Hawk, East Arevalo, Idaho, Eberhardt, Nev., Elkborn, Mont., Emmore, Idaho, Emma, Utah, Esmeralda, Nev., Flagstaff, Utah, Garfield, Nev., Golden Feather, Cal., Golden Gate, Cal., Golden Leaf, Mont., Golden River, Cal., Idaho, Jay Hawk, Mont., Josephine, Cal., Kohnoor, Colo., La Luz, Mex., La Plata, Colo., La Valera, Mex., Maid of Erin, Colo., Mammoth Gold, Ariz., Mount McClellan, Montana, Mont., Mona Lake Gold, New California, Colo., New Consolidated, New Eberhardt, Nev., New Gold Hill, N. C., New Guston, Colo., New Hoover Hill, N. C., New Russell, N. C., New Viola, Idaho, Old Lout, Colo., Parker Gold, N. C., Pittsburg Cons., Nev., Poorman, Idaho, Plumas Eureka, Cal., Richmond Con., Nev., Rnby, Nev., Sam Christian, N. C., Sierra Buttes, Cal., Plumas Eur., Cal., Silver King, United Mexican, Mex., West Argentine, Colo., Yankee Girl, Colo.

Paris. June 23.

Francs. East Oregon, Ore., Forest Hill Divide, Cal., Golden River, Cal., parts, Laurium, Greece, Lexington, Mont., parts, Nickel, New Caledonia, Rio Tinto, Spain, parts, Tharsis, Spain, Vieille-Montagne, Belgium.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid-Acetic, No. 8, pure, 1,040, 1/2 lb. @ .08. Commercial, in bbls. and cys. .015 @ .016. Carbonic, liquefied, 1/2 lb. .30. Chromic, chem. pure, 1/2 lb. 1.00 for batteries. Hydrobromic, dilute, U. S. P. .25. Hydrocyanic, U. S. P. .45. Hydrofluoric .20. Alcohol-95%, 1/2 gall. \$2.30 @ \$2.40. Absolute .33. Ammoniated .28. Alum-Lump, 1/2 lb. .016 @ .017. Ground, 1/2 lb. .0165 @ .0175. Powdered, 1/2 lb. .04 1/2 @ .05. Lump 1/2 ton, Liverpool .25. Aluminum Chloride-Pure, 1/2 lb. \$1.25. Amalgamating solution, 1/2 lb. .60. Sulphate .018 @ .03. Ammonia-Sul. in bbls. lots, 1/2 lb. @ .02 1/2 @ .03. Carbonate, 1/2 lb., English and German .07 1/2. Muriate, white, in bbls., 1/2 lb. .08 1/2. Aqua Ammonia-(in cys.) 18 1/2 lb. @ .04 @ .05. 20 1/2 lb. .04 @ .05. 26 1/2 lb. .04 1/2 @ .05. Antimony-Oxymur, 1/2 lb. .04 @ .06. Regulus, 1/2 ton, London. \$42 1/2 @ \$43 1/2. Arsenic-Red, powdered, 1/2 lb. .15. Arsenic-White, powdered 1/2 lb. @ .02 1/2 @ .03. Red 1/2 lb. .05 @ .065. Yellow .08 @ .09. White at Plymouth, 1/2 ton. \$12 1/2 @ 13. Asbestos-Canadian, 1/2 ton. \$50 @ \$300. Italian, 1/2 ton, c. i. f. L'pool. \$18 @ \$30. Ashes-Pot, 1st sorts, 1/2 lb. 4 1/2 @ 5. Pearl .06 @ .06 1/2. Asphaltum-Prime Cuban, 1/2 lb. .04 @ .05 1/2. Hard Cuban, 1/2 ton. \$28.00. Trinidad, refined, 1/2 ton. \$30.00. Egyptian, 1/2 lb. .08 @ .09. Californian, at mine, 1/2 ton. \$12.00. at San Francisco, 1/2 ton. \$15.00. Barium-Carbonate, pure, 1/2 lb. .45. Carbonate, commercial, 1/2 lb. .06 @ .10. Chlorate, crystal, 1/2 lb. .75. Chloride, commercial, 1/2 lb. .05 @ .10. pure, 1/2 lb. .16. Iodide, 1/2 oz. .40. Nitrate, 1/2 lb. .07 @ .07 1/2. Sulph., Am. prime white, 1/2 ton. \$18 @ \$19. Sulph., foreign, floated, 1/2 ton. \$21 @ \$23. Sulph., off color, 1/2 ton. \$11.50 @ \$14.00. Carb., lump, f. o. b. L'pool, 1/2 ton. \$6. No. 1, Casks, Runcorn. " " \$4 10 0. No. 2, bags, Runcorn. " " \$3 15 0. Bauxite-1/2 ton. \$10.00. Bichromate of Potash-Scotch, 1/2 lb. 10 1/4 @ .11. American, 1/2 lb. 10 1/4 @ .11. Bichromate of Soda-1/2 lb. .09 1/2 @ .10. Borax-Refined, 1/2 lb., in car lots. @ .08 1/2. San Francisco. Concentrated, in car lots. @ .08 1/2. Refined, Liverpool 1/2 ton. \$29. Bromine-1/2 lb. .15 @ .22. Cadmium Minion-1/2 lb. \$2.00. Cadmium Iodide-1/2 lb. \$5.50. Chalk-1/2 ton. \$1.75 @ \$2.00. Precipitated, 1/2 lb. .05 @ .06. China Clay-English, 1/2 ton. \$13 @ \$18.00. Domestic, 1/2 ton. \$9 @ \$11. Chlorine Water-1/2 lb. .10. Chrome Yellow-1/2 lb. .10 @ .25. Chrome Iron Ore-1/2 ton, San Francisco. \$10.00. Chromalum-Pure, 1/2 lb. .40. Commercial, 1/2 lb. .12. Cobalt-Oxide, 1/2 lb. \$2.50 @ \$2.90. Copper-Sulph. English Wks. ton. \$20 @ \$21. Vitriol (blue), ordinary. 03 1/4 @ 03 1/2. extra. 04 1/2. Nitrate, 1/2 lb. .40. Copperas-Common, 100 lbs. 73 @ 90. Best, 100 lbs. 85 @ 1.00. Liverpool, 1/2 ton, in casks. .02. Corundum-Powdered, 1/2 lb. .04 1/2 @ .09. Flour, 1/2 lb. .03. Cryolite-Powdered, 1/2 lb., bbl. lots. .07. Emery-Grain, 1/2 lb. (1/2 kg.) .04 1/2 @ .05. Flour, 1/2 lb. .02 1/2 @ .10. Epsom Salt-1/2 lb. .01 1/2. Feldspar-Ground, 1/2 ton. \$20.00. Crude. \$10 @ \$14. Fluorspar-Powdered, No. 1, 1/2 ton. \$30.00. French Chalk-Fuller's Earth-Lump, 1/2 ton. \$20 @ \$25. Glauber's Salt-in bbls., 1/2 lb. .01 @ .0125. Glass-Ground, 1/2 lb. .10. Gold-Chloride, pure, crystals, 1/2 oz. \$12.00. pure, 15 gr. c.v., 1/2 doz. \$5.40. liquid, 15 gr. g. s. v., 1/2 doz. \$5.50. Chloride and sodium, 1/2 oz. \$8.00. 15 gr. c.v., 1/2 doz. \$2.88. Oxide, 1/2 oz. \$27.25. Gypsum-Calcined, 1/2 bbl. \$1.25 @ \$1.50. Land Plaster. Iodine-Resublimed. \$3.30 @ \$3.35. Iron-Nitrate, 40%, 1/2 lb. .01 1/2. 47%, 1/2 lb. .02 1/2. Kaolin-See China Clay. Kieselrite-1/2 ton. \$9 @ \$10. Lead-Red, 1/2 lb. .06 1/2 @ .07 1/2. White, American, in oil, 1/2 lb. .06 1/2 @ .07 1/2. White, English, 1/2 lb., in oil. .06 1/2 @ .06 3/4. Acetate, or sugar of, white. 12 @ 13. Granulated. Nitrate. Lime Acetate-Am. Brown. \$1.00 @ \$1.05. Gray. \$1.75 @ \$1.87 1/2. Litharge-Powdered, 1/2 lb. .06 1/2 @ .07 1/2. English flake, 1/2 lb. .09 @ .09 1/2. Magnesite-Crude, 1/2 ton of 1,015 kilos. \$14.75. Calcined, 1/2 ton of 2,240 lbs. \$22.00. Brick, 1/2 ton of 2,240 lbs. \$47.50. Manganese-Ore, per unit. \$23 @ 28. Oxide, ground, 1/2 lb. .02 1/2 @ .06 1/2. Mercuric Chloride-(Corrosive Sublimate) 1/2 lb. .60 @ .69. Powdered, 1/2 lb. .54.

Marble Dust-1/2 bbl. \$1.29. Metallic Paint-Brown 1/2 ton. \$20 @ \$25. Red. \$20 @ \$25. Mineral Wool-Ordinary slag. .01 1/2. Ordinary rock. .02 1/2. Ground, 1/2 ton. Mica-In sheets according to size. 1st quality, 1/2 lb. .25 @ \$6.00. Naphtha-Black. Nitre Cake-1/2 ton. \$10.00. Nitre-Kochelle, 1/2 lb. \$1.50 @ \$1.55. Washed Nat Ox'rd, Lump, 1/2 lb. .06 1/2 @ .06 3/4. Washed Nat Ox'rd, Powder, 1/2 lb. .07 @ .07 1/2. Golden, 1/2 lb. .03 1/2 @ .04. Domestic, 1/2 lb. .03 @ .04. Oils, Mineral-Cylinder, light filtered, 1/2 gal. .14 @ .16. Dark filtered, 1/2 gal. .10 @ .13. Extra cold test, 1/2 gal. .2 @ .24. Dark steam refined, 1/2 gal. .09 @ .12. Phosphorus-1/2 lb. .55 @ .60. Precip., red, 1/2 lb. .85 @ .90. white, 1/2 lb. .93 @ .97. Plumbago-Ceylon, 1/2 lb. .04 @ .05. American, 1/2 lb. .05 @ .07. Potassium-Cyanide, 1/2 lb., C. P. .70. 67%, 1/2 lb. .45. Bromide, domestic, 1/2 lb. .23 @ .25. Chlorate, English, 1/2 lb. 12 1/4 @ .13. Chlorate, powdered, English, 1/2 lb. .13 @ .13 1/2. Carbonate, 1/2 lb., by casks, 82% .04 1/2 @ .05 1/2. Caustic, 1/2 lb., pure slick. .06 1/2 @ .07. Iodide, 1/2 lb. \$2.58 @ \$2.63. Nitrate, refined, 1/2 lb. .06 @ .08. Bichromate, 1/2 lb. .10 @ .11. Yellow Prussiate, 1/2 lb. .23 1/4 @ .24 1/2. Red Prussiate, 1/2 lb. .40 @ .45. Pumice Stone-Select lumps, 1/2 lb. .01 @ .15. Original cks., 1/2 lb. .01 1/2 @ .02. Powdered, pure, 1/2 lb. .01 1/4 @ .02 1/4. Pyrites-Non-cupreous, p. units. 12 @ 15. Quartz-Ground, 1/2 ton. \$12.50 @ \$17.50. Kotten stone, Powdered, 1/2 lb. .03 1/4 @ .03 1/2. Lump, 1/2 lb. .06 @ .07. Original cks., 1/2 lb. .04 1/2 @ .05 1/2. Rubbing stone, 1/2 lb. .03 1/4 @ .04. Sal Ammoniac-lump in bbls., 1/2 lb. .80 1/4. Salt-Liverpool, ground, 1/2 sack. .70. Domestic, fine, 1/2 ton. \$7 @ \$7.50. Common, fine, 1/2 ton. \$4.50 @ \$5. Turk's Island, 1/2 busb. .26 @ .28. Salt Cake-1/2 ton. \$10.00. Salt Peter-Crude, 1/2 lb. .03 1/4 @ .04 1/4. Soapstone-Sodium-Prussiate, 1/2 lb. .22 @ .24. Phosphate, 1/2 lb. .06 @ .08. Stannate, 1/2 lb. .08 @ .15. Tungstate, 1/2 lb. Hyposulphite, 1/2 lb., in casks. .0235 @ .0245. Strontium-Nitrate, 1/2 lb. .09 @ .09 1/2. Sulphur-Roli, 1/2 lb. .02 1/4. Flour, 1/2 lb. .04 1/2 @ .05 1/2. Sylvinit, 23 @ 27 1/2, S. O. P., per unit. 40 @ 42 1/2. Tale-Ground French, 1/2 lb. .01 1/4 @ .01 1/2. American No. 1, 1/2 lb. .01 @ .01 1/2. Terra Alba-French, 1/2 lb. .75 @ .80. English, 1/2 lb. .70 @ .75. American, No. 1, 1/2 lb. 1.00. American, No. 2, 1/2 lb. .45 @ .60. Tin-Crystals, in kegs or bbls. 14 @ 15. feathered or flossed. .25. Double or strong, 5 1/2 B. 1.0 @ 1.2. Oxy. or nitro. .19. Tin Plates, 1/2 box, Swansea, best charcoal. 18 @ 19. best coke. 15 @ 16. Vermilion-Imp. English, 1/2 lb. .90 @ .95. Am. quicksilver, bulk. .65. Am. quicksilver, bags. .68 @ .73. Chinese. .95 @ \$1.00. Trieste. .90 @ .95. American. 11 1/4 @ .13. Zinc White-Am. Dry, 1/2 lb. .04 1/2 @ .05. Antwerp, Red Seal, 1/2 lb. .07 1/2. Paris, Red Seal, 1/2 lb. .08 @ .08 1/2. Muriate solution. .06 1/2. Sulphate crystals, in bbls., 1/2 lb. .06 1/2.

THE RARE METALS.

Aluminum-1/2 lb. 50 @ 65. Arsenic-(Metallic), per lb. .40. Barium-(Metallic), per gram. \$4.00. Bismuth-(Metallic), per gram. \$2.40. Cadmium-(Metallic), per lb. \$1.00. Calcium-(Metallic), per gram. \$10.00. Cerium-(Metallic), per gram. \$7.50. Chromium-(Metallic), per gram. \$1.00. Cobalt-(Metallic), per lb. \$6.00. Didymium-(Metallic), per gram. \$9.00. Erbium-(Metallic), per gram. \$7.50. Gallium-(Metallic), per gram. \$140.00. Glucium-(Metallic), per gram. \$12.00. Indium-(Metallic), per gram. \$9.00. Iridium-(Metallic), per oz. \$7.00. Lanthanum-(Metallic), per gr. \$10.00. Lithium-(Metallic), per gram. \$10.00. Magnesium-(Powdered), per lb. \$4.00. Manganese-(Metallic), per lb. \$1.10. Chem. pure, per oz. \$10.00. Molybdenum-(Metallic), per gm. .50. Niobium-(Metallic), per gram. \$5.00. Osmium-(Metallic), per oz. \$65.00. Palladium-(Metallic), per oz. \$35.00. Platinum-(Metallic), per oz. \$10 @ \$13. Potassium-(Metallic), per lb. \$28.00. Rhodium-(Metallic), per gram. \$5.00. Ruthenium-(Metallic), per gm. \$5.50. Selenium-(Metallic), per gram. \$2.00. Seltium-(Metallic), per oz. \$1.80. Sodium-(Metallic), per lb. 5 @ 6 1/2. Strontium-(Metallic), per gram. .60. Tantalum (Metallic), per gram. \$9.00. Tellurium-(Metallic), per lb. \$5.00. Thorium-(Metallic), per gram. .20. Titanium-(Metallic), per gram. \$2.20. Thorium-(Metallic), per gram. \$17.00. Tungsten-(Metallic), per lb. .80. Uranium-(Oxide), per lb. \$5.00. Metallic, per gm. .20. Vanadium-(Metallic), per gm. \$22.00. Yttrium-(Metallic), per gram. \$9.00. Zirconium-(Metallic), per oz. \$65.00.