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MR. WILLIAM H. COOPER, mining engineer, will leave for Charlotte, North Carolina, April 25th, on professional business.

THE preservation of the Adirondack forests is so important for the water supply of our Erie Canal and the Hudson River, as well as for many other important streams, that it seems strange our intelligent legislators should need the universal support of the press to induce them to pass the bills now before the New York Legislature in behalf of this most important object.

THE American Institute of Mining Engineers will hold its next meeting at Chattanooga, Tenn., commencing May 19th. The spring meeting is always a large and pleasant one, and Chattanooga and its vicinity offer many inducements to attend this meeting. We hear from many sides the hope that the meeting will be devoted more to professional discus-

sion and less to "excursions" than has of late been the rule. Mr. H. S. CHAMBERLAIN is Chairman of the Local Committee.

GOLD mining is attracting more and more attention everywhere throughout the civilized world. The production of gold is decreasing and the amount required is constantly increasing. The consequence is, that the purchasing power of gold is greater every year. Gold mining is almost the only industry whose product is more valuable the "harder" the times and the less it costs to produce. It is almost the only mineral product that never depreciates in value and that never overstocks the market.

ELABORATE tests of Dr. BAUER'S quicksilver antidote for phylloxera are making near Sonoma, Cal. The results are not yet recorded.

Arsenous oxide in the soil around the vines or other plants injured by insects has been found very efficient, and, according to some authorities who have used it, this promises to be one of the most important improvements in agriculture in recent times. The arsenous oxide (white powdered arsenic) is said not only to kill potato bugs and other insects, but all worms, and even the larvæ from which come nearly all the enemies of the agriculturist and fruit-grower.

THE amicable war between the civil and the military engineers promises to put on record the data that may set at rest this much discussed and important question. We are pleased to afford every facility for a full statement of the matter, but have taken the liberty of omitting a number of the excellent things stated by "Spectator" in his letter this week. The fact is, "Spectator" is so prolific in his good things and has answered so fully the letters of the civil engineers, that he can afford to lose a little and yet make it "lively" for his opponents. No doubt the civil engineers have an abundant supply of facts and figures to demonstrate the inexpediency of employing military engineers on civil work. The practical demonstration of the relative cost and quality of the work done by each class of engineers would be extremely interesting and valuable, and with many would be the best measure of the respective claims to engineering ability.

THE war between Russia and England, which seems inevitable, has already filled the English manufacturing works with orders, and will, for a time at least, keep them busy. Large orders have also been placed in this country, especially on Russian account (the great amount of these orders has not been reported or appreciated), and the effect will be a very considerable increase in work in the industries affected. A war between Russia and England, by closing the Black Sea grain supply, would give a great impetus to our grain shipments, increasing the freights to American (neutral) shipping to our railroads and canals. Every branch of trade would feel the effect of this increase in business, and for the moment we should profit by that most dire of evils, a great war.

The condition of our markets is generally such that even a small increase in demand might precipitate a general revival. In other words, the situation is one calling for the closest attention of business men who hope to float in on the approaching tide.

THE following note appears in the daily papers, under date of Washington, April 8th: "Representatives of the European countries comprising the Latin Union will meet at Paris on the 15th inst., to consider the subject of continuing the Union, which expires by limitation on January 1st, 1886. This convention was to have assembled in January last, but was postponed until February, and afterward until April, in order that the action of the United States Congress on the silver question might be known. In view of the approaching convention, Secretary BAYARD has directed the representatives of the United States in the Latin Union countries to signify to the governments of these countries the willingness of this government to consider the question of adjusting and fixing a common rate between the coinage values of gold and silver, when European countries are ready to unite, with the view of securing the unlimited coinage and legal tender of the two metals on a ratio agreed upon by the several nations. Italy has already signified her desire to continue the Union, and has asked that Germany be invited to join it."

This does not advance the cause of bi-metalism in the least. Even should war not prevent the cooperation of other European countries, there is not the least probability that the Latin Union countries will embark in unlimited silver coinage. Until all the great civilized countries can agree upon a fixed ratio between silver and gold at which they will accept either metal in all transactions, it is simple folly to suppose that the two metals can be kept afloat together by the action of one country or by the Latin Union. No doubt, Germany and England would gladly see us embark in the Quixotic effort to prop up silver while they quietly gather in our gold. There is not much chance of their being gratified, however; for the danger we are in and the greater ones we are

approaching are known and appreciated by our business men and by those in high places, and the remedy will be applied before serious consequences arrive.

THE gold production of Nova Scotia, though not large, is remarkably uniform, and it has always been supposed to show some profit over average cost. The great drawback is in the limited quantity of the ore. The veins are very small, from one inch to a foot in thickness being the average, and consequently the small quantity treated must necessarily show a high cost. The total quantity of quartz crushed, 25,186 tons, would be a fair amount for a single mine to produce and a single mill to treat, while there were no less than 27 mines and the same number of mills in operation the past year. The Homestake mill, in Dakota, crushes more ore in a single month than the whole of Nova Scotia produces in a year.

The following table shows the average yield and quantity of ore milled and the labor employed for five years.

When it is considered that the ores are free milling and the gold, usually as coarse gold, readily amalgamated to a high percentage, the high cost of treating the Nova Scotia ore is the more surprising:

GOLD—GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of gold extracted.	Stuff crushed.	Yield per ton of 2000 pounds.		Total days' labor.	Average earnings per man per day and year, at 300 working days, \$18 per ounce.	
			Tons.	Dwt. gr.		Per day.	Per year.
1880.....	13,234 0 4	14,037	18 20	103,826	\$2.18	654	
1881.....	10,756 13 2	15,556	12 20	126,308	1 52	456	
1882.....	14,107 3 20	22,081	12 18	106,884	2.37	711	
1883.....	15,446 9 23	25,954	10 21	97,733	2.84	862	
1884.....	16,059 18 17	25,147	12 18	118,087	2.40	720	

It is well known that Nova Scotia mills are far from perfect—indeed, are very primitive, and we see no immediate prospect for much improvement, unless large quantities of low-grade ore may be made available for supplying an economical mill.

CORRESPONDENCE.

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

Coal and Ironstone Production in England in 1884.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I am sorry to say that an error has been discovered in the figures I sent to you last week. [See the JOURNAL for April 4th, page 221.] The corrected figures are:

Coal, statute tons, 2240 pounds each	1884. 160,757,815
Fire-clay	2,053,927
Ironstone	10,412,443
Shale and other minerals	1,648,610
Total	174,872,795
Number of persons employed	520,376
Fatal accidents	863
Deaths occasioned thereby	942

I send you these corrections at the earliest opportunity.

Yours faithfully, C. LE NEVE FOSTER.

LLANDANO, March 23, 1885.

The Sturtevant Mill, Stamps, and Rolls.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Your issue of March 28th, containing a reply to my memorandum in the ENGINEERING AND MINING JOURNAL of March 21st, did not reach me until late last week, too late for me to answer it then. I wish to consider the arguments offered by "D." in criticism of the statements that I made regarding the product and usefulness of the Sturtevant mill. "D." first objects to my basing my statements upon figures. I believe, notwithstanding, that it is generally assumed, especially by men of our profession, that figures are the best advisers; it is true that he bears out his principle in himself omitting to quote results when he asserts that rolls produce more dust than the Sturtevant mill. The case that he cites is certainly an extraordinary one, and the results differ very widely from standard figures given by Rittinger, Küstel, Krom, etc.

In his paper he states or implies—

1. That my conclusions deduced from figures obtained by actual experiment are absolutely incorrect, as "these figures are susceptible of a different interpretation; . . . in fact, may be taken to prove the exact reverse of my conclusions." This is a point that it does not belong to me to decide.

2. That rolls produce at least as large a proportion of fines as stamps. It seems to me unnecessary again to enter upon this long discussion, which was fairly settled long ago in favor of rolls, and to which decision such men as Rittinger, Küstel, Krom, and, I believe, Stetefeldt and Raymond, adhere. Let it suffice simply to recall as memoranda that with rolls what has been sufficiently acted upon does not remain or return for further crushing, as is the case in the stamp-battery, where the discharge is more accidental than positive.

The following figures, the only ones I have at hand, are given by Küstel after Rittinger:

Rolls, fine crushing to pass No. 100; coarse to pass a 5-32 hole.	
Grains.....	88-90 per cent.....92 per cent
Dust.....	12-10 ".....8 "
Stamps, 5-32.	
Grains.....	.....32 "
Flour { .....	.....32 "
Dust { .....	.....68 per cent {36 "

That stamps produce a large percentage of fines does not necessarily recommend the Sturtevant mill, which does the same.

3. That practically all gold and silver ores have been crushed by stamps. Gold and silver ores form comparatively but a small portion of the ores that are crushed over the world to-day; and yet a large percentage of these are crushed by rolls; stamps are very little used in Europe, and where used their action is so different from that of our very heavy stamps (that have a grinding turn after impact) that they may be considered as a different tool, just as rolls of unequal diameter, or driven at different rates of speed, are a different tool from twin synchronous rolls. It is not too much to say that nearly all base gold and silver-bearing ores are crushed in rolls or jaws, especially when, as is generally the case, the pulp is to be concentrated before treatment. In this case, the sizing begins at No. 10, often at No. 8. Water-jigs are not supposed to do good work on stuff finer than No. 20; hence my sizing began at No. 10.

4. That if the sizing began at No. 30, the 22 per cent of fines over No. 140 would amount to 35.8 per cent of the total stock. This is not strictly accurate. To obtain this figure, we have subtracted 38.7 per cent of the stuff varying between sizes Nos. 10 and 30, and it is a well-known fact that, if we were to attempt to reduce this coarse sand, a very much larger proportion of fines would be produced than in the case of the ordinary lump feed. The best work of all such fast "grinders and centrifugals" is done at the start; we can not, therefore, accept 35.8 per cent as the total yield of fines on 30-mesh crushing.

5. It is not fair to stamps to put the numbers of 60, 67, 76 per cent of dust finer than No. 150 against the 35 per cent of the Sturtevant product; for in the latter case the required size of pulp was only No. 10, whereas the stamps were required to crush to a much higher number. To compare the two, they should have started on the same basis. I see no ground as yet for claiming that "the Sturtevant mill is vastly superior to stamps." I hope that the figures that "D." has promised us, and the publication of which, I am sure, a great many professional men are eagerly looking for, may prove this fact, which, however, will be very far from proving that the mill is a substitute for rolls.

6. "With wet stamps," the degree of fineness of crushing is usually limited "by the matter of cost or difficulty of settling, rather than by fear of making ore too fine for subsequent treatment." If I understand this sentence aright, it contains its own condemnation, and needs no further comment.

7. As to the action of the mill, "D." says that no theory of grinding can account for the pulverizing of cast-iron balls, of metallic copper, of copper matte, of base ores with little slime; and this is a perfectly fair statement. I said the action of the mill was chiefly a grinding one, and I maintain that this is the case as long as the mill is kept full with the ordinary mixture of rock from breaker and returns from screens. Where the mill is only half full or perhaps less, we have very different conditions; we no longer have two more or less solid buhstones grinding each other down and being ground down by friction against the sides of the discharge apertures; but a few isolated projectiles striking the circular screen, and occasionally each other, with great force so as to be shattered under the blow. Making use of this observation, it would be easy to reduce the quantity of slimes on base ores by taking advantage of their easy cleavage and regulating the feed so as to increase the useful effect of the centrifugal force and diminish the attrition. If we fill the mill with fragments of cast-iron as we would with quartz rock, I am not sure that the products would not be to a certain extent similar, the yield being a much smaller one, however.

In conclusion, let me say that I am very sorry the product of the Sturtevant mill is not a good one for concentration, as the machine has many advantages that recommend it for the work I had proposed doing, and the results have disappointed me as much as any one. A microscopic examination of the pulp might be interesting, and would complete the comparative tables that "D." is about to publish. He may yet have some convincing arguments to bring forward. Let us all say honestly what we have to say upon this subject, and *honi soit qui mal y pense*.

JOHN HEARD, JR.

Civil vs. Military Engineers.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: "Spectator's" sentence, "Those who remember the earlier industry of the attempts to remove obstructions in the East River and Hell Gate can not easily be made to regret that this great work was at last taken out of the hands of civilians, and put into the hands of the army engineers. That history alone contains nearly the whole argument of the question now at issue," shows a childlike confidence in the ignorance of his readers.

Does "Spectator" suppose there is any civil or mining engineer not knowing that those earlier industries were essayed in conformity with the knowledge and resources then available, namely, surface blasts with black powder, fifteen years before the first use of nitro-glycerine in this country, and fourteen years before Burleigh's first patent for a power-drill?

General Newton, it seems, took charge of this work in 1866. Before that, only \$20,000 had been appropriated by government, all other funds used at Hell Gate having been furnished by the merchants of New York. Since that, up to and including May 4th, 1882, 2½ million dollars have been appropriated.

Before firing the great blast at Hallett's Point, the details of which were admirably worked out, except that the exploders were not in all cases heavy enough to secure an explosion of the first order, experience was had in the harbor of Malta in driving subaqueous tunnels, for the site of a floating dry dock, and throwing down the pillars and roof by charges in holes drilled vertically from the surface; and Von Schmidt had

blown up Blossom Rock after a series of futile dalliances with surface charges by the army engineers in charge.

You will possibly, Mr. Editor, pardon the use of the word "cheeky" in connection with this attempt of "Spectator's" to claim that the world's increase in knowledge of the use of high explosives is due to the constitution of the United States Corps of Engineers and the examinations they are required to pass.

It is unfortunate that "Spectator" should have given the discussion a personal turn, as no one would care publicly to examine the value of the services of the gentleman under consideration in the numerous instances referred to by "Spectator" and in the cases where he has been employed as consulting engineer by civil parties. OBSERVER.

NEW YORK, April 2.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In my last letter, I gave at length the professional history of Gen. John Newton, the present Chief of the Corps of Engineers. It is sufficient for my present purpose to present in a condensed form the history of all the other army engineers in charge of civil works. The following table, taken from official records, does this, to the date of June 30th, 1884.

NAMES.	Total service, years.	Eng'r in charge, years.	Number of different works.	Approximate Number of ex. and surveys.	Number of boards.
C. S. Stewart	38	25	20	9	5
C. E. Blunt	38	30	47	6	6
Q. A. Gillmore	35	24	49	16	25
G. H. Mendell	32	20	17	12	8
W. P. Craighill	31	20	66	40	23
O. M. Poe	28	18	17	10	13
D. C. Houston	28	20	22	7	32
G. H. Elliot	29	19	24	2	6
H. M. Roberts	27	19	53	7	10
W. E. Merrill	25	14	14	24	33
W. McFarland	24	19	61	24	12
J. W. Barlow	23	15	63	19	1
P. C. Baines	23	15	6	0	1
G. L. Gillespie	22	10	51	39	13
C. R. Suter	22	11	22	12	18
S. M. Mansfield	22	18	30	10	8
W. R. King	21	8	16	17	6
W. H. H. Benyard	21	11	36	36	6
A. Mackenzie	20	5	27	6	5
A. N. Darnell	20	11	30	45	2
C. J. Allen	20	6	14	14	7
C. W. Raymond	19	4	26	6	4
L. C. Overman	19	1	12	1	1
A. M. Miller	19	1	22	21	2
W. H. Heuer	19	4	38	4	2
T. H. Handbury	19	1	9	7	0
J. C. Post	19	5	34	3	3
J. B. Quinn	18	3	2	0	0
D. W. Lockwood	18	2	32	2	0
E. H. Ruffner	17	2	7	0	0
T. Turtle	17	2	31	13	6
Ed Maguire	17	1	10	2	0
C. F. Powell	17	2	18	10	1
F. A. Hinman	17	2	47	0	3
W. L. Marshall	16	2	11	0	1

It will be noticed that the officers who have graduated since the war have spent in preparatory service and training a much longer average period than did the earlier graduates.

The detailed account of the work done by each of the above officers lies before me as I write. But the summary I have given is enough. I believe it constitutes a crushing reply to the assertion so freely indulged by amateur participants in the newspaper discussion of this subject, that young West Point graduates, without experience, are placed in charge of works.

In the JOURNAL of March 28th, "C. D. M." comes to the rescue of "C. U. E.," with a number of criticisms and assertions concerning my first letter. . . . I proceed to consider the "one point" which he states as follows:

"Under the head of Engineer Department at Large, I find in the civil register for 1883-84 about 40 officers detailed for river and harbor work. With two or three exceptions, none of them has young military engineers detailed for duty under him. Those so detailed are either in Washington or New York, and hold positions that Mr. 'Spectator' must well know, if he is as well posted as he claims to be, are superior to any held by civilian assistants, and are certainly so considered by the incumbents. The point that I desire to bring to Mr. 'Spectator's' attention is this: Where are these lieutenants gaining the practical experience in river and harbor work that is fitting them to take charge of these works, on which they are not now employed," etc., etc.?

Elsewhere, "C. D. M." says the number of military engineers engaged on river and harbor work exclusively is about 40, and the number of civilian assistant engineers is about 225.

I must say, with Josh Billings, "I'd most as lieve not know any thing, as know so many things that ain't so!" The number of civil assistants employed by the Engineer Department and under its orders is about 143. "C. D. M." includes in his estimate those who are employed by the River Commissioners, which have nothing to do with the system now under criticism, except as a warning of what may result from the meddling of politicians with that system. These 61 assistants are not selected and employed by, or under the orders of, the Engineer Department.

Now as to the 40 officers. As I have shown, there were last June 35 officers in charge of works. If "C. D. M.'s" statement means any thing pertinent to the debate, it means that nearly all the rest of the corps were engaged in duty not connected with these civil works. What amount of shelter he may find in the word "exclusively," I don't care to inquire.

The report of the Chief of Engineers for 1884 shows the 101 officers of the corps to be engaged as follows: 4 (including the chief) in the office of the chief at Washington; 18 on the care of fortifications (we are not building forts now) together with river and harbor works; 2 on these duties, plus membership of the Board of Engineers; 1 on these duties, plus Yorktown monument; 3 on these duties, plus light-house duty; 1 on Board of Engineers, Gun Foundry Board, and with Engineer Battalion; 1 on river and harbor works, Mississippi Commission, and Board on Water-ways; 23 on river and harbor works alone; 1 on this duty, plus Mississippi, plus light-house duty; 2 on the same, minus the Mississippi; 1 on Board of Engineers, plus Mississippi; 1 on same Board, plus light-

house duty; 3 on the Washington Aqueduct; 14 at the School of Application, Willets Point; 2 on leave of absence; 1 on sick-leave; 1 preparing a report on civil and military investigations in Europe; 1 constructing public buildings; 1 engineer secretary to the Light-House Board; 9 topographical engineers on the staffs of general officers; 4 instructors in engineering at West Point; 3 light-house engineers; 2 secretaries and assistants to the Mississippi River Commission; 1 assistant engineer to the Commissioner of the District of Columbia; 1 assistant light-house engineer.

In other words, there were 51 officers whose duties are wholly or principally on river and harbor works of construction, 9 who were principally employed in supervising civil works, 10 engaged in civil constructions (buildings, light-houses, etc.), 4 instructing in engineering at West Point, 14 instructing and being instructed in engineering at Willets Point, 9 on staff duty as topographical engineers, 3 absent, and one writing a report. That is to say, practically the whole force was actively engaged in civil engineering or in engineering instruction.

But let us see where the young officers are who have not yet been put in charge of works. On this point, I happen to be able to give more recent statistics, namely, those of January 16th, 1885.

First, as to the only young military engineers (according to "C. D. M.") detailed to serve under other military engineers. These, he says, are either in Washington or New York. . . . I am quite well enough posted to say that the number of young military engineers on duty in Washington and New York, January 16th (and the state of affairs was not exceptional on that day, so far as I know), was in Washington, none; in New York, none. The soft places which they are asserted to be occupying do not exist, except in the brain of "C. D. M." The junior engineer officer on duty in Washington was Captain Symons (11 years in service); the junior engineer officer at New York was Brevet Lieut.-Col. Gillespie (23 years in service). Lieutenant Derby—a first lieutenant, 7 years in service—was assistant at Hell Gate.

Young engineer officers, after leaving the School of Practice, do the same work as other assistants. They survey lines, draw maps, etc., and when on topographical staff duty, are often called to very hard and disagreeable labor. On the said 16th of January, the officers not in charge of works comprised 11 captains and all the lieutenants of the corps, namely, 26 first and 8 second lieutenants. The following table shows where they were at that time:

	Captains.	1st Lieut.	2d Lieut.	Total.
1. Active assistants on river and harbor works	3	13		16
2. Secretaries and assistants, river commissions	2	1		3
3. Topog. engineers at military head-quarters	1	3		4
4. Instructors in engineering at West Point		3		3
5. " " " Willets Point	3	1		4
6. Students		5	8	13
7. Assistant to Chief of Engineers	1			1
8. Absent (sick)	1			1
	11	26	8	45

Assuming for the sake of the argument that the 4th, 5th, 7th, and 8th of these classes are not in the line of actual practice, we find that out of 45 junior officers, 36 are in practice; and remembering that, by a system of rotation, the various stations and kinds of duty are given to different officers in turn, and that this is kept up, as our statistics have proved, for an average period of 16 years, it is easy to calculate that about 12 years of direct practice is thus secured for each young officer as a pre-requisite for the charge of works.

Since writing the above, I have read in the last number of the JOURNAL the second letter of "C. U. E." His new-born sense of courtesy is amusing enough. If I will promise not to "call names," he will kindly go on! One would think that I, and not he, had been guilty of unprovoked and outrageous assault! If I were calling names, I should call that "cheek"!

"C. U. E." based the argument of his first letter directly upon the assertion that inexperienced West Point graduates were put at once with authority in charge of works. He said this plainly. Did he mean it? It is not true as a general rule; it is not true in any single case; it never has been true; and there is nothing left for "C. U. E." but to retract it, and express his regret that he ever said it. Until he discharges this obvious duty of honesty, his admonitions of courtesy will find no listeners. When he has thus far purged himself from contempt in the court of honor, I will ask him to explain by what right, in his last letter, he makes some five or six pretended quotations from me, inclosing in quotation-marks phrases which I did not employ. Is it possible that he does not know the meaning of such marks?

Other points in the letters of "C. D. M." and "C. U. E." will be duly covered in the course of my further consideration of the general subject. SPECTATOR.

The Domestic Value of Phosphorus.—Dr. Wedding and Dr. Frank have brought before the Agricultural Society of Berlin the question of the value of phosphorus in rural and domestic economy. They propose the actual trial of the manurial value of the ammonia phosphates of magnesia on a large scale.

The Standard Ohm.—Some time ago, the International Conference of Electricians determined to adopt the name of "ohm" for the unit of electric resistance. The value of 1 ohm is represented by a mercury column of 1 meter in length and 1 square meter in section, at a temperature of 0 degree C. This resolution was taken in the spring of last year. The one thing that remained yet to be done was to "realize" the standard ohm. Each of the different nations could undertake this realization. In France, M. Cochery, Minister of Posts and Telegraphs, intrusted this labor to M. René Benoit, first assistant-superintendent of the International Office of Weights and Measures. M. Benoit seemed to be specially marked out for this delicate work, seeing that he had previously prepared the prototypes of the meter in iridiated platina, which had been very much noticed. M. Benoit, being in advance of the scientists of other nations, lodged as early as the 5th December last, in the archives of the Ministry of Posts and Telegraphs, four standards of very great accuracy, the difference between them being less than 100,000th. In this way, the standard ohm has been changed from a mere definition into a reality.

MODERN AMERICAN METHODS OF COPPER SMELTING.*

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

CHAPTER II.

THE ORES OF COPPER.

Although the copper-bearing minerals are numerous, yet those of commercial importance are few in number, and for the most part quite simple in chemical composition. The following minerals may be properly considered ores of copper, and are found in the United States in the localities enumerated.

Native Metallic Copper.

Native copper is distributed in the Lake Superior conglomerate to an extraordinary extent, and is found in masses of great size. This metal is remarkably free from any admixture of foreign substances, containing absolutely no arsenic, antimony, or sulphur, and only mere traces of silver, cobalt, nickel, zinc, and lead.† The peculiarly favorable physical qualities of metallic copper, when free, as in this case, from films and layers of copper oxide, fit it admirably for the purpose of mechanical concentration; and by thus substituting an exceedingly inexpensive operation for a costly and complicated series of furnace processes, it becomes profitable to work ores of a grade that, under any other conditions, would be absolutely valueless.‡ The average yield of the principal Lake mines is scarcely 1½ per cent of copper,§ excepting the abnormally rich Calumet & Hecla, which produces a 4½ per cent ore. The occurrence of metallic copper in porphyry over a large and but slightly explored area at Santa Rita, New Mexico, has been already described. Its value is seriously impaired by the effects of internal decomposition, which causes heavy loss when the scales and nodules of metallic copper thus partially oxidized are subjected to the ordinary wet concentration.¶ Metallic copper also occurs as a product of the decomposition of other ores in the upper portions of many veins and deposits, but scarcely ever in sufficient quantity to become an object of gain.

Cuprite, or Red Oxide of Copper, Cu₂O; 88.8 Cu, 11.2 O.

This ore occurs entirely as a product of decomposition, and while quite widely distributed, is nowhere of more than temporary commercial importance in the United States, except in so far as its general admixture in sheets and veinlets increases the average tenor of the ore. The largest masses known to the author are found in the Santa Rita mines, and are evidently the result of a more or less complete oxidation of metallic nodules, which are often still unaltered at the center. This ore also occurs in the Longfellow, Copper Queen, United Verde, Pima, and many other of the Southern oxide and carbonate mines; and as a product of the decomposition of sulphide ores in the surface-filling of many of the less important Butte City veins; also throughout Nevada and California, and in the narrow fissures of Pennsylvania and New Jersey. In localities where it occurs in sufficient quantities to be regarded as of some importance, it frequently contains an admixture of the hydrated oxide of iron, and forms that dullish, brick-red mineral known to the Germans by the appropriate name of *ziegelerz*. It is also found in moderate quantities at Nacimiento, New Mexico, though possessing no definite chemical composition.

In the places enumerated, where the cuprite has resulted from the alteration of sulphide ores, and has merely a value for the specimen collector, it is usually nearly free from impurities, and forms a beautiful, brilliant red crystalline or amorphous mineral.

Melaconite, Black Oxide of Copper, CuO₂; 79.8 Cu, 20.2 O.

This ore, with its metallic contents usually in part replaced by oxides of iron and manganese, is not quite so widely distributed as the sub-oxide, but is more frequently found in masses sufficiently large to pay for extraction. Perhaps its most remarkable occurrence in the United States was at Ore Knob, Tennessee, where the upper portion of the vein furnished a large amount of from 20 to 50 per cent ore, and gave rise to expectations that were completely disappointed after a very shallow zone of enrichment had been passed through. Nearly all the cupriferous beds of Georgia, Tennessee, and other Southern States are capped by a similar, though much less extensive, layer of this black oxide. It occurs in numerous other veins in much smaller quantities, under the same conditions as cuprite.

Malachite, Cu₂O, CO₂ + HO; 71.9 CuO, 19.9 CO₂, 8.2 HO.

This is a much more valuable compound of copper than the two preceding oxides, from a commercial stand-point.

While it may be said to occur in widely distributed but ordinarily in non-paying quantities, in the upper decomposed regions of most copper deposits, there are certain localities in which it forms the principal ore of this metal. This is the case in Arizona and New Mexico, where, in some cases, it results from the decomposition of sulphides, as demonstrated by the increasing percentage of this as depth is gained, and in others it seems to have been deposited originally in this form.

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† The traces of sulphur occasionally reported in the Lake copper undoubtedly come from the coal used in its refining. See *Investigations on Copper Refining*, by T. Egleston.

‡ See *The Losses in Copper Dressing at Lake Superior*, by H. S. Munroe, Transactions American Institute of Mining Engineers, 1879.

§ A five years' average yield of the Osceola, Allouez, Franklin, and Quincy mines was 1.44 per cent.

¶ An average sample of thirteen tons of concentrates taken by the author at Santa Rita, in 1881, and partially analyzed under his supervision, gave, after continuing the concentration by hand to a point of the almost complete removal of the rock constituents:

Oxides of copper	13.42
Carbonates of copper	1.27
Oxides of iron	0.13
Metallic iron (from stamps)	0.29
Sulphur	0.11
Insoluble residue	0.37
Metallic copper	83.63
Zn, Ag, Co, Ni, Pb, Mn	Traces.

99.25

This analysis presented points of considerable difficulty, especially in determining the amount of oxide of copper in the presence of metallic copper. Entirely satisfactory results were not obtained; but the method proposed by W. Hampe, by means of nitrate of silver, yielded the only figures that could lay the slightest claims to accuracy.

Yet even in this case, the total ore-mass in which it is found is probably of secondary formation, the metallic contents having come from the breaking up of sulphide compounds, and their subsequent solution, transportation, and re-deposition in the condition of carbonates. It is very seldom found in a state of purity, but is mixed with various salts of lime and magnesia, oxides of iron and manganese, silica in its various forms of quartz, chalcedony, flint, chert, and jasper, and when seemingly present in large quantities, it often forms only worthless incrustations, or merely colors green nodules and masses of valueless material. It is then difficult, and in some cases impossible, to form any accurate opinion of the tenor of the ore from its external appearance.

Azurite, 2CuO, CO₂ + HO; 69.2 CuO, 25.6 Co₂, 5.2 HO.

This mineral requires only a passing notice. It is distributed in the same manner and occurs under the same conditions as its sister carbonate, but in very much smaller amounts. It rarely occurs in profitable quantities, although it is very noticeable on account of its striking and beautiful color. Specimens of this mineral are found with malachite and calc-spar in the Longfellow mine, exceeding in beauty any thing of the kind that is known elsewhere in the United States.

Chalcopyrite, Cu₂S, Fe₂S₃; 34.4 Cu, 30.5 Fe, 35.1 S.

This is by far the most widely distributed ore of this metal, and furnishes the greater proportion of the world's copper. It yields, when pure, a product unsurpassed in quality by that of any other ore. It occurs principally in the older crystalline rocks, frequently accompanied with an overwhelming percentage of iron pyrites, in bedded veins in Newfoundland, in Quebec, Canada, in Vermont, Virginia, Georgia, Tennessee, and Alabama.

The value of copper-bearing fissure-veins below the limit of surface decomposition is always due to this mineral. In some localities, the chalcopyrite forms with pyrite a fine-grained mechanical mixture, varying in color with its percentage of copper from deep yellow to steel-gray. This compound is easily recognized under the microscope as a mechanical mixture, and not a chemical compound. In most of the carbonate mines of the Southwest that have attained any considerable depth, chalcopyrite is already becoming apparent, in minute specks; and it is highly probable that the altered ores near the surface, with their valuable admixture of ferric oxides, are all due to the decomposition of this mineral. The sulphureted fissure-veins of the Rocky Mountains and Sierra Nevada are seldom free from this mineral, although their value almost invariably depends upon their precious metal contents. The remarkable purple ores and copper glance of Butte City, Montana, will doubtless give place in depth to the universal yellow sulphide; probably at a point corresponding with the ancient drainage level of Anaconda Mountain.

Chalcocite, Copper Glance, Cu₂S; 79.7 Cu, 20.3 S.

This ore is seldom found in a condition of perfect purity, its valuable component being frequently in part replaced by iron and other metals. Its copper percentage rarely falls below 55, and even at this low standard the mineral retains its physical characteristics, a slight diminution in its luster being the principal difference observable. When high in copper, it greatly resembles the white metal of the smelter. Chalcocite, containing from 60 to 74 per cent of copper, forms the entire present copper value of the noted Anaconda mine, Butte, Montana. Several of the other Butte mines carry the same mineral, although, as they approach the western boundaries of the district, it gradually passes into bornite or peacock ore. It is also an important ore in Arizona, occurring in large quantities near Prescott as well as in the Coronado and other Clifton mines. In New Mexico, it constitutes virtually the entire value of the Nacimiento and Oscura Permian beds. It occurs frequently in Texas in the Grand Belt mines, and is the principal ore of numerous narrow fissures in the Middle and Atlantic States. In the Orange Mountains of New Jersey, examined by the author, it was found in a species of shale, carrying a copper glance of the following composition:

Copper	75.20	Sulphur	17.97
Iron	4.10	Insoluble	1.10
Manganese	1.13		
Silver (2.37 ounces)	0.01		99.51
Gold	Trace		

Bornite or Erubescite, 3Cu₂S, Fe₂S₃; 55.58 Cu, 16.36 Fe, 28.06 S.

This is one of the most beautiful of the sulphureted ores of copper, being characterized in its fresh condition by a superb purplish-brown color, which soon changes on exposure to the air into every conceivable hue, from a golden yellow to the deepest indigo, and from a brilliant green to a royal purple. The mode of occurrence of this mineral and its limited extent of distribution as regards depth indubitably stamp it as a product of decomposition, solution, and re-deposition of the metallic contents of the upper portion of the vein. This explanation also accounts for a greater or less area of barren ground, beginning at the surface, immediately underlain by a zone of unusual richness, often out of all proportion to the amount of leached material above it. This point can be easily explained by assuming that the surface line is at present much lower than at some former date, and that the universal processes of disintegration and removal have swept away a great portion of the impoverished area that supplied the metal for these rich secondary minerals. That this is the explanation of their formation in the celebrated Butte City mines can scarcely be doubted, although exploration to a depth of 650 feet (350 feet barren, 300 feet enriched) has as yet failed to demonstrate the lower boundary of the zone of wealth, and the upper line of the poorer sulphides, which doubtless form the normal filling of the vein. Like copper glance, this mineral is far from uniform in its composition, varying in richness from 42 to nearly 70 per cent of copper without entirely losing its characteristic color.

Tetrahedrite, Gray Copper Ore, Fahlore (Cu₂S, FeS, ZnS, AgS, PbS)⁴ (Sb₂S₃, As₂S₃); 30.40 per cent Copper.

Except in those rare and highly argentiferous varieties in which the copper is replaced to a greater or less extent by silver, this is seldom regarded in the United States as an ore of copper.

Both its scarcity and its obnoxious components (arsenic, antimony,

etc.) prevent its use as a source of copper in this country, where the extreme purity of our ores has established such a high standard for copper. Only the most favorable circumstances, mineralogical, metallurgical, and commercial, would render the working of non-argentiferous fahlores at all practicable. This mineral occurs in small quantities in certain of the Butte copper mines, rendering their product slightly inferior to that from the oxidized ores of Arizona or the pure sulphides of Vermont. This slight disadvantage is, however, far outweighed by their contents in silver, which doubtless owes its presence to this same arsenical mineral. As soon as the Eastern refineries are prepared properly to treat the enormous quantities of this matte, which is rich in copper, but very poor in silver, the small percentage of tetrahedrite, which is at present regarded by the Butte smelters as a decided disadvantage, will be eagerly sought after as a valuable source of silver.

The San Juan, Colorado, region contains an argentiferous tetrahedrite of fair grade in sufficient quantities to warrant the anticipation of an addition to the general supply of copper that might seem important, were it not for the overwhelming output of Lake Superior and Montana, which completely overshadows any ordinary yield. A mere list of the silver mines that owe their value to the occurrence of tetrahedrite would fill

THE SPENCE AUTOMATIC DESULPHURIZING FURNACE.*

By W. H. Adams, New York City.

Among the persistent experimenters of the present century, no one man is more widely and favorably known in the metallurgical world than the late Peter Spence, of Manchester, England, to whom we are indebted for many of the successful processes in the manufacture of acids and alkalies, and for much of that perfection in mechanical detail that goes so far toward insuring success.

For the past twenty-five years—a period covering the greatest changes in soda processes and a revolution in acid manufactures effected by the substitution of pyrites for brimstone—Mr. Spence was constantly engaged in perfecting the plant for the economical treatment of pyritous ores; and no text-book has been complete without reference to his many inventions, patented or otherwise.

The results of his labors for the past six years were not given to the public, by reason of the active competition existing among manufacturers on the continent of Europe and in Great Britain; but it was well known and conceded that the crowning triumph of his life had been

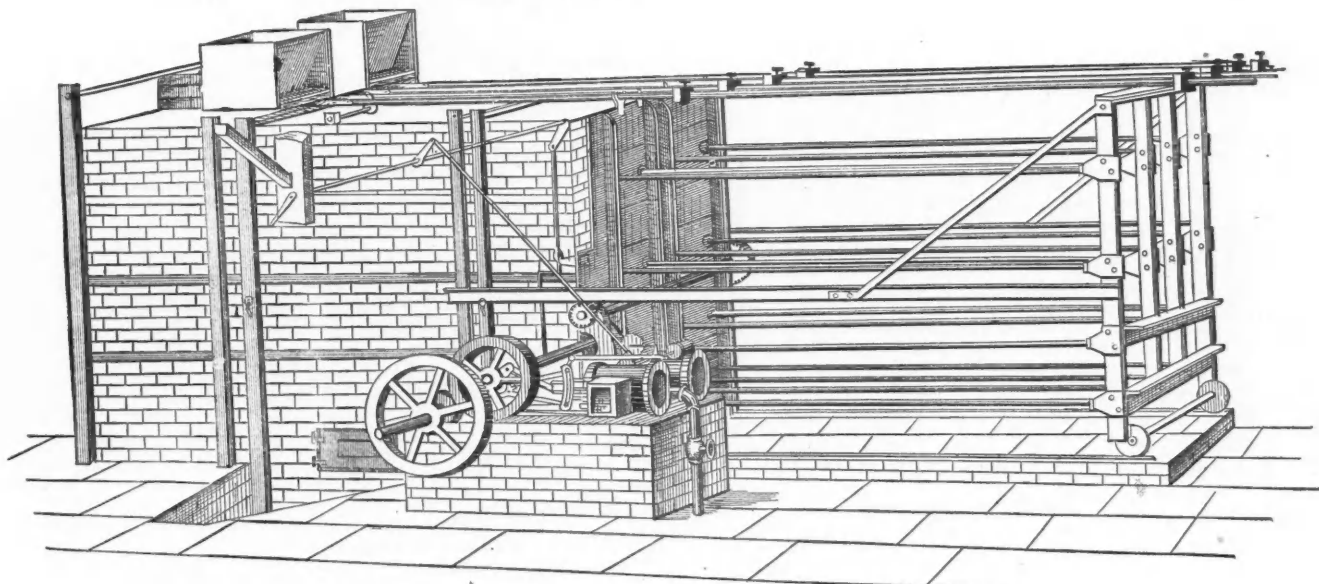
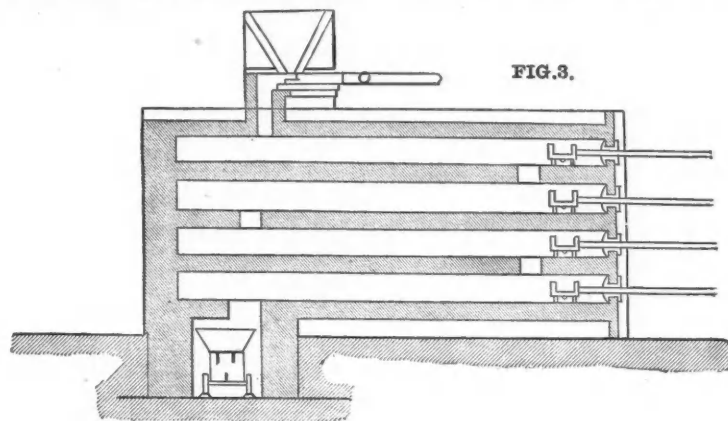


FIG. 1. SPENCE AUTOMATIC DESULPHURIZING FURNACE. ELEVATION IN PERSPECTIVE SHOWING ENGINES, RAKES, FEED-HOPPERS & EXTRA FIRE-BOX.

a large space; but in most cases, the method employed for their treatment is of such a nature that the less valuable metal is entirely lost. Under such circumstances, this can hardly be classed among the ores of copper. The Ontario mine, Utah, is the principal example of a long list of similar cases. Certain of the Walker River mines, Esmeralda County, Nevada, yield tetrahedrite in sufficient quantities to make its treatment by a wet process, for the production of blue vitriol, remunerative. Among these mines, are found the only instances in the United States, to the author's knowledge, where chrysocolla (hydrous copper silicate) occurs in sufficient abundance to exert any decided influence on the percentage of the ore mined, the principal value of which, however, is made up of the various carbonates and oxides of copper.

The Lumber Trade in 1884.—The *Northwestern Lumberman* has collected elaborate statistics of the production of white pine lumber in the Northwest, giving the output of nearly every mill last year. The total production for twelve years is given as follows, in thousands of feet:

Year.	M ft.	Year.	M ft.
1873.....	3,993,780	1879.....	4,806,943
1874.....	3,751,306	1880.....	5,651,295
1875.....	3,968,553	1881.....	6,768,857
1876.....	3,870,046	1882.....	7,552,151
1877.....	3,595,333	1883.....	7,824,790
1878.....	3,620,473	1884.....	7,935,033

It appears from this that the production last year was four per cent more than the year before, but in some of the lumber districts only a comparatively small part of the year's production was marketed,

achieved in the successful working of his automatic desulphurizing furnace, which mechanically calcined "smalls" or finely crushed pyrites—the bugbear of all chemical manufacturers.

That he was met by many delays and disappointments, and that many difficulties were overcome by him personally, goes without saying, when we remember the wrecks of so many attempts in this direction; but the systematic workings of these furnaces, at the several factories under his control, attest the correctness of his plans and the careful attention he paid to details, giving him as a reward unquestioned advantage over all competitors, an advantage held for several years already, against all opposition or new devices.

Although negotiations have been in progress for two years past, it was not until after the death of Mr. Spence that patents for this furnace could be secured outside of England, or that the study of its mechanism could be made; but now that Americans have the control of the invention in this country, and since, without doubt, this perfected mechanical furnace will play an important part in the future treatment of all classes of ores containing sulphur, I deem it worthy of early mention before the Institute.

Fig. 1 shows the double furnace in perspective; the space occupied by it being 34 feet by 18 feet. When two double furnaces are coupled together and run by one engine (as preferred in all cases), the space required is 34 feet by 32 feet. A building 40 feet by 40 feet is therefore necessary to accommodate this plant, with a shed-roof, if connection is made to towers and chambers, or an ordinary flat-roof building with

* A paper read at the Philadelphia Meeting of the American Institute of Mining Engineers, September, 1884.

supporting posts placed between the furnaces, when connected directly with the chimney, as in the process of desulphurizing gold ores. Fig. 2 is a longitudinal section.

There are several practical points of excellence about the furnace (which has been in operation near New York for the past three months) that entitle it to careful examination by engineers. The action of the furnace will be understood to be automatic, the ores being elevated from the furnace-floor, brought in from the floor above, or by other means supplied in quantities as required to keep the hoppers full. This matter of detail will readily be understood by those practiced in the handling of ores from different levels, and the drying of the ores (if wet) will also be understood to be a simple matter when small quantities are regularly fed.

The hoppers being filled, a small auxiliary engine is started, and by means of a changeable gear, properly connected, opens the valves to start the pair of engines shown in the foreground of Fig. 1.

These engines, having 7-inch by 12-inch cylinders, and running at 40 revolutions per minute (giving a minimum of wear and tear for the service performed), quietly and positively operate by means of geared wheels the rods to which, in the furnace, are attached toothed rakes (Fig. 2).

The rods are very firmly held in place and position by the rack, which, supported at its rear end by wheels, travels along a railroad.

The movement of the rack (with rakes inside the furnace) opens the ports for the admission of fresh ore from the hoppers to the first shelf, and the discharge of finished or calcined ore from the lower shelf into cars. When the rakes have finished the forward stroke, the engines reverse automatically, and the rack returns to and stops in position.

The auxiliary engine continues running, and at stated times (determined by the manager) again starts the large engines, another operation of stirring and raking with feed and discharge of ores taking place.

This automatic and regular method of feed and treatment of the ore on the bed of the furnace is the result of years of study and practice, directed to the object of replacing by a uniform mechanical procedure the discretionary operation of hand labor.

By study of the plant now in operation, the following conclusions are reached:

1. The constituent elements of the ores being first determined, the feed and discharge are regulated to exact amounts in pounds, and the number of charges fed into the furnace is duly registered.

2. The auxiliary engine being set to start the motive power say every five minutes, and the time required for the forward and back-stroke being say one and a half minutes, it follows that the interior parts of the rakes are exposed to action of heat and acid fumes but one third of the time, thus approximating manual labor in wear and tear of plant.

3. The draught of air being regulated and controlled by the chemist at will, insuring the proper oxidation of the ores, and no more, less chamber space must be required than by any other process of burning pyrites, and, moreover, no special care need be given to location of plant, since strong winds or variable currents can have no effect in causing "blow-outs" of gas at the doors.

4. The movement of the ores from the hoppers to the discharge-opening is accomplished by a system of reversed teeth, which are positive in action.

The deterioration or destruction of cast-iron rakes and teeth has been reduced to a minimum by the simple but novel idea of *burying the parts in ore*, which accumulates at the front of the furnace-beds when the rakes are at the position of rest.

5. Pyrites "smalls," such as are found in Virginia, at the Milan or Capelton mines, carrying 47, 45, and 40 per cent of sulphur, respectively, can be calcined with two double Spence furnaces, run by one engine at the rate of from 15,000 to 20,000 pounds per day of twenty-four hours, the cinders containing from 1½ to 2½ per cent of sulphur.

It is claimed that larger amounts of "smalls" containing copper, blende, etc., can be put through, and double the above quantity, where sulphur fumes are passed directly into the air—as would be the case in working auriferous concentrates.

6. Where necessity exists for bringing the sulphur contents of cinders from iron pyrites (FeS₂) down to ½ to ¼ per cent to utilize the iron, or for the like treatment of rich gold-bearing sulphurets, the result is accomplished by the addition of a fire-place to the lower hearth. This is shown in Fig. 1, although not ordinarily used.

By this means, the proper heat is kept in the ores until they are discharged into iron cars; but in general working, the ores are "dead" on the lower shelf.

7. The average cost of calcining ores by this automatic furnace is not greater than by any other method at present in use.

The cost of the furnace, complete, with power, is about the same as that of the equivalent grate-bar space in kilns, or equal burning space in the present type of shelf-furnaces.

There are running at Bridgeport, Connecticut, one double furnace; at Gowanus Bay, Long Island, two double furnaces; at Elizabethport, New Jersey, two double furnaces; and others are building.

Rawhide Gear-Wheels.—A Mr. C. C. Hall, answering an inquiry in our excellent contemporary, the *American Machinist*, gives the following information: When I want the best pinion possible—in my mind—to make of any known substance, I cut out a number of disks of rawhide, place them on a flanged sleeve similar to the core of a paper friction-pulley, and screw a collar up as tightly as possible, meanwhile warming the blank for an hour or two up to about 200 degrees Fahr. The warming has the effect of allowing the disks to lie closer together, by becoming straightened out. I turn and cut such gears as I would iron, and I have not the slightest difficulty in making entirely noiseless gearing. I have never known one of these gears to break or show symptoms of wearing out. I have in mind one machine I made five years ago, where one 6-inch by 2½ inch rawhide bevel pinion has run 500 revolutions a minute, driving a machine for making wire staples almost constantly since, yet showing no signs of yielding. The pinion runs two 12-inch diameter bevel-wheels in opposite directions, and the duty of these is to cut and bend 1600 wire staples (from No. 14 wire) a minute.

BLOWING IN LEAD OR COPPER CUPOLA FURNACES.

Written for the Engineering and Mining Journal by Carl Henrich, M.E.

After drying a newly made crucible of a cupola furnace, by keeping a small fire in the same for some time, it has been the general usage to blow in the furnace in about the following manner:

A good fire, generally of wood, is started in the bottom of the crucible. As the fuel gets to burning thoroughly, more fuel—wood or charcoal—is gradually added, until the furnace is filled to the level of the tuyeres with live charcoal, or with charred and brightly burning sticks of wood. Then more fuel—charcoal or coke—is added, and charging commenced, at first with light charges of ore and flux and heavy charges of fuel, gradually changing the ratio of fuel to charge, until the normal ratio is obtained. During this charging process, the tap-holes and tuyere-holes are more or less kept open, and the fuel at the bottom continues to burn and to heat the crucible to some degree. When the filling of the furnace has progressed far enough in the opinion of the metallurgist, the tap-holes are plugged and the tuyeres, or some of them, inserted, and a gradually increasing blast is turned on.

The result of this method of blowing in a furnace is very frequently a cold crucible in the beginning of the campaign, and also frequently accretions in the furnace of a mixture of chilled slag, charcoal, and ashes. Such accretions are very apt to stay in the crucible during the campaign and serve as a nucleus for other accretions. A cold crucible surely is a source of much annoyance, and frequently of very hard work, to the men at the furnace, and any method to avoid starting with it will certainly be welcome to all.

The writer has had his share of annoyance from this source, and having found how to avoid it by a simple modification of the blowing-in process, trusts that its publication may be of some interest to others.

In blowing in a furnace, I start in the way described above, up to the time of putting on the blast or part of it. When the furnace has been filled from one half to two thirds the distance between the tuyeres and the charge-floor, I have the slag-tap plugged up, as also all tuyere-holes, with the exception of one or two—according to the size of the furnace—farthest removed from the bullion or metal-tap. In the metal-tap, a hole of about two inches diameter is left open. I generally use a 2-inch nipple of an old gas-pipe inserted in a clay plug for the purpose. Then the blast is turned on under the usual pressure through the one or two tuyeres left open. The result is, that the flame is—in part, at least—blown downward into the bottom of the crucible and out through the hole left open in the metal tap. Besides this, the ashes that have accumulated, together with fine charcoal, on the bottom of the crucible, are also blown out through this same hole; and the flame and heat are afforded much better access to the bottom and sides of the crucible.

In the old manner of blowing in, as described in the beginning of this communication, the ashes accumulate on the bottom of the crucible and keep it from getting properly heated.

The hole at the metal-tap is kept clear with a rod, to facilitate the continual blowing out of the accumulating ashes and small charcoal. This hole is kept open until slag begins to flow from it. It is then plugged; more tuyeres are, at short intervals, gradually and systematically inserted in their places. I generally tap slag once or twice at the bullion-tap, after plugging it up, and after this let the crucible fill up and commence tapping at the slag-tap. By following this plan, I have never had a cold furnace at the start; every thing has worked nice and hot from the very start.

In blowing in, according to this plan, I have in a large measure abandoned the old plan of gradually increasing the charges to their normal ratio to the fuel used, by limiting this proceeding to two half-charges and one three-quarter charge, in the beginning, to the full weight of fuel, making up, besides, half the difference of the charge-weight with good clean slag.

The idea of this modified proceeding is, to blow away the cover of ashes from the bottom of the crucible, and to blow the flame downward into the bottom of the crucible, so as to have the crucible clean and red-hot, when the slag gets down into it. After that, the melted slag will stay melted, when coming in contact with the bottom, and the troubles incident to charcoal accretions in the crucible and to a cold crucible will be avoided.

Good Work at Warwick Furnace.—Mr. John Birkinbine writes to the *Bulletin*: I have received some data concerning the operation of Warwick Furnace at Pottstown, Pennsylvania, during March, from Mr. Edgar S. Cook, manager, which is so remarkable that I consider it worthy of presentation. The Warwick Furnace has a bosh diameter of 15½ feet and a height of 55 feet. It has been in continuous blast for over four years. The following table shows the work of the furnace for four consecutive weeks, being from the 220th to the 223d week of the blast, using three fourths anthracite coal to one fourth coke for fuel:

DETAILS.	Week ended			
	March 7.	March 14.	March 21.	March 28.
Ore smelted, gross tons.....	1065 95	1022 15	1077 55	1047 25
Fuel consumed, ".....	597 30	576 86	603 55	583 90
Foundry iron made, gross tons.....	370 50	93 00	345 50	282 00
Gray forge made, ".....	178 00	449 00	208 00	309 50
Total made, ".....	548 50	542 00	613 50	591 50
Yield of ore, per cent.....	51 30	53 00	56 90	56 30
Fuel to ton of iron, gross tons.....	1 0875	1 0625	0 9875	0 9875
Average temperature of blast.....	831°	839°	830°	833°
Stoppages, minutes.....	214	409	339	370

The following are the analyses of the fuels used:

Fuels.	Volatile matter.	Ash.	Carbon.	Sulphur.
Coal, Schuylkill Co.....	5 68	11 23	82 24	0 841
Coke, Connellsville.....	1 08	12 08	85 65	1 183

The large yield of iron and low fuel consumption indicate what can be accomplished in a furnace of moderate size, without superheated blast, and depending chiefly upon anthracite coal.

CORNISH ROLLS OF THE FORT SCOTT MACHINE-WORKS.

The use of rolls in place of stamps for crushing ore is becoming more and more general in this country, and is universal in the new and best constructed foreign works. The plant as now adopted in concentrating-works consists usually of one or two sets of rock-breakers, of the Blake or other convenient pattern. These reduce the rock to a size of about $\frac{1}{4}$ inch. Two sets of Cornish rolls reduce the ore successively from this size to the maximum desired in concentrating, which may vary from $\frac{1}{16}$ of an inch to $\frac{1}{4}$ of an inch. The ore from the fine rolls goes to sizing-screens, and from these the sizes down to say $\frac{1}{16}$ th of an inch go to jigs, the ore finer than $\frac{1}{16}$ th of an inch going usually through spitzkasten and sometimes directly to slime-tables, or belts of one of the accepted types. Perhaps the most important machinery in such a mill is the crushing-rolls. These must combine enormous strength, durability of wearing parts, facility of repairs, with moderate first cost.

The rolls are now almost always made with removable shells of steel, or of special grades of cast-iron, and they vary in diameter from 20 inches to 36 inches, and in width from 10 inches to 16 inches. Sometimes one roll is made wider than the other; but there is an object in as far as possible making the parts interchangeable.

The accompanying illustration shows one pattern of coarse crushing rolls manufactured by the Fort Scott (Kansas) Foundry and Machine Works, which is said to have given great satisfaction. The shells, from 2 $\frac{1}{2}$ to 3 inches thick, are of a special iron said to be very durable. They are provided with two ribs cast on, which fit into grooves in the cone, to prevent the shell from slipping.

The boxes have large oil-chambers, and the bearings are protected from dust by glands and packing for dry crushing and by grooved collars for wet crushing.

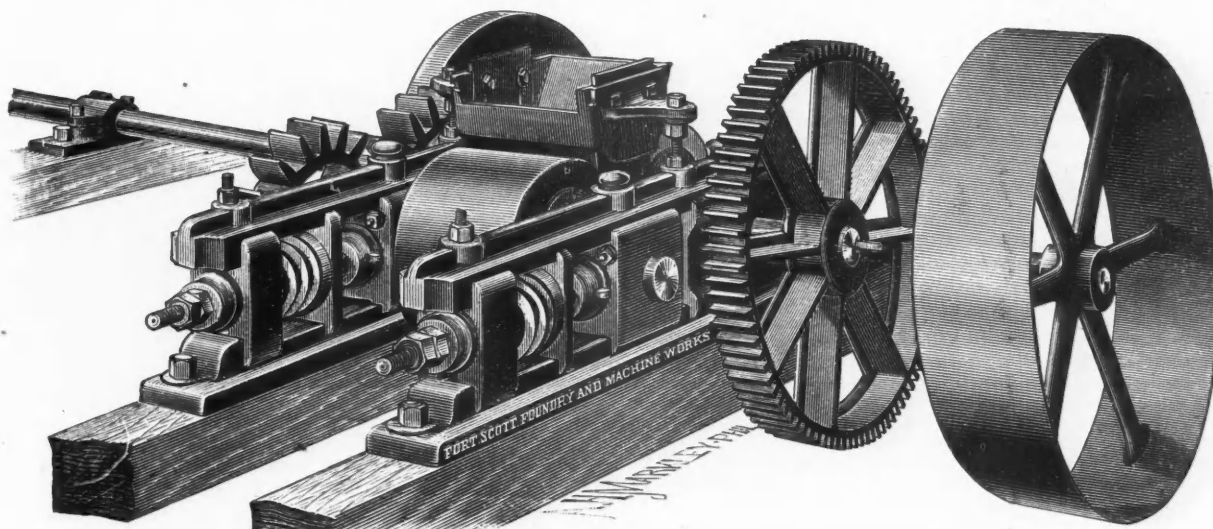
The springs are of rubber, made in sections. The rolls are provided with the usual means of setting them to any desired distance apart. The

ASBESTOS, ITS MANUFACTURE AND USES.

Asbestos is a fibrous variety of actinolite or tremolite, and consists of silica, alumina, magnesia, oxide of iron, and water. It has been known for many hundreds of years, and indeed it is reported that asbestos cloth was used on the funeral pyres of the ancients. Whether that be true or not, it is certain that until recent years asbestos has been regarded merely as a kind of scientific curiosity, valuable as an illustration of the wonderful diversity of nature, but of little practical use in the world. A few years ago, almost simultaneously, a movement was set on foot in England, Scotland, and Italy, and asbestos began to be mined and to be manufactured, at least in an experimental way. The time was opportune for the new venture. For years, steam pressures had been gradually rising, and whereas 30 pounds to the square inch at sea, and 50 pounds on land, had hitherto been the average, these pressures were now beginning to be doubled, and the old forms of packing for joints and glands showed great distress. Gasket rings and hemp gland packings had both been superseded by more durable and compact appliances; but these were far from perfect, and when exposed to the higher temperature that was evidently coming, it was certain that they would give trouble.

In the year 1879, three firms that had entered into the mining and manufacture of asbestos formed themselves into one company, and a rigorous search was made through the region of the Italian Alps, where asbestos was known to exist, to discover all the sources. The result of several surveys was the discovery of about 180 valuable mining properties, covering 80 square miles of land, in districts about 80 miles from Milan. All these mines were secured by the company.

The Italian asbestos lies in beds and pockets, which are mostly reached by open quarrying, dynamite being largely employed in this operation. The lumps, as they are taken from the mine, consist of bundles of hard fibers, lying parallel with one another, and strongly bound together. They vary in color from light gray to brown, and the general appearance of a



CORNISH ROLLS OF THE FORT SCOTT MACHINE-WORKS.

fine crushing-rolls have a hopper constructed so as to bring feed uniformly across the face of the rolls and prevent unequal wear, and they are so geared together that one roll revolves a little faster than the other. This produces a slight rubbing motion. The rolls are geared on both sides.

The cost of rolls is much less than stamps for the same work, and where concentrating crushing is to be done, they make less slime, and present other advantages over stamps.

The Fort Scott Works have made a specialty of concentrating machinery, and appear to have made a success of it.

NOVA SCOTIA MINERAL PRODUCTION IN 1884.

The Nova Scotia mineral statistics are in general kept in a very full and creditable manner, and they offer some very suggestive features.

The following represents the mineral production for the years 1883 and 1884:

	1883.	1884.
Gold, ounces.....	15,446	16,079
Iron ore, tons.....	52,410	54,885
Manganese ore, tons.....	150	302
Copper " ".....	60	110
Lead " ".....		100
Antimony " ".....		600
Coal raised " ".....	1,422,553	1,389,295
*Gypsum, " ".....	144,068	111,068
*Building-stone, " ".....	181	780
Coke made, " ".....	44,189	40,085
Limestone, " ".....	26,477	25,567
*Grindstones, etc. " ".....	155	2,200

There has been a small increase in the output of gold and iron ore, and a decline in that of coal, coke, and gypsum; but the entire mineral production of this old country is to-day quite insignificant, as compared with that of some of our States.

Rapid Tunnel Driving.—Some rapid work has lately been done on the Mersey Tunnel Railroad by Colonel Beaumont's boring-machine. The distance accomplished in one week, through the red sandstone under the Mersey, was 87 yards, which is the fastest on record.

* Amounts exported, home consumption unknown.

fine sample of asbestos is suggestive of the interior of the riven trunk of a tree. By the exercise of a little care, threads may be separated, many feet or even yards in length, the continuity being perfect from end to end, the general appearance and strength being very similar to those of flax. It is this quality of length and strength of fiber, and its chemical purity, that distinguish Italian asbestos from all other. The mineral is pretty widely diffused; it is found in Canada, Corsica, the United Kingdom, and in many other places, but in most of these countries it presents a very different appearance from that we have already described. Instead of the bundles of fibers being several feet in length, they are broken up into short pieces of only from 1 inch to 3 inches, and are bound together with such rigidity that the woody appearance of the fracture is nearly lost. Another peculiar characteristic of the Italian asbestos is the greasy feeling that it possesses, resembling that of French chalk or soapstone. When the material is manufactured into gland packings, this quality becomes valuable, as it prevents the necessity of introducing any foreign substances, and permits a perfectly pure packing of asbestos, through which the rod will slide with light friction, and with less oil than other kinds.

The manufacture of asbestos is carried on in several places in England. The chief seat of the industry is, however, at Harefield, near Rickmansworth. All the asbestos goods used by engineers may be classed, as regards their process of manufacture, under two heads—paper and yarn. The paper may be worked up in various ways, and the yarn may be twisted, plaited, or woven, but the crude material is made to assume one of these two forms before it is worked into the finished article.

There are several other branches of manufacture, such as boiler covering, putty, cement, patent fire-proof paint, etc.

The crude asbestos is brought from Italy in bags containing from 1 cwt. to 2 cwt. each, in pieces of all sizes, from that of a man's hand to such as a man can scarcely lift. These have first to be opened out to free the fibers from one another and from the non-fibrous material by which they are bound together. For this purpose, two rollers covered with teeth of pyramidal form are used. These revolve, as a rule, at equal peripheral speeds, and at the same time have a sideways motion in relation to each other, so that the asbestos, which is fed in with the fibers lying parallel to the line of motion, is both crushed and separated at the same time. By the direct pressure, the binding agents are separated, and then the loosened fibers are combed apart by the reciprocating motion, which, however, is

not sufficiently great to interfere with their parallelism. The lower roller is driven directly from the prime mover, while the upper is operated by a train of gearing that allows the distance between the two to be adjusted. Each roller-shaft is connected by a collar and a connecting rod to a reciprocating beam, which receives its oscillation from an eccentric driven by a pulley and belt. Thus, when the machine is at work, the rollers are both rotated and drawn backward and forward at the same time. The toothed wheels are, of course, secured by feather keys, to render this possible.

Three machines of this kind, but of gradually reduced sizes, are employed to open the asbestos, and then the portion with the longer fiber is taken to the boiling-tanks, to be softened by heat and moisture. Each tank is provided with a rotating beater, which maintains a thorough circulation, taking up the fiber, opening and drawing it out, and then sending it forward to be soaked for a time until it comes around again to the beater. The short fiber is taken to edge-runners and ground, and prepared for the beating-engines, where the binding material is added and thoroughly incorporated: the whole is drawn off into a receiving-tank in the mill-board machine-room. From the tank, it is conveyed to the millboard machine, to which agitators are attached to keep the fiber from settling. The water is drawn off through a fine wire gauze on a revolving cylinder, leaving a thin coating of the asbestos pulp in the cylinder. This is then taken off by an endless band and transferred to a second solid rotating cylinder, where it steadily accumulates until the desired thickness has been reached. It is finally cut across and removed in the form of a square sheet of millboard or paper.

The sheets, as they come from the machine, contain a large percentage of water, which is removed partly by pressure, and partly by drying. They are first laid between sheets of zinc in a powerful hydraulic press, and much of the water is forcibly expressed, and then they are hung up by spring clips in a steam-heated drying-room, to complete the desiccation. When the process is finished, the sheets are again pressed to render them flat and to improve the surface, the edges are trimmed, and their manufacture is then complete. The sheets ordinarily measure 40 inches by 40 inches, while their thickness varies by thirty-seconds of an inch, from $\frac{1}{32}$ inch to $\frac{1}{4}$ inch. The millboard is cut into shapes suitable for the purposes for which it is intended: pipe-joints are made with rings, valve-chest joints with rectangular shaped washers, and other joints with appropriate forms. The value of the material lies in its indestructibility; it is a pure mineral substance, and suffers no change from contact with heat, steam, or grease, and exercises no chemical influence on the metal with which it lies in contact, so that when the joint is broken the surfaces are found to be uncorroded and to have suffered no change. A finer description of asbestos paper is made for electrical work, as it forms a very efficient non-conductor.

So much for the first branch of the manufacture, which, although commercially very valuable, yields in interest to the second. Asbestos yarn may be worked up in a hundred different forms, serving as many different uses, while the paper appears to be chiefly serviceable for making joints, though it is now used also for making fire-proof partitions and for other building purposes. It may not be that we shall ever reach the time when our under-garments will be purified by fire instead of by the laundress's art; but short of this, many uses now filled by materials the thorough cleansing of which can only be secured by their destruction may, possibly, be better served by asbestos.

We must now go back to the point in the process where the cleaning of the fiber ends. That description of raw material designed for the manufacture of yarn is discharged from the boiling-tanks into hydro-extractors. There all the free water is thrown out, and the drying is completed by steam heat. The fiber is then taken to a "shaking" machine, which separates the long fiber from the short, the latter being sent into the millboard department, and the former to the "carding" room. But its appearance is scarcely encouraging to one who has been accustomed to cotton or wool. These latter staples, examined under the microscope, exhibit a notched or serrated appearance, which explains the ready way the material clings together when twisted. But with asbestos, this structure is entirely wanting, and therefore the problem of twisting it into a thread presents special difficulties, which are rendered more evident when its behavior in the breakers and carding-engines is watched. Instead of leaving these in a sheet or "lap," it drops out in separate fragments, just as it entered, except that the fibers are combed out straight and laid side by side, parallel with each other. In spite of this, however, the carding is accomplished in several successive machines, each set to a finer gauge than the preceding. It is a difficult task to describe machinery of this class intelligibly, even with the help of engravings, to those who are totally unacquainted with it, and it would take more space than we have at disposal to describe the relative offices of card cylinders, lickens-in, and doffers. It is sufficient to say that the entire process is one long-continued brushing or combing, in which cylinders covered with teeth of gradually increasing fineness pass the fibers from one to another, continually drawing them out, until all knots and irregularities are eliminated and they lie straight and parallel.

The last machine is that known in the woolen trade as the condenser. Its final cylinder is covered with rings of card filleting with bare zones between them. The fibers are stripped from these rings by a reciprocating knife called a "fly comb," and in the case of worsted are delivered in a number of parallel filmy tapes on to a traveling apron. Above this apron is a second, traveling in contact with it at the same speed, and having in addition to its forward motion a sideways or reciprocating motion. The tapes are fed forward between the two aprons and are at the same time rolled or "condensed" into threads. They are not spun, as there is no regular twist, but may be compared to threads of putty or dough rolled between the palms of the hands. The asbestos, as we have already explained, will not cling together upon mere contact, and consequently it leaves the last card cylinder as fragments rather than tapes. These fragments are neatly gathered into rows upon the apron by reciprocating scrapers, and are then condensed as they proceed to the coiling cans. This is a part of the process that has required the most time and money to work out, and it was only after a long course of experiment that a carding and condensing apparatus was devised that was successful in producing satisfactory threads.

From this point, the manufacture of the yarn is simple. It is spun upon slubbing or roving-frames, such as are used in the cotton trade, except that no effort is made to draw it. These frames have a "positive take-up," and do not put any strain upon the yarn until it is twisted, when its tensile strength is very great, as the individual fibers are much stronger than those usually met with in spinning operations. The three remaining processes are doubling or twisting, braiding, and weaving. In the first, a number of yarns are laid together, and are twisted into a cord or rope. This is generally used as the core of a braided packing, and is inclosed in a plaited cover by a machine of the usual construction, or the packing may be braided from the center with fine threads. If a square packing be desired, in place of a round one, this is attained by the device of using four smaller cores around the central one. These extra cores are fed up through the heads around which the braiding spindles revolve in their mazy course, and are securely bound on to the middle core in such a way that the finished strand is of square section. One form of round packing is produced in a smallware loom, and is a specialty with the United Asbestos Company. It consists of a parallel or slightly twisted core, surrounded by an annular envelope of straight longitudinal warp threads bound together by a fine weft, which is drawn tight in the weaving and sinks into the soft center, so that it is not exposed to wear until the covering is nearly destroyed. The result is an exceedingly elastic gland packing that has a fine bearing surface on the rod, and is capable of easy and rapid manufacture.

The asbestos cloth is woven in a loom exactly like calico, except that the reeds and healds are much coarser. The narrow cloth or tape is woven in a smallware loom. Both the sheeting and the tape are used for making joints, and the former is sometimes rubber-proofed to render it water-tight. The asbestos and India-rubber woven tape is so constructed that it can be bent around a corner without puckering, and thus is particularly useful in making joints in man-hole and mud-hole doors. If the cloth or tape be rubbed with plumbago or powdered asbestos before it is used, the joint may be broken and remade many times with the same packing. The cloth is also worked up into square gland packing by being cut into strips and built into a square rope with a backing of pure rubber to give additional elasticity. The edges of the strips lie in contact with the rod, and as the gland is screwed home, the compression of the rubber feeds the asbestos forward, so that a large proportion of the whole bulk can be actually worn away by the continual friction before new packing is required. It is scarcely necessary to detail the many other forms of gland packing that can be made, as it is evident that all the forms hitherto manufactured in cotton can be made with asbestos yarn.

The indestructibility of asbestos renders it serviceable for many miscellaneous purposes. It is used for filters and strainers both for domestic purposes and for chemical liquids. It is manufactured into drop-curtains for theaters, furnace-men's aprons and leggings, firemen's clothes and gloves, and ladders and ropes for fire-escapes. As a lining for deed-boxes, it serves to convert them into portable fire-proof safes; and lastly, it has attained a very great celebrity as the basis of a fire-resisting paint.

Throughout the whole of this article, we have spoken entirely of Italian asbestos. But there is a considerable trade in the Canadian material, which is lower in price. The hard and distinctly mineral structure of the American variety undergoes quite a different preliminary treatment from the softer silky texture of the Alpine product. The color of the cleaned Canadian fiber is a dead white, the staple is not long, and the peculiar greasy feel that we noticed above is absent.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book-buyers, give the retail price!]

Steam Making; or Boiler Practice. By Charles A. Smith, C.E., Professor of Civil and Mechanical Engineering at Washington University, St. Louis, Mo. Chicago: The American Engineer, 182-184 Dearborn street. 1885. 8vo, pages xii + 195 and many illustrations, most of them full-page. (No Index.) \$2.50.

Chapter I. On the nature of heat and the properties of steam. II. On combustion. III. Externally fired stationary boilers. IV. Internally fired stationary boilers. V. Internally fired portable, locomotive, and marine boilers. VI. The design, construction, and strength of boilers. VII. Design and construction continued—proportions of heating surface, etc.; economic evaporation; explosions. VIII. Miscellaneous boilers; choice of boiler fittings and appurtenances. (Four of the introductory pages are devoted to a sketch of the life and character of the author, by C. M. Woodward, Dean Polytechnic School, Washington University. The two volumes, *Steam Making and Steam Using*, are sold together for \$5.)

Steam Using; or Steam-Engine Practice. By Charles A. Smith, C.E., Professor of Civil and Mechanical Engineering at Washington University, St. Louis, Mo. Chicago: The American Engineer, 182-184 Dearborn street. 1885. 8vo, pages x + 298, numerous illustrations, many of them full-page. (No Index.) \$3.

Chapter I. On the nature of heat and the properties of steam. II. On valve gear. III. The quantity of steam which might be and which is used. IV. On the indicator, the indicator diagram, and the different classes of engines. V. The experiments of Hirn and Hallauer. VI. Steam heating. (Four of the introductory pages are devoted to a sketch of the life and character of the author, by C. M. Woodward, Dean Polytechnic School, Washington University. The two volumes, *Steam Making and Steam Using*, are sold together for \$5.)

Toughened Filter-Paper.—At a recent meeting of the London Chemical Society, a paper was read on Toughened Filter-Paper, by E. E. H. Francis. Filter-paper that has been immersed in nitric acid, relative density 1.42, and washed with water, is remarkably toughened, the product being pervious to liquids, and quite different from parchment-paper made with sulphuric acid. Such paper can be washed and rubbed without damage, like a piece of linen. The paper contracts in size under the treatment, and the ash is diminished; it undergoes a slight decrease in weight, and contains no nitrogen. Whereas a loop formed from a strip 25 mm. wide of ordinary Swedish paper gave way when weighted with from 100 to 150 grams, a similar loop of toughened paper bore a weight of about 1.5 kilograms. The toughened paper can be used with the vacuum pump in ordinary funnels without extra support, and fits sufficiently closely to prevent undue access of air, which is not the case with parchment-paper. An admirable way of preparing filters for the pump is to dip only the apex of the folded paper into nitric acid, and then wash with water; the weak part is thus effectually toughened.

THE SALT DEPOSITS OF NEW YORK.

By Prof. J. S. Newberry.

All the salt deposits of New York apparently occur in one formation, that which has been called for that reason the Onondaga Salt Group, or more recently, the Salina Formation, a part of the Upper Silurian system. This seems to be the deposit of a great salt lake that occupied Central and Western New York, Northern Pennsylvania, Northeastern Ohio, and Southern Ontario. Its outlines are not definitely traced, and may have been quite irregular, but probably included an area as great as that of Lake Huron or, perhaps, Lake Superior. In this lake, besides the land-wash, which is now represented by the colored shales and marls seen about Syracuse, were deposited great sheets of gypsum and rock-salt, and when the water surface was more extended, the impure limestones that form the well-known "Water-Lime Group," from which so much hydraulic cement is made on the Hudson, and in Central and Western New York. About Goderich, Canada, near the northern margin of the old salt lake, rock-salt has been found in a number of wells, forming beds from two to sixty-five feet in thickness, interstratified with gypsum and water-lime. At Sandusky, Ohio, near the western border of the old lake, where its sediments are not more than forty feet in thickness, they include beds of gypsum that are the basis of an important industry. At Syracuse, the salt is not obtained directly from the Salina formation, but from brine pumped from wells that penetrate a great mass of sand, gravel, etc., that fills one of the old buried channels formed when the continent stood higher above the ocean than now—before the Ice Period, when they were to a large extent filled and obliterated—and its surface was deeply scored along the lines of drainage. The old channel at Salina, cutting across the strata, receives the drainage from deeply buried beds of salt, long ago suspected to exist, which have lately been discovered by borings in the country south. Salt being very soluble, rain falling on the surface and penetrating the rocks to these beds of salt has gradually dissolved them to form brine, which, flowing down to a lower level, has filled the reservoir formed by the old channel referred to, and from this has been pumped up and evaporated.

The salt deposits of the Salina Group exhibit an interesting diversity of composition. Some are almost chemically pure, while others contain a large quantity of chloride of calcium, chloride of magnesium, sulphate of magnesia, etc., which constitute the "bitterns" of the salt-boilers. These differences are apparently the result of different conditions under which the precipitates were made. Salt water contains a great variety of substances held in solution, among which gypsum, common salt, sulphate of soda, sulphate of magnesia, and the chlorides mentioned are most abundant. When it is evaporated, these salts are thrown down in the inverse order of their solubilities. For example, the sulphate of lime (gypsum being the least soluble) is first deposited; then when the solution is more concentrated, chloride of sodium and the other salts in order, until finally only the deliquescent salts mentioned are left. These have such affinity for water that they do not exist in nature except in solution, and, after being artificially prepared, rapidly absorb moisture from the atmosphere. These facts give us an explanation of the varying purity of the salt, and the occurrence in certain places of great sheets of gypsum. Where a land-locked basin receives the drainage of the surrounding country—which, although apparently pure water, always contains some salts—by evaporation, the water becomes "salt," a characteristic of all undrained lakes, Great Salt Lake and the Dead Sea being good examples. If such a solution should be further concentrated, the least soluble ingredient, gypsum, would be first thrown down; and a sheet of this might be precipitated while yet all the other saline constituents were held in solution. With further evaporation, a belt or margin of gypsum would be left around the shallower portions of the lake, and chemically pure salt would be deposited when the concentration passed the point of saturation for salt. The diminished waters, now retiring to the deeper parts of the basin, would leave behind them in places sheets of pure salt, while the precipitates subsequently made would contain an abnormal quantity of bitterns.

Just such a record we seem to have in the sediments of the old Salina lake as well as in those of later date in other parts of the world; the salt of certain localities or certain layers being nearly pure, while that of other localities or layers contains an undue proportion of impurities. The salt basins of the Upper Ohio and of Michigan, both distinct from and of later age than that we have been considering, show the same peculiarities.

By some writers, the gypsum of the Salina Group, as well as that of other formations, is attributed to the action of acid waters on carbonate of lime; but the continuous sheets of gypsum contained in the Salina Group, separated by thin bands of pure limestone, disprove this theory. They are evidently chemical precipitates from saline waters, alternating with the limestones, which were formed from the hard parts of organisms inhabiting the water during the intervals when it was pure enough to sustain animal life.

Mr. Sutro's Library for San Francisco.—Mr. Adolph Sutro, of San Francisco, Cal., intends to found for San Francisco a technical and scientific reference library. The volumes already purchased, which are said to amount to from 60,000 to 70,000, are intended as a nucleus, and large additions will be made. A suitable building will also be erected.

Production and Consumption of Pig-Iron in Austria-Hungary.—Mr. V. Wolff gives, in the *Oesterreichische Zeitschrift für Berg- und Hüttenwesen*, the production of pig-iron in metric tons (2204 pounds):

YEAR.	AUSTRIA.			HUNGARY.			Total production.	Consumption.
	Mill.	Foundry.	Total.	Mill.	Foundry.	Total.		
1880 ..	286,320	33,982	320,302	132,825	11,107	143,932	464,234	493,423
1881 ..	337,650	41,796	379,446	148,974	15,026	164,000	543,446	610,470
1882 ..	302,165	43,313	345,478	161,203	14,772	175,975	611,453	709,327
1883 ..	474,754	47,646	522,400	165,097	13,540	178,637	710,037	827,974

NOVA SCOTIA COAL TRADE IN 1884.

The report of the Department of Mines gives the following information on this subject:

The total sales for the year 1884 amounted to 1,261,650 tons, made up of 945,518 tons of round and 316,132 tons of slack coal, as compared with 1,297,523 tons during the year 1883, comprising 1,016,418 tons of round and 281,105 tons of slack coal. This would show a decrease of 70,900 tons in the round coal sales, and an increase of 35,027 tons in the slack coal sales; making a total decrease of 35,873 tons.

The increase in the sale of slack coal (which does not pay royalty) is worthy of notice, and the following table will show that its value for economic purposes is being appreciated:

Total sales of slack coal,	Tons.
1884 ..	316,132
1883 ..	281,105
1882 ..	247,100
1881 ..	209,011
1880 ..	177,977
1879 ..	113,719
1878 ..	131,528
1877 ..	109,155

At present, about 85,000 tons of the slack are burned into coke. The following are the principal customers using slack for other purposes:

	Tons.
United States ..	51,519
Quebec ..	46,353
New Brunswick ..	38,061
Prince Edward Island ..	27,532
Nova Scotia ..	75,000

This grade of coal now forms the bulk of our exports of fuel to the United States; and I believe it is used there chiefly for mixing with anthracite smalls for boiler furnaces. Most of that sold in the Dominion is for steam-raising in stationary boilers, and some, especially in Prince Edward Island, for lime-burning. It is in many cases an excellent fuel for raising steam, and its introduction at the boilers of our collieries has given results equal to that of round coal, at a diminished cost.

The home sales were 493,050 tons, compared with 471,327 tons in 1883, and 458,592 tons in 1882.

The Best Furnace Record.—The *Cleveland Iron Trade Review* says: "Lucy Furnace No. 2, of Pittsburg, Mr. Julian Kennedy, manager, since her recent blowing in, has been doing some wonderful work. From Mr. Hugh Watson, manager of the Central Furnace, Cleveland, who has just returned from Pittsburg, we learn that on one day last week the Lucy made three hundred and forty tons of Bessemer iron, and that her total output for the week was 1947 tons. This is so far ahead of all previous records, either in this country or abroad, that no comparisons can be made. The Lucy has recently been remodeled throughout and her height increased to 87 feet." Mr. Kennedy has since informed us that the product of the furnace in March was 7919½ tons.

Engraving by Electricity.—Lieut. Buller Carter, of Bow-lane, London, has invented a new engraving machine, in which electricity has been introduced into the mechanism with great success. It is chiefly intended for decorative engraving upon metal work, and is capable of producing highly finished results with a celerity in which manual work is completely distanced. The words or designs to be engraved are first furnished by a setting of ornamental types or a stereotype plate. Over this is passed, in parallel lines, an arm of the machine, to which is attached a fine protected platinum point. The motion of the arm is responded to by that of a table, which carries the metal to be inscribed or decorated beneath the point of the graver. The types or stereotype plate, by raising the platinum point, put into circuit a current of electricity, which, acting upon an electro-magnet, raises or depresses the graver, and produces an enlarged or reduced engraved copy of the types upon the metal on the table with perfect accuracy.

Composition of Pittsburg Natural Gas.—Dr. George Hay, who had been appointed by the Natural Gas Commission to make an analysis of natural gas, submitted a report, which is given as follows:

	Per cent.
Carbonic acid ..	0.00
Heavy hydrocarbons (olefiant gas, etc.) ..	0.50
Carbonic oxide ..	1.00
Oxygen ..	1.30
Light carbureted hydrogen (marsh-gas) ..	95.20
Hydrogen ..	2.00
Nitrogen ..	0.00
	100.00
Specific gravity of dry gas ..	0.520
Specific gravity of wet gas ..	0.554

Dr. Hay stated to the commission that it was more economical to conduct gas at a low pressure. High-pressure pipes should be carried in the air or on the surface of the ground. Dr. Hay stated that natural gas exploded with from 9 to 14 volumes of air. Mr. Robert Young, of the Allegheny Gas-Works, was examined, and said that he had also made an analysis of natural gas, and that it corresponded with that made by Dr. Hay.

Alloys of Indium and Gallium.—The lively action of water on alloys of aluminium and gallium renders the examination of alloys of gallium and indium interesting. These latter alloys do not decompose water in an appreciable degree, and are not even strongly attacked by dilute chlorhydric acid. In this case, they abandon quantities of each metal sensibly proportional to its relative mass in the alloy. The fusing-points are difficult to determine, because, apart from the temperatures at which fusion begins, the fluidity grows gradually, and the metal remains pasty, and seems to be formed of a mixture of crystals and liquid. Some results obtained by M. Boisbaudran are as follows: 2In+Ga (by weight In = 227 + Ga = 69.9) gives a white alloy easily cut by a knife. At 56 degrees, it shows evident signs of fusion, forming a semi-paste; and it becomes a viscous liquid at 75 or 80 degrees C. Again, In+Ga (by weight In = 113.5 + Ga = 69.9) begins to melt at 16.5 degrees C., is half softened at 35 degrees C., and a viscous liquid at from 60 to 80 degrees C. Further, In+4 Ga (by weight In = 113.5 and Ga = 279.6), gives a white alloy that begins to melt at 16.5 degrees C., and is liquid at from 25 to 30 degrees. The fusing-point of the most fusible alloys of indium and gallium is therefore about 16.5 degrees C.

FURNACE, MILL, AND FACTORY.

Sealed proposals will be received until April 17th, at the Ordnance Office, War Department, Washington, D. C., for six hundred cored cast-iron shot without sabots or bands, as follows: 300 10-inch, weighing 450 pounds each; 200 8-inch, weighing 285 pounds each; 50 8-inch, weighing 235 pounds each; 50 8-inch, weighing 180 pounds each. The tenacity of the iron to be not less than 26,000 pounds per square inch.

The fires of Mount Laurel furnaces, at Temple, Pa., which have been out for some months, were relit April 4th.

A report from Allentown, Pa., states that a gradual revival is apparent in the iron industry in that section. Preparations are making to blow in one of the stacks of the Lehigh furnace there and one of the Coplay furnaces at Coplay.

The Ways and Means Committee at Harrisburg, Pa., March 31st, passed favorably on the bill to exempt incorporated manufacturing companies from the payment of a tax on their capital stock, which, if passed, would diminish the State revenues yearly about \$300,000. A bill having this purpose in view had twice been negatived. The action of the committee places incorporated manufacturing companies on the same footing with limited partnerships, which pay no tax on capital stock. The Cambria Iron Company is greatly interested in the passage of the bill, as it pays about \$65,000 a year on its capital stock, while the Edgar Thomson Steel-Works pays nothing.

At a meeting of the creditors of the Palmer Wire Company, held in Palmer, Mass., April 3d, the condition of the corporation's affairs was presented, and a committee of three was appointed to confer with the officers of the corporation to make the best arrangements for dealing with the embarrassed company.

Singer, Nimick & Co.'s melting-shops at Pittsburg, Pa., resumed operations April 6th, after an idleness of ten months.

The new Clapp & Griffiths converters at the mill of Oliver Brothers & Phillips were started on the 2d inst.

The Eureka Iron and Steel-Works, of Wyandotte, Mich., manufacturers of Lake Superior charcoal, pig-iron, plate iron, and tubing, have resumed operations.

The sum of 5,819,000 francs is to be devoted to the building of nine bridges in Roumania.

The Salt Lake Foundry, at Salt Lake City, Utah, was sold out April 2d at marshal's sale, on a judgment for \$12,000 in favor of the Deseret Bank. It was bought in by the same syndicate that bought in the machinery sold it under execution a few days before, and is to be opened up for a new trial soon.

The Western Nail Association met April 8th in Pittsburg, Pa., but did not take the expected action in regard to the card rate. The next meeting will be held in Wheeling on the 22d inst.

A company is reported as having been formed in Alleghany, Pa., with \$50,000 capital, for manufacturing iron railroad cross-ties, for which purpose it will erect works.

The preparations of American exhibitors for the London Inventions Exhibition, says a dispatch from London, are disappointing to the hopes entertained in this country that America would show herself in force. Many Americans who had signified their intention to exhibit articles and to whom space had been allotted, have withdrawn, thinking that the American Exhibition to be held in 1886 will show their goods to better advantage. Unless American exhibits increase in number, the space allotted to them will be divided among general exhibitors.

The New York, Philadelphia & Norfolk Railroad has ordered 150 box-cars for fast freight service, to be built at the shops of the Pennsylvania Railroad, at Altoona, Pa.

In proposals recently made by a firm of Tyne, England, ship-builders, the prices for steel vessels were the same as the estimates for iron steamers of the same size and class.

The English government has purchased several Gatling guns for use in the Northwest.

P. L. Kimberly & Co.'s rolling-mill at Greenville, Pa., has resumed operations. The mill has been shut down since last fall, owing to the embarrassment of the firm.

The Jenney Electric Light Company, of Indianapolis, has filed articles of incorporation. Messrs. Addison H. Nordyke, Daniel W. Marmon, Amos K. Hollowell, Brainard Rorison, and Charles D. Jenney are members of the company.

The Atlas Works, Limited, have just finished two complete rolling-mills for manufacturing steel and iron nails, and engines, trains, and rolls. One mill is for the St. John's Nail Manufacturing Company, at St. John's, Newfoundland, the other is for the Ellis & Leisey Iron and Steel Company, Pottstown, Pa. The Atlas Works are also negotiating for two new mills.

Proposals for furnishing 500,000, more or less, granite paving-blocks, to be delivered at Washington, D. C., will be received until April 15th at the office of the Engineer Commissioner at Washington.

LABOR AND WAGES.

Judge Ewing, of Pittsburg, Pa., April 7th, decided that a store order, given by any company to an employé in payment of wages was illegal. The miners who have been compelled to accept these purpose entering suit against their employers for the recovery of their wages in lawful money. Their attorney has already entered suits aggregating \$75,000, and in a short time expects to have this amount increased to several hundred thousand dollars. Two years ago, the Legislature passed a bill declaring these store orders illegal. Unfortunately no penalty was provided, and the system still prevailed.

The puddlers and mill men employed by Messrs. William Cooke & Co. (Limited), Sheffield, England, recently sent a deputation to the manager to intimate to him a decision that is without parallel in the iron trade. The deputation stated they were well aware of the difficulties under which the company had labored in consequence of the stagnation in the iron trade, and as their wages could not be reduced, owing to their being governed by the South Staffordshire Board of Conciliation, they had decided at a meeting that it was their duty to help their employers to tide over the period of adversity. They had therefore agreed to work a week for nothing, and expressed the hope that their offer would not be rejected.

The first report of the Bureau of Labor Statistics of California, among other suggestions, favors the eight-hour system.

The district convention of the Amalgamated Association of Iron and Steel-Workers met at Pittsburg, Pa., April 4th, and elected delegates to the National Scale Convention to be held in that city on April 18th. A proposition to submit to a reduction in the scale of prices for the new year, beginning June 1st, was voted down, and the delegates to the National Convention were instructed to vote for this year's wages on a basis of \$5.50 a ton for puddling.

The river coal miners' strike in Pennsylvania ended April 6th in favor of the strikers, and 6000 miners resumed work the same day at an advance in their wages. The action of Walton & Co., the most extensive operators on the Monongahela River, in conceding the increase to their men April 4th, broke the backbone of the strike, and a general stampede of the other operators to resume work followed. Two thirds of the mines have started up, and the rest will be working before the end of the week. The strike lasted four weeks, and the miners are jubilant over the victory. There is no change in the situation of the railroad miners' strike.

A large number of miners of Macoupin County, Ill., are on strike against a reduction of 33 1/2 per cent in their wages. They appeal to the workmen of the country for aid.

The committee of the Ohio Legislature appointed to inquire into the causes of the Hocking Valley strike agreed upon a report, April 9th, which was submitted to the Legislature April 10th. They submit no resolutions or recommendations, saying there is already an arbitration law in force and also a bill prohibiting the truck system. They condemn what is known as the iron-clad contract as a source of discontent with the miners, and believe that if it could be prohibited one of the prime causes of disaffection would be removed.

The laborers employed by Coxé Brothers at the Beaver Meadow breaker met in a body April 8th and made a demand upon the superintendent of the mine for an increase of 10 per cent in their wages. The operators were notified of the action of the men and ordered the works to be shut down.

There are no signs of an amicable adjustment between the operators and strikers at Jeddo, Drifton, and Highland, Pa.

The miners at Sabel's ore mines, Boyertown, Pa., April 9th, were reduced from 50 to 45 cents a ton.

The reduction was generally accepted. A number of the mines in Berks and Lehigh counties, which were lying idle during the winter, are preparing to resume.

The Delaware & Hudson Canal Company, April 8th, granted the demands of the boatmen, giving the men running the company's boats 70 cents a ton until August 1st, and 65 cents from then until the close of the season, and the owners of cleared boats 60 cents until August 1st, and 55 cents from then until the close of the season.

According to dispatches, forty thousand coal miners are now on strike in Yorkshire, England, alone, against the 10 per cent reduction in wages ordered on April 1st.

RAILROAD NEWS.

The Chesapeake & Ohio Canal Company has filed in the United States Circuit Court, at Baltimore, Md., a petition setting forth the agreement of the company with Robert T. Baldwin and others for the sale of the repair bonds of 1878, and asking the approval of the court. Judge Bond passed an order setting the matter for a hearing April 20th, 1885. The petition is signed by L. Victor Baughman, President of the Canal Company.

It is reported from Port Moody, British Columbia, that vessels in that port (the Pacific terminus of the Canadian Pacific Railroad) loaded with iron from England for the railroad company, refuse to allow the iron to be removed until the freight is paid. This action was caused by advices from the Bank of Montreal that the company has no funds to its credit there and the many rumors that the syndicate is in straitened circumstances and would not again be assisted by the government. The opinion is, that the government will have to complete the road and operate it as government property.

The annual report of General Manager Charles E. Pugh, of the Pennsylvania Railroad, covering in detail the operations of the main line and branches during 1884, has just been completed. The earnings for the year were \$30,196,884; the expenses, excluding rentals and interest on equipment, \$17,575,105; and the net earnings, \$10,509,923, a decrease of \$1,498,534, as compared with the preceding year. The cost of operating the main line and branches was about 58 1/2 per cent of the receipts from transportation. The number of passengers carried during the year was 11,429,776. The passenger business increased 6 1/2 per cent in the number carried and decreased 1/2 per cent in mileage. The through freight moved Eastward was 1,293,700 tons; Westward, 531,069 tons. Local freight, Eastward, 13,330,714 tons; Westward, 7,428,342 tons; making a total of 22,583,225 tons, an increase of 909,665 tons, compared with 1883. The mileage of through and local freight in both directions was 3,082,499,986, an increase compared with the previous year of 85,607,419 miles. The through oil shipments in 1884 were 3,016,532 barrels, an increase of 1,494,802 barrels, and the local shipments 265,357 barrels, an increase of 30,391. The coal shipments were 10,454,215 tons, an increase of 1,164,727 tons, and the coke shipments 2,846,126 tons, a decrease of 291,274 tons. There were 187 1/2 miles of single track laid by the different branches. The total trackage at the close of the year was 2739 1/2 miles. On the United Railroads of the New Jersey division, 12,664,050 passengers were carried, a gain over the previous year of 1,324,720, and the total through and local freight moved was 9,144,735 tons, an increase of 289,168 tons.

The Philadelphia & Reading Railroad has deposited with the State Treasurer of New Jersey \$184,000, the amount of the assessment levied by the State Board of Assessors on the New Jersey Central road. The sum was ordered by the Supreme Court to be deposited before a certiorari could issue in the appeal case.

The Susquehanna & Mahoning Railroad was chartered at Harrisburg, April 7th, with a capital of \$150,000. The road will be fifteen miles long, and will run through Jefferson County, Pa.

The directors of the Mexican Central Railroad Company, at their meeting held in Boston, Mass., April 7th, re-elected the old board of officers. In the last six months of 1884, the company earned \$1,525,461, and there remained on January 1st, 1885, after paying expenses, a balance of \$156,255.

The construction of the Potzouaro branch of the Mexican Central Railroad was begun April 6th.

The Tennessee Coal, Iron, and Railroad Company's report for March shows coal received directly from

the mines 15,175 tons, and coke 9069 tons, making a total in 1885 respectively of 45,492 tons and 23,422 tons.

The Delaware & Hudson Canal is open at Rondout. The boatmen are taking charge of their boats promptly.

Navigation between Port Clinton and Philadelphia on the Schuylkill Canal was opened April 8th, and nearly 500 boats that were lying idle during the winter between these points resumed for the season. The canal between Port Clinton and Schuylkill Haven is still closed on account of repairs, but it will be open in a few days.

COAL TRADE NOTES.

CANADA.

PROVINCE OF NOVA SCOTIA.

The Sydney mines have resumed operations. All hands are working on the south side, double shifted.

COLORADO.

At the meeting of the Colorado Coal and Iron Company, held in Colorado Springs last week, the old Board of Directors was re-elected, except that Henry Edy, of New York, was chosen in place of N. B. Lawrence, who declined re-election.

FRANCE.

An explosion of fire-damp occurred in a mine at Martinells April 3d, by which eighteen persons were killed.

KANSAS.

The miners at Burlingame are scarcely averaging half-time.

MARYLAND.

Canal-boat loading continues at Cumberland. The George's Creek Company and the Maryland Company have begun loading.

Mine Inspector Sheridan has, it is said, discovered that the oaths of office taken by the weigh-masters at the various mines of the Cumberland region have in many instances been defective. He has, therefore, had prepared the proper printed form, and is having all weigh-masters take the oath over in accordance with it.

MEXICO.

It is reported that five car-loads of coal are extracted daily from the mines in Matamoros, near Rio Salinas.

MISSOURI.

The Rich Hill Coal Company shipped out 1650 cars of coal during the month of March, notwithstanding five days of idleness on account of the railroad strike.

The miners at No. 6, of the Rich Hill Coal Company, have organized a Mutual Benefit Association, to include the entire Rich Hill coal district. Mr. W. R. Holland, the prime mover in the enterprise, has now 56 members in good standing, and applications constantly coming in. The assessment will be 50 cents a month dues and in case of disability to work through sickness or accident, the member draws \$5 a week. It is intended, as soon as the membership is strong enough, to incorporate under the State laws.

PENNSYLVANIA.

ANTHRACITE.

By the caving in of the gangway at the Cuyler Colliery, operated by S. M. Heaton & Co., at Raven Run, about four miles from Shenandoah, ten men were killed. The disaster occurred April 6th, about 400 feet from the bottom of the slope. The damage to the mine is said to be extensive. Thousands of tons of coal and rock have given way. The damage will reach \$30,000. The cause of the cave-in is attributed to the fact that the mine has been too extensively worked, and that sufficient support in the form of pillars of coal had not been left to keep up the top. Many of the mine officials who have ventured in say that the coal in the pillars that are still standing is so soft that it can be cut easily with the pick. The mine is worked on the Buck Mountain vein, which has a thickness of fourteen feet. The colliery had a capacity to ship 300 cars of coal a day, and employed 300 men and boys.

The Lenox Coal Company, of Shamokin, with a capital of \$750,000, was chartered April 7th.

The application of James M. Boyd, a bond and stockholder of the Pennsylvania Anthracite Coal Company and the New York & Susquehanna & Western Railroad Company, to have a receiver appointed, upon the ground of insolvency, was refused by Judge McKennon, of Philadelphia, April 3d, on the ground that the dispute was entirely among the stockholders.

According to press dispatches, John C. Haddock, of Brooklyn, a member of the firm of Haddock & Steele,

and the proprietors of a number of collieries in the vicinity of Wilkes-Barre, has been arrested on a criminal prosecution for a violation of the mine laws in not providing ambulances at the mines for the conveyance of wounded men. James Kileen is the complainant. He was a miner in the Black Diamond Colliery, and on December 8th was injured by a fall of coal. He was carried to his home in a lumber wagon, and asserts that the jarring and exposure aggravated his wounds and rendered necessary the amputation of his arm at the shoulder.

BITUMINOUS.

The Governor on April 7th sent the names of the following persons to the Senate to revise the mining and ventilation laws in the bituminous coal regions: Senators, H. J. Humes, Crawford; Abner Ross, Green; F. H. Agnew, Beaver. Representatives, James R. Burns, Erie; A. M. Neely, Clarion; Jesse M. Howell, Fayette; A. C. Robertson, Alleghany; John Lowry, Indiana. Inspectors, James Lombit, Washington; J. J. Davis, Armstrong; Thomas K. Adams, Mercer; Roger Hampson, Sullivan; August Stiner, John M. Watt, John Cunningham, Alleghany; George E. Sprague, Westmoreland; H. C. Smith, Lawrence; Joseph Passmore, Center; Hugh Stillwagon, Fayette; Joseph Delahune, Clearfield. Operators, Samuel O'Neill, Alleghany; F. C. Shellenburg, Westmoreland; J. Frank McNutt, Clarion; Daniel Lauchman, Blair; Pressly Moore, Fayette; George M. Brisson, Clearfield.

At the annual meeting of the Westmoreland Coal Company, held April 1st, the following directors were elected to serve during the ensuing year: Samuel Welsh, Stephen H. Brooke, Henry Winsor, Francis H. Jackson, Richard H. Downing, P. Pemberton Morris, Pemberton S. Hutchinson, Jacob P. Jones, Horace Magee, T. Wistar Brown, and Alexander Biddle. At the meeting of the Board of Directors, Francis H. Jackson was elected President and Edmund H. McCullough Secretary and Treasurer.

Six men in the employ of Thomas Hughes are at work in the old pit of the Castle Shannon Company. They are digging coal near the entry at 2½ cents a bushel. The coal is mined and delivered at the tippie for 2½ cents.

COKE.

Of the 10,435 ovens in the Connellsville region, there were for the week ended April 3d 2852 idle.

McClure & Co., one of the four firms of the coke syndicate, have sued the Masonic Bank, of Pittsburg, for \$25,000, alleged to have been loaned them in 1880.

UTAH.

The coal mines at Rock Springs have a daily output of from eighty to ninety car-loads. Cars are now loaded with from thirteen to twenty tons. The old coal mines are worked and new territory is opened up.

OIL AND PETROLEUM NOTES.

KENTUCKY.

The Vinson Oil Company, located on Big Blaine, near Louise, has made its first shipment of oil. It has two kinds of oil, both obtained from the same well. One kind is what is called the green, and the other the yellow. The green is found at the depth of 353 feet from the surface, and the yellow is found at the depth of 358 feet.

NEW YORK.

In the Supreme Court at Buffalo, April 7th, the Buffalo Lubricating Oil Company, Limited, filed a complaint against Hiram B. Everest, Charles M. Everest, John D. Archbold, Henry H. Rogers, the Acme Oil Company, the Vacuum Oil Company, and the Standard Oil Company, in which it charges the defendants with successful conspiracies against its business and asks \$250,000 damages.

The Gas Consumers' Association of the State of New York has filed its certificate of incorporation at Albany. The object of the organization is to protect consumers from extortion by gas companies. The office of the company is in New York City, and the trustees are John H. Sherwood, Jackson S. Schultz, William H. Wood, Theodore Moss, Robert H. Strebeigh, Francis H. Thurber, William D. Garrison, Sheridan Shook, Henry Cranston, Henry M. Smith, and Frank S. Gardner.

PENNSYLVANIA.

It is expected that natural gas will be in use throughout the Wayne mill at Pittsburg within a week. Lindsay & McCutcheon are laying gas-pipes and will get gas from Washington.

The Penn Fuel-Gas Company has received the con-

tract by the Water Committee at Pittsburg to supply natural gas to the water-works for one year. The contract price was \$21,800. Last year, the gas cost the city \$44,000.

Adams & Co., Pittsburg, have both their glass furnaces on Tenth street working with natural gas.

G. Duncan & Sons, Pittsburg, started natural gas in their glass furnaces April 4th for the first time. They are running both.

Natural gas is introduced as fuel in nearly all departments of Oliver Brothers & Phillips's Fifteenth street mill, Pittsburg.

The bar, sheet, and finishing mill of the Wayne Iron-Works, at Pittsburg, has resumed operations. Natural gas has been introduced.

Hussey, Howe & Co., of Pittsburg, are introducing natural gas into all departments of their steel-works. No coal will be used for any purpose except at the blacksmith forges.

Clark's Solar Iron-Works, Pittsburg, which were shut down for extensive repairs, have resumed. Natural gas will be used in all departments.

GENERAL MINING NEWS.

ARIZONA.

COCHISE COUNTY.

COPPER QUEEN.—The output of copper bullion for March was 629,165 pounds.

MARICOPA COUNTY.

CENTRAL ARIZONA.—C. M. Jameson, of Phoenix, has been appointed legal agent of this company. The mine has been leased to parties now working it.

PIMA COUNTY—MEYERS DISTRICT.

ARIZONA PEERLESS.—The claim has two main veins running nearly north and south and about 125 feet apart, with several smaller intermediate veins. The company has sunk a shaft on the west vein to the depth of 220 feet, exposing a well-defined ledge, varying in width from three to five feet, carrying ore the whole distance, showing silver, gold, and copper. Work is pushed day and night.

QUIJOTOA DISTRICT.

A serious accident happened from the explosion of foul air in the uprise of the Peerless mine, March 28th, killing two men. Mr. J. W. Mackay has visited the mines on his way to San Francisco.

PINAL COUNTY.

SILVER KING.—San Francisco papers report that Albert V. and Mary E. Bills have brought suit in the Superior Court against this company for \$215,560.30, claimed as dividends due them on shares.

YAVAPAI COUNTY.

BELL PLACER.—The company intends to proceed immediately to lay out and construct a ditch several miles in length, by which these placers and a large number adjoining for a distance of two miles, may be worked by hydraulic process.

CALIFORNIA.

EL DORADO COUNTY.

CEDAR SPRINGS.—The mine and machinery of this company, at Placerville, have been attached by the creditors and miners and the works are closed down. It is reported that Mr. Brown, superintendent of the works, has started from Boston, with money, in order to settle all demands.

MONO COUNTY.

GORILLA.—Operations will be resumed in Mill Creek as soon as practicable. The machinery for the new mill is ready for shipment from San Francisco.

BODIE DISTRICT.

BODIE CONSOLIDATED.—For the week ended March 28th, 140 tons of ore were crushed. The product was shipped with last week's run. At the mine, the men were employed in the stopes. Thirty-nine men are employed.

CONSOLIDATED PACIFIC.—Since the last report, in Pacific No. 1 drift a small vein has been cut dipping northeasterly at an angle of nearly 60 degrees, and running northwesterly and southeasterly. Though small, the vein looks well, and the drift has been mined to the northwest on the vein. Where cut, the vein seems to have been disturbed and considerably broken from some cause.

STANDARD CONSOLIDATED.—There were extracted and sent to the mill 492 tons of ore for the week ended March 28th. Since the 30th, operations have ceased.

PLACER COUNTY.

WESKIE.—This mine at Succor Flat has been sold, it is said, in Paris, France, for \$190,000. The purchase-money has already been paid through the Lon-

don, Paris & American Bank of San Francisco. The *News Letter* says: A large amount of this must go in commissions, as the mine is not worth one half of such a sum. It would be interesting to know how much was paid the French engineers who came from France to report on the mine. The usual squabble is going on among the vendors over the division of the spoils.

SAN BERNARDINO COUNTY.

CALICO WATER-WORKS COMPANY.—This company has been organized with a capital stock of \$40,000, divided into four thousand shares of the par value of \$10 each. The object is to furnish water to the people of Calico and vicinity for domestic uses and for mining and milling purposes. The directors for the first year are D. Bahten, C. B. Stocking, E. E. Stacy, Isaac Norton, and James Miller.

CANADA.

PROVINCE OF QUEBEC.

The Smith quarries, situated at Cote, St. Louis about 70 acres, are to be sold by private contract by W. E. Shaw, 235 St. James street, Montreal. This property, intersected by the Quebec, Montreal & Ottawa Railroad, and fronting on the Cote St. Louis road, comprises the finest quarries on the Island of Montreal. It shows 8 feet of pure graystone. Reasonable terms for payment will be given.

COLORADO.

There will be no exhibition this year at Denver. The venture has been an unprofitable one from the start.

CHAFFEE COUNTY.

Tobey, Dorn & Co. have started up their concentrator at Salida. A test shipment of ore from the Hortense mine has been made, which, if successful, will lead to extensive work on that well-known property. The mill, which is an experimental plant, will be thoroughly tested on the different ores in this county, and if the result is satisfactory, the owners intend to erect an extensive plant at some central point in the county.

YANKEE BLADE.—J. H. Ware and J. R. Higgins, of New York, have started up this mine, and purpose sinking the main shaft to a depth of 500 feet, running new levels at regular intervals of fifty feet below the bottom of the present shaft and cleaning out and driving the old levels. It is the intention to drive cross-cuts from the shaft at right angles with the levels, so as to thoroughly exploit the ground. The new management has purchased a mill situated near the Minnie, and purposes thoroughly overhauling it and making it available.

CLEAR CREEK COUNTY.

COLORADO CENTRAL.—It is reported that a two-inch vein of solid gray copper ore has been opened up.

FREELAND.—If the railroad company gives a reduced rate on the company's northern coals, the smelter will be moved from Freeland down in the vicinity of the H. & W. mine at Idaho Springs.

PAY ROCK.—Work has begun at the mill. Among the additions to the machinery, there is to be a battery of five stamps for crushing the tailings from the coarse jigs, and an Embrey table for the treatment of the slime from this battery. It is proposed to cover the revolving buddle with cement, and have the water fed from a revolving hollow cylinder placed in the center, thus having the water-feed revolve, instead of the table. At the mine, operations continue.

SNOWDRIFT.—This property, recently purchased by Mr. Daniel Weld of Boston, has been prepared by the erection of hoister, pump, etc., for extensive development under the direction of Major Henry Fulton, and a force is engaged in mining. Some ore of high grade has already been shipped.

DOLORES COUNTY.

NEWMAN.—The sheriff sold at Rico, March 30th, under execution, the group of mines known as the Newman group, composed of the Newman, Chestnut, Swansea, Swansea Extension, Stephens, Parsons, and the Newman mill-site for \$12,000. The property was bid in for L. D. Kendall, whose judgment of about \$10,000 against this company caused the sale. The first three of these properties are worked under lease. The Stephens is owned by other parties, and the Swansea Extension was relocated by other parties. The entire group is valued at much over \$100,000.

EAGLE COUNTY.

Among the properties worked are the High View, Sunrise, Golden Wave, Mountain Lion, Sir William Wallace, Midnight, and Camp Bird. The Sunrise, Midnight, and Mountain Lion each have good ore-

streaks. Preparations are also in progress for starting up one or more of the mills in the Holy Cross District.

GILPIN COUNTY.

CALIFORNIA.—In the main shaft of the California mine, on Quartz Hill, and the deepest shaft in the State, in the east 1700-foot level, a vein of smelting ore fully 14 inches in width has been struck, the crevice being four feet between walls. The back of the 1600-foot level also gives a good showing. The 1800-foot stations are being established and levels commenced east and west from that depth preparatory to the resumption of sinking.

GALENA.—At this mine, on Central City Hill, sinking the main shaft has been resumed, the present depth being 508 feet. It is expected that the junction of the Galena and Bugher veins will be reached in sinking an additional thirty feet.

NEWFOUNDLAND GOLD MINING COMPANY.—This company has been organized to work the Newfoundland lode, on the southerly slope of Gunnell Hill. It has purchased from the Hendrie & Bolthoff Manufacturing Company, of Denver, 30-horse power Lidgerwood engines and patent hoister, capable of sinking to a depth of 1000 feet. Contracts have been let for the placing of the machinery, which is to be completed and in running order within the next thirty days.

HINSDALE COUNTY.

CROOKE MINING AND SMELTING COMPANY, LIMITED.—John J. Croke has gone to London to confer with the company and arrange an amicable basis upon which to resume work on the Ute and the Ulé mines.

HENSON CREEK REDUCTION COMPANY.—W. S. Elmendorf has been reappointed superintendent of the concentrator at Capital City and other property of the company. The concentrator will be run if ore is furnished.

LAKE COUNTY.

The Leadville *Herald* reports the following:

CHRYSOLITE.—The results of operating the mine and mill promise to prove far more satisfactory this month than they did last. After first starting up the mill, many mechanical defects were encountered, resulting in delays and stoppages that have now been remedied, and April will witness a steady run. The maximum amount of ore treated each day at the mill was sixty-eight tons, and on the average it is calculated will not fall short of sixty tons. The ore, it is said, mills well, and the amount saved is highly satisfactory. The mineral is conveyed from the mine to the mill by rail, at an expense of less than fifty per cent of what it would cost to haul it down by teams. At the mine, a force of thirty-nine men is employed, and the bulk of the ore extracted is the product of cleaning up the old stopes and workings. In working in this manner, a great deal of lead ore is also met with, unsuited to the milling process. This stuff has been thrown to one side, for concentration. Preparatory work has been in progress on the concentrating mill of the company, situated at the mine, and the jigs, which have been closed down for the winter, are to start up again.

DENVER CITY.—The adjourned meeting of stockholders was held at Leadville, April 1st. A statement of the financial condition at the close of business on December 31st, 1884, shows an indebtedness of \$25,301, resulting from the settlement of the claim of Rivoux to a quarter interest in the property, and expenses incurred in working the mine last year. The lease heretofore granted to the Lee Basin Mining Company has been renewed for the term of two years. At this date, the company is said to owe but about \$16,000, which is due to the Lee Basin Company. Since January 1st, 1885, the lessees of the mine have shipped \$55,000 worth of ore. It was the royalties on this production that reduced the indebtedness of the company. The remaining debt is due to the Lee Basin Company, which, in consideration of the lease, has assumed to carry the obligation of the Denver City.

DUNKIN.—Contracts have been made for 7000 tons of argentiferous iron ore, of which 5000 tons go to Pueblo and 2000 tons to Salt Lake City, Utah. The mine, during the past three months, has not earned any money, but the prospects have greatly improved recently. A portion of the mine is leased.

LA PLATA.—During March, between 800 and 900 tons of ore were produced.

LEADVILLE CONSOLIDATED.—The new shaft sunk for the purpose of prospecting for a lower ore-body, which it is thought will be found below the limestone, has reached a depth of 100 feet.

LEE BASIN.—The board for the ensuing year was elected at the annual meeting at Leadville, April 1st. It is as follows: Whitaker Wright, Andrew J. Reilly, Carl Mueller, Frederick Kuhne, Robert Bunsen, Edwin B. Woods, and Eugene Curran. The financial statement shows that the property had been bonded for \$100,000, to secure a loan of that amount for a period of two years. One half of the bonds have been placed in Germany, and the remainder are in the treasury. The money secured through this loan was used in extinguishing the old bonded indebtedness of the company, and settling up the affairs of the Denver City Company. The assets of the Lee Basin Company at present consist of about \$7000 cash, \$16,000 due from the Denver City, and the Denver City lease. Mr. Bunsen will continue in charge of property, and also the company's lease on the Denver City mine. He has been authorized to rebuild the Lee Basin hoisting plant at the Wright shaft, which was destroyed by fire a few years ago, and to work the property. Anticipating this order, much had already been done by Mr. Bunsen to resume work, and a great portion of the machinery is now in good repair. It is estimated that \$5000 and a month's time will suffice to place the Wright plant in working condition. While repairing the Lee Basin plant, the company will continue operations at the Denver City, where it is taking out considerable ore.

LITTLE CHIEF.—The entire mine is leased to four different parties who are working the property, producing considerable ore, resulting in fair profits to themselves and the company.

LITTLE PITTSBURG.—All the workings of the company's properties are under lease, resulting in a small production of ore and iron. The company is not doing any thing at present toward opening up new ground, having closed down the prospect-work in progress a short time ago. The company owns a large tract of virgin ground on the northern side of Fryer Hill, on which considerable money has already been expended, and which invites further development.

SILVER CORD.—From 800 to 1000 tons of ore have accumulated at the mine, the result of a steady production and the impassable condition of the roads. The present daily product of the mine, including the Ruby workings, is about 70 tons. About 50 tons a day are shipped to the Pueblo smelter. The principal source of ore in the Silver Cord mine just now is the northwest corner of the property near the Iron Silver line. This section shows quite large ore-bodies, belonging to the northern ore-chute of the Silver Cord combination. The mineral is mostly of low grade, and does not carry a great deal of lead. Exploration-work is advanced at a fair rate in various portions of the Cord and Ruby mines. The connection between these two properties still requires about 300 feet of drifting.

YANKEE DOODLE.—A new shaft sinking on the lower or western portion of this mine, below the break or line of fault, has attained a depth of 300 feet. Exploration-work to the eastward will soon begin.

LA PLATA COUNTY.

The gold discoveries at the head of Junction Creek, near Durango, are creating considerable excitement. Several companies have already formed. Sluices will be put up and extensive preparations made to work the various properties as soon as the snow permits.

SAN MIGUEL COUNTY.

Salt is now manufactured in Paradox Valley by Mr. P. T. Stevens. The salt is said to be 90 per cent pure.

GOLD KING.—The company has designated Gold King as the principal place of business in the State and James Reynolds as the resident agent.

SUMMIT COUNTY.

ROBINSON CONSOLIDATED.—Mr. C. D. Moore has been reappointed manager of the company's mines at the recent annual meeting, held in this city. Further information regarding the business transacted at this meeting has been refused by the company.

DAKOTA.

LAWRENCE COUNTY.

CALEDONIA.—The mill has been started up, and new hoisting-works have been erected, the old ones having been destroyed by the caving in last July.

ELBA.

Tenders were to be received until April 10th at either Rome, Leghorn, or Genoa for the lease of the minerals in the Isle of Elba. It was not expected that the tenders would be less than 35,000 francs per annum

and 1.20 francs per ton have to be paid to government for all the ore raised, except that which is sent to the royal establishments of Fallonica and Ceina.

IDAHO.

PHILADELPHIA MINING AND SMELTING COMPANY.—Mr. Moulton, superintendent of this company, has resigned. Mr. Hardess, the metallurgist, and Mr. Dewey, the accountant, will succeed him, on or about the first of May.

LIMA.

A meeting of the nitrate producers of Tarapacá was held at Iquique March 14th. It was determined, in view of the constant fall in price of the article in foreign markets, to limit the annual exportation to seven millions of quintals in place of ten millions, as heretofore. This places each establishment on a one quarter producing power, and consequently there is much distress and financial trouble in the department. To add to this, we are assured that France and Italy have signified to Chili that favorable action toward the holders of nitrate certificates is expected.

MEXICO.

Governor Tabor's property at Jesus Marie is reported to be doing very well. Last month, ten stamps of the new mill were kept in operation and a product of \$25,000 realized. This month, twenty-five stamps will be kept dropping, and very good results may be expected. Only forty feet more are required to open the vein through the new tunnel. As soon as this new opening is effected, the mine will be drained of water, and the property be placed in a condition for a large monthly production.

MICHIGAN.

COPPER MINES.

CALUMET & HECLA.—The March increase of production is due to the improved hoisting facilities, which include the Leavitt drums and new skips carrying about a half-ton each more than the old ones. Four of the Leavitt drums are now in full operation, and two more are rapidly approaching completion.

OSCEOLA.—It is stated that the stamp-mill will shut down May 1st, preparatory to the machinery, frames, and heads being removed to the proposed new mill to be erected at the foot of the Hungarian River.

PENINSULA.—The attempt to get the stockholders to contribute a dollar a share, which would afford \$100,000, to pay the debts of the company, has failed.

GOLD MINES.

CASS.—This mining company has filed articles of association; the capital stock is \$75,000; to develop the gold deposits of Tuscola County.

MARQUETTE.—Encouraged by the improved appearance of the openings made on this property, the company has doubled the force at work on its prospect in the north part of Marquette.

MINNESOTA.

MINNESOTA & LAKE MANITOU GOLD AND SILVER MINING COMPANY.—This company was organized last August, but not until recently did it prepare to do business on a large scale. The capital stock is \$2,000,000, and is divided into 1,000,000 shares at \$2 each. The officers are Thomas Nudson, President; George Camden, Vice-President; T. F. Young, Secretary; Peter J. Johnson, Treasurer; Firmin Bedard, Superintendent and Manager, all of Benson; J. B. Bottineau, Minneapolis, Solicitor.

NORTH SHORE SILVER AND COPPER MINING COMPANY.—When this mine was first worked, it yielded quite an amount of copper; but when a greater depth was reached, it was found to contain deposits of silver ore. The shaft has now attained a depth of sixty feet, and a low-grade silver ore is taken from the mine. The company will put in a plant of machinery.

SILVER CITY MINING COMPANY.—Work has been going on steadily with satisfactory results since the first of January.

MONTANA.

LEWIS & CLARKE COUNTY.

A cave inlaid and festooned with sulphur of varying thickness has been discovered near the Alta Mineral Springs, on the north fork of Sun River, near Augusta.

ALICE.—A Cornish pump will be put on the Magna Charta as soon as the third compartment to the main shaft can be completed.

ANACONDA.—The company is preparing to manufacture its own fire-brick at Anaconda. It is now crushing rock from its quarry near Dillon, to be used in the manufacture. The rock is said to have a very large percentage of silica.

LEXINGTON.—A new compressor and diamond drills are going in at this mine.

MOULTON.—The face of the 500-foot west drift shows a good ore-body at a distance of 1000 feet from the shaft. The mill is running twenty stamps on Moulton ore and twenty on custom ore.

RISING STAR AND SILVER SAFE.—The suit between the owners of the above mines came up at Butte April 3d. The plaintiff interposed a challenge to the jury panel, which was sustained. The court then issued a venire for jurors returnable forthwith. The jurors were summoned by the sheriff, and plaintiff interposed a challenge to the panel. The challenge was sustained, and the court said the case must stand adjourned until the September term. Prof. William P. Blake, of New Haven, Conn., W. S. Keyes, of San Francisco, and G. W. Maynard, of New York City, were the experts engaged by the owners.

MEAGHER COUNTY.

GOLD BLUFF.—Messrs. Tooker and Merrill have sold to Michigan capitalists an undivided half-interest in this mine, a gold quartz lode situated on Trout Creek. It is said that the vein is from three to six feet wide, and consists of a high grade of free-milling ore. The company expects, in a short time, to incorporate under the laws of the territory, and to put in extensive improvements that involve the expenditure of a large sum of money.

MONTANA BELLE.—Mr. Thomas Couch has secured a bond for sixty days on this group of mines at Neighart. The mines included in the bond are the Montana Belle, the Minnehaha, and the St. Julian. All of the properties are pretty extensively developed.

NEVADA.

EUREKA COUNTY.

The bullion shipments from the town of Eureka during the first four months of 1885 will probably be the smallest as to amount known for any like time in many years. The cause is, that both of the large furnaces of the Eureka and Richmond mining companies are, and have been for some time past, closed down. Ores in large quantities continue to be hauled to both works.

RUBY HILL.—At the regular annual meeting of this tunnel and mining company, held in Eureka recently, the secretary's report showed that the total length of the tunnel up to the letting of the last contract was 850 feet; that the total cost of the same was \$7287.86, which includes labor, lumber, track-iron, materials, hauling, etc., making an average cost per foot of about \$8.50. The amount has all been raised by one cent assessments.

HUMBOLDT COUNTY.

PARADISE VALLEY.—Operations at the new mill were resumed April 1st. The company reports that it is without indebtedness.

ORMSBY COUNTY.

Secretary Manning has instructed the Superintendent of the United States Mint at Carson City to suspend coinage operations until the beginning of the next fiscal year, July 1st, and reduce the force accordingly. The mint will, however, remain open for the receipt of bullion from depositors.

PIOCHE COUNTY.

RAYMOND & ELY.—The entire plant, including mines and complete machinery at Pioche, formerly owned by the Raymond & Ely Mining Company, will be sold as a whole or separately. The machinery includes: One large pumping-engine, 24-inch cylinder, 6-foot stroke; one 12-inch Cornish pump, connected with pumping-engine; one hoisting-engine, 18-inch cylinder, 36-inch stroke; one hoisting-engine, 12-inch cylinder, 34-inch stroke; one large air-compressor with receiver; complete sets of tools, patterns, etc. Also, one 30-stamp mill, and one 20-stamp mill, at Bullionville. All the above property is in first-class order. Applications are to be made to Edward J. Le Breton, 217 Sansome street, San Francisco, Cal.

STOREY COUNTY—COMSTOCK LODE.

The pay-rolls of the mines on the Comstock for the month of March will foot up over \$100,000.

BULLION.—The miners who are at work prospecting the Bullion croppings have changed their base of operations from the old Croesus to the Fairview shaft, which they are now engaged in cleaning out preparatory to sinking. If the prospect warrants it, they will put up a whim on the ground to do the hoisting work.

CONSOLIDATED CALIFORNIA & VIRGINIA.—Report for the week ended March 28th: On the 1750 level, the drift running southwesterly from the main west

drift has been extended 70 feet. Hoisted 396 cars, 368 tons of waste. Extracted 368 tons of ore. The average assay value of this ore, as per sample taken from 398 mine cars, is \$18.61 a ton. The Morgan mill has worked 2221 tons and 45 pounds of ore, which yielded bullion of the assay value of \$40,766.17. Ore extracted under the Jones contract, 362 tons. The average assay value of this ore, as per samples taken from 302 mine cars, is \$27.58 a ton. Shipped to Eureka mill under this contract 341 tons 1520 pounds. The average assay value of the same, as per sample from the railroad cars, was \$33.12 a ton.

EUREKA MILL.—The owners of this mill are about to construct a large tailings mill with slow-motioned slum-pans for the purpose of working the large pile of slums and tailings that have been accumulating near their sixty-stamp mill. The stage of water in the Carson is not lower than usual at this season, and the volume at present in the river is said to be more than double the amount required to run the mills to their full capacity.

HALE & NORCROSS.—On the 2900 level, west cross-cut No. 3 is out about fifty feet, thirty of which are said to be in fine ore. Numerous stringers of ore a foot in width, averaging \$60 a ton, are still showing in the face. On the 300 level, the west cross-drift started for the vein near the extreme end of the north lateral drift at a point directly under cross-cut No. 3 on the 2900 level, is now out 15 feet.

MARIPOSA MILL.—The old mill, north of Seven-mile Cañon, started up, April 2d, and will be kept grinding away until the pile of tailings now remaining on the dump have been run through, which will take about two months. These tailings were flumed to their present location many years ago, and are the remainder of a small mountain containing several thousand tons that accumulated from the working of ore in the old Sacramento and other mills in the cañon that have since been dismantled.

SIERRA NEVADA.—The surface repairs have been completed and active prospecting operations resumed on the 600 level.

NORTH CAROLINA.

UNION COUNTY.

The Smart and Fulwood mines, situated about sixteen miles from Charlotte, are to be opened up and developed. The veins on the property are gold-bearing quartz and galena with pyrites. Mr. W. H. Cooper will have charge of the work, and Mr. E. L. Young, of the New York Milling Company, will be his associate and assistant.

PENNSYLVANIA.

Nearly one hundred slate men, from Pennsylvania, New York, and Vermont, met at Easton, April 8th, and formed the National Slate Exchange. The Exchange will include producers, consumers, middlemen, and brokers, and will be conducted on regular exchange principles, with call boards and dealings in margins and futures.

FAYETTE COUNTY.

BEAR WALLOW.—The miners at these mines of the Dunbar Furnace Company are said to be leaving. The ore is exhausted and the wages paid are low.

UTAH.

BEAVER COUNTY.

FRISCO MINING AND SMELTING COMPANY.—It is reported that a sale of the Cave mine, which is owned by this company, is pending. Mr. Sam Godbe is in New York for the purpose of effecting a transfer of this property.

HORN-SILVER.—The Horn-Silver smelter at Francklyn suspended operations March 28th, all the ore which was in the yards at the time of the big cave in the mine having been worked up. About fifty men are employed at the mine. It is not known when work will be resumed on a large scale; but it is thought that when the work is resumed, and shipments of ore begun, the smelter will fire up again.

VIRGINIA.

AUGUSTA COUNTY.

AMERICAN MANGANESE COMPANY, LIMITED.—This company was recently organized for the purpose of working manganese mines and dealing in manganese on a large scale. The president is Mr. M. C. Davis, and its secretary and treasurer Mr. H. M. Curry. The offices are at No. 8 Fifth avenue, Pittsburg, Pa., and at Crimora, Augusta County, Va. A long lease has been secured on the Crimora manganese mines. The company has also acquired an important interest in

the stock of the Virginia Manganese Company which owns that mine. The mine is situated about $2\frac{1}{2}$ miles southeast of Crimora station of the Shenandoah Valley Railroad, in the Western Blue Ridge. It has now been worked for a number of years, and during the past four years has furnished over 16,000 tons of high-grade manganese ore. Mining operations are vigorously and successfully prosecuted, and the present output is over 80 tons of ore daily. The shafts have reached a depth of 117 feet. Arrangements are completed for sinking an artesian well, to increase the water supply.

WEST VIRGINIA.

WYOMING COUNTY.

TRANS-FLAT-TOP LAND ASSOCIATION.—Black-band iron ore has recently been found on this company's property on the head-waters of Guyandot River on a stratum 3 inches thick, in the middle of a coal-bed of the No. XIII. coal measures, 28 inches thick.

WISCONSIN.

THE RAKAGON (OR KAKAGON) IRON MINING COMPANY.—This company has been formed with a capital stock of \$500,000. The incorporators are Mats Matson, A. S. Perinier, N. Booth, C. J. Critchett, E. Garnich, G. W. Merrill, and B. B. Scott.

ORE MARKETS.

Commissioner Fink has sent out the following circulars:

By agreement of the standing committee of the joint executive committee, the present basis of rates on the articles named below, namely, 20 cents per 100 pounds, Chicago to New York, may be guaranteed for the calendar year ending December 31st, 1886; pig-lead, car lots; bullion, base, car lots; ore, silver, lead, antimony, or copper and calamine, car lots; copper matte, ingots, cakes, slabs, or pigs, car lots; copper residue, car lots. Value not to exceed \$100 per net ton, to be limited by written release.

By agreement between the trunk lines, on and after Friday, March 20th, the basis of West-bound rates to Clinton, Michigan, will be the same as to Jackson, Michigan.

CHATTANOOGA, TENN.

Fifty per cent red fossil a ton, \$1.60@1.85, Brown hematite, \$2.25@2.50, delivered at furnace.

CLEVELAND, OHIO.

No. 1 specular and magnetic Bessemer ores, a ton, \$5.75.

No. 1 specular (non-Bessemer) ore, a ton, \$5.

Bessemer hematites, \$4.25@5.

Non-Bessemer hematites, \$3.75@4.

DENVER, COLO.

For the silver and gold in ores, from 90 to 95 per cent of the New York quotation (gold being counted at \$20 an ounce).

For the lead in ores, 15 to 35 cents per unit.

For the copper in ores, from \$1 to \$1.30 per unit.

Smelting charges, from \$8 to \$20.

LAKE SUPERIOR, MICH.

The following table shows the prices for season contracts made by some Lake Superior mining companies for the new year, as compared with prices for the two past years, per gross ton:

Kinds of ore.	1883.	1884.	1885.
Republic and Champion	\$7.50	\$6.00	\$5.75
West Republic	7.50	6.25	5.75
Barnum, Cleveland, and Lake Superior specular	6.50	5.75	5.00
Chapin and Menominee	6.00	5.25	4.75
Hematites	4.75	4.50	4.00

The price of Republic and Champion ore has not declined as much this year as the prices of the other ores, but the ores named sold comparatively lower than the others last season.

NEW YORK CITY.

The price of ore and matte is everywhere a matter of negotiation, so that it is impossible to quote exact prices. Many works quote a price and then make deductions for smelting charges, etc., etc.; but if we bring the price down to a net figure for the ore and mattes poor in silver and gold that are treated by such works as the Orford, we should quote for ore delivered at works 90 per cent of the market value of the gold and silver, and about 5 cents a pound for the fine copper—no deductions of any kind.

SILVER CITY, NEW MEXICO.

From 90 to 95 per cent of the assay value for gold

or silver will be paid for ores, deducting first from \$12 to \$17 for smelting charges. Copper will be paid for at the rate of 75 cent per unit.

FINANCIAL.

Mining Stocks.

NEW YORK, Friday Evening, April 10.

The warlike disposition shown by our friends across the sea during the past few days, has brought us an improvement of business in various branches, and it is not unlikely that this will still more increase if war is declared. The mining market has felt the influence of this improvement; a better feeling has existed, the dealings have been larger, and the prices higher in almost all instances.

The boom in the Comstock shares has been the main feature. Sutro Tunnel, as usual, took the lead as far as transactions are concerned; they amounted to 92,400 shares; the price, in consequence of the large business, assumed an upward tendency, and ranged from 15@23c., closing at 18c. Consolidated California & Virginia followed with sales of 17,312 shares, and higher prices at from 59c.@\$1, closing at 85c. The principal interest, however, was centered in Hale & Norcross. Explorations are carried on actively at this mine, and the excitement on the west coast runs high in regard to the developments making. The dealings in the stock have been small, amounting to only 500 shares; the prices have been higher, running from \$7@10.50. At San Francisco, they were still higher. Our closing quotations last week showed \$6.37½; this week, \$10.37½; an advance of \$4 a share. It is probable that the stock may go still higher, as the manipulators in San Francisco, no doubt, have great experience in managing affairs of this kind. Savage, the neighbor of Hale & Norcross, has been influenced by its rise. The stock here advanced from \$3.50@86, closing at \$5.50. At San Francisco, during the same period, it was quoted at from \$2.87½@5.12½; but 870 shares changed hands. Sierra Nevada shows larger dealings and an advance of 75 cents a share; it opened at 85c., and closed at \$1.30, going during the week as high as \$1.60. Mexican ruled at from 80c.@1.23, with sales of 400 shares. Potosi, from \$1.25@1.75; sales, 600 shares. The other Comstocks were dull. Eureka Consolidated remains firm at from \$4.60@4.75. Official advices state that the company has now 2000 tons of good ore on the dumps. The Tuscarora stocks have been quiet.

The latest advices from the Standard Consolidated mine are, that work was resumed three days after it was closed down, and that rich ore is now produced from a four-inch vein; the output is to be increased, and the mill is to start up as soon as enough ore has been accumulated. The stock declined during the week from \$1.25@95c., closing at \$1; the transactions amounted to 2400 shares. Consolidated Pacific ranged from 45@53c., with sales of 4600 shares. Bulwer at from 35@42c.; sales, 2000 shares. Bodie was quiet; only 100 shares were sold at \$1.75. Plymouth Consolidated shows a large business; the price, ex dividend, ranged from \$16.13@16.25, and from \$16.63@17; the dealings show 2001 shares.

The usual amount of business has been done by Horn-Silver; the price has been steady at from \$2.15@2.40, with sales of 4800 shares. The smelter has closed down, and only development-work is done at the mine by a small force of men. Stormont has loomed up again, and shows that it is not out of existence; the sales amounted to 900 shares, at from 10@14c.

Although the reports from the prominent Colorado mines are good, as will be seen in another column, there is but little interest manifested in their stocks, and the transactions this week show small sales and low prices. The dividends that may be looked for from this quarter, in the near future, will no doubt change this situation.

Silver King, Alice, Central Arizona, and others remain as usual.

The dealings this week have amounted to 146,858 shares, and, as compared with the transactions of the preceding week, show an increase of 102,019 shares. A complete summary of the market will be found elsewhere.

The members of the old New York Petroleum Exchange will vacate their rooms in the Welles Building May 1st, after which they will transact business with the Consolidated Stock and Petroleum Board.

Coal Stocks.

Until yesterday, when the indications of war between England and Russia became very marked, the business in all kinds of stocks and bonds was more quiet than it has been for some time, and all values tended downward. Yesterday, however, a strong upward movement set in, which was followed by a slight reaction to-day, not because the war rumors were any less threatening, but because no more actual conflicts of the forces were announced. Furthermore, there is a strong difference of opinion as to what the immediate influence of war would be upon our markets. That ultimately there would be a very large demand upon us for provisions and supplies is not denied; but there is a fear that the issuing of large loans for war purposes at tempting figures would bring about a large sale of American securities now held abroad, and probably such a shipment of gold from this country as temporarily to put us upon a silver basis, although ultimately we should receive back more gold than we should ship, especially as the balance of trade is already largely in our favor.

Chesapeake & Ohio Railroad stock has been very quiet and weak, selling down to \$3 and recovering to \$4. It is supposed that the company will not be able to meet all of its interest charges on May 1st. These have been constantly increasing under the reorganization programme created some years since.

Although the anthracite coal trade has had a weakening tendency, the anthracite coal stocks have been held very firm by the pools. Delaware & Hudson sold down to \$77½ on Wednesday, and up to \$80½ yesterday, reaching \$79½ to-day. The sales of Lackawanna for the week amount to but a good day's business when the stock is not under pool manipulation. It is well understood that this stock is practically cornered by a pool operated by S. V. White, and there is a disinclination to operate in it, the bulls looking upon it as too high, and the bears being afraid to short it, owing to the punishment they have received in all similar efforts for a long time past. Central of New Jersey has been active and irregular, according to the reports at the time. At one time, Baltimore & Ohio was purchasing the stock for a control; at another time, it was the Pennsylvania Railroad purchasing. Then the probable action of the Court upon the request of the Reading Receivers for permission to pay the Jersey Central interest, due April 1st, was bet upon. To-day, Judge McKennan authorized the Reading receivers to pay the interest, provided the operations of the Jersey Central left a net profit from which to pay. On November 30th, 1884, the net loss was over \$800,000 for the eighteen months that the Reading Company had possession. It is well known that the first four months of the fiscal year are always unprofitable, while, under the small business and lower prices this year, there has been no possible chance of making up the deficiency that existed on November 30th. It is, therefore, evident that the Jersey Central bondholders will have to go without their interest unless the ingenious Reading bookkeeper comes to their assistance and shows an unexpected profit.

MEETINGS.

The annual meetings of the following companies for the election of trustees and the transaction of business will be held at the times mentioned:

Delaware & Hudson Canal Company, No. 21 Cortlandt street, New York City, May 12th, from twelve o'clock M. to two o'clock P.M.

Glendon Iron Company, No. 18 Post-Office Square, Boston, Mass., May 6th, at eleven o'clock A.M.

Illinois Silver Mining and Milling Company, Nos. 82 and 84 Dey street, New York City, May 5th, from twelve o'clock M. to one o'clock P.M.

Little Pittsburg Mining Company, of Colorado, No. 45 William street, Room 22, New York City, May 1st.

Lykens Valley Railroad and Coal Company, office of E. F. Hoffman, transfer-agent of the company, No. 113 Chestnut street, Philadelphia, Pa., May 4th, at one o'clock P.M.

Sampson Silver Mining Company, No. 231 East Temple street, Salt Lake City, Utah, May 4th, at one o'clock P.M.

Terrible Mining Company, office Adams & McHarg, No. 33 Wall street, New York City, May 4th, from twelve o'clock M. to one o'clock P.M.

DIVIDENDS.

Granite Mountain Mining Company, of Montana, has declared a dividend of \$60,000—not \$30,000, as was reported in our last number.

Valencia Mica Company, of New Hampshire, has declared a quarterly dividend of \$2.50 a share, payable April 15th.

PIPE LINE CERTIFICATES.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report that prices during the past week have fluctuated between 80% and 77%. The production of Thorn Creek has been increasing, which in a measure accounts for the weakness as compared with the preceding fortnight. The war news on Thursday stimulated some buying, but prices did not hold, and opinions are divided as to the result on oil of actual war. Russia does not export much, and consequently is not a competitor of the American article in the European markets. It does not appear probable that war would increase the general consumption, and ocean freight rates have already advanced; and this will tend to check shipments. The general feeling in speculative markets would, doubtless, be improved by a foreign war. Advance figures of Pipe Line Company show a decrease of stocks during March of 146,000 barrels.

The following table gives the sales and quotations at the Consolidated Stock and Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
April 4	\$0.80 1/4	\$0.80 3/4	\$0.78 3/4	\$0.78 3/4	1,736,000
6	.78 3/4	.78 3/4	.77 3/4	.78	3,649,000
7	.78	.78 3/4	.77 3/4	.78 3/4	2,703,000
8	.78	.78	.77 3/4	.77 3/4	2,880,000
9	.78	.79 3/4	.77 3/4	.78 1/4	4,577,000
10	.77 3/4	.78 3/4	.77 3/4	.77 3/4	2,033,000
Total sales					18,578,000

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

NAME OF COMPANY.	CLOSING QUOTATIONS.					
	April 3.	April 4.	April 6.	April 7.	April 8.	April 9.
Albion						
Alpha						
Alta	.30	.35	.30	.35	.50	.45
Argenta						
Bechtel						
Belcher	.90		.85	1.12 1/2	1.62 1/2	1.12 1/2
Belle Isle						
Best & Belcher	1.75	1.75	1.62 1/2	1.50	2.12 1/2	2.37 1/2
Bodie	2.00	2.00	1.62 1/2	1.62 1/2	1.62 1/2	1.62 1/2
Bullion						
Bulwer						
Chollar	2.25	2.50	2.75	2.87 1/2	3.87 1/2	3.75
Con. Pacific						
Con. Cal & Va.	.65	.65	.65	.70	.95	1.00
Crown Point	1.00	1.12 1/2	1.12 1/2	1.12 1/2	1.75	1.75
Day						
Elko Cons						
Eureka Cons.		4.25	4.62 1/2	4.50	4.50	
Eschquer						
Gould & Curry	1.75	1.62 1/2	1.50	1.50	2.00	2.00
Grand Prize						
Hale & Norcross	6.87 1/2	6.87 1/2	7.25	7.75	10.50	10.38
Independence						
Martin White			.60			.60
Mexican	.80	.75	.75	.70	1.00	1.37 1/2
Mono						
Mount Diablo			4.00	4.00		
Navajo	1.00		1.12 1/2	1.00	1.00	1.37 1/2
Northern Belle						
North Belle Isle						
Ophir	.70	.70	.75	.70	1.12 1/2	1.50
Overman						
Fotosi	1.00	1.00	1.25	1.37 1/2	1.75	1.62 1/2
Savage	3.00	3.12 1/2	3.37 1/2	3.37 1/2	5.00	5.12 1/2
Scorpion						
Sierra Nevada	.85	.85	.90	.90	1.00	1.50
Silver King						
Tip-Top						
Union Cons.	.75	.85	.75	.75	.90	1.25
Utah	.55		.70	1.12 1/2	1.25	1.75
Wales Cons.						
Yellow Jacket	2.00		1.75	1.87 1/2	2.25	2.37 1/2

Boston Copper and Silver Stocks.
BOSTON, April 9.

[From our Special Correspondent.]

The market for copper stocks the past week has been very dull and stupid. The occurrence of two holidays had a tendency to make matters still worse, and the recorded transactions are the smallest for a long time past. The principal dealing has been in Calumet & Hecla, and, although the sales have been light, there is a firm undertone to the price, and the stock is in good demand at an advance of \$1 1/2 over closing sale of last week, quotations being \$161 @ \$161 1/2. The production for March is reported as about 2400 tons. We note a slightly firmer tone to ingot copper, and this fact accounts in some degree for the advance in the stock. In the event of war between England and Russia, we shall no doubt see much higher prices for both ingot copper and the stock of the large producing mines. A few shares of Osceola sold at \$8 1/2 @ \$8 1/4.

The rest of the list was entirely neglected. Quincy has been offered freely at \$29, but no one seems to want it at that figure, the best bid being \$27, and no sales. Franklin, \$5 1/2 bid, \$6 asked. Atlantic, \$6 bid, \$7 asked. We hope to see a better market for these stocks in the near future, as these prices look cheap for mines that are on a dividend-paying basis.

In silver stocks, there is no special feature, and the market is dull and lifeless. Bowman Silver lost its advance of last week, and sold down to 19 @ 20c., with plenty of stock offering at 17 @ 18c., sellers' option. Dunkin and Catalpa both steady at 18 @ 20c. Consolidated Pacific dull at 35c. bid, 60c. asked.

Miscellaneous stocks dull. American Electric and Illuminating Company common sold at \$1, which is also bid; preferred stock, \$5 @ \$5 1/2. Water-meters steady at 20c. bid, for both New England and Standard.

3 P.M.—The war news had its effect upon the market this afternoon, and Calumet & Hecla advanced to \$165, with sales of sixty shares at that price, closing \$163 bid, \$165 asked. Franklin sold at \$5 1/2 (300 shares), with same bid, \$6 asked. Osceola, \$8 1/4 bid, \$8 1/2 asked. Quincy still offered at \$29, but the bid was advanced to \$28, and no sales. We look for higher prices next week.

BULLION MARKET.

NEW YORK, Friday Evening, April 10.

DATE.	LONDON.		DATE.	N. Y.	
	Fence.	Cents.		Fence.	Cents.
April 4	49	106 3/4	April 8	48 3/4	106 1/2
6	49	106 3/4	9	48 3/4	106 1/2
7	48 3/4	106 3/4	10	48 15-16	106 3/4

The Director of the Mint has fixed the value of the Shanghai tael for custom-house purposes at \$1.17 1/2, against a former valuation of \$1.21 1/2.

Silver for Coinage Purposes.—The Treasury Department, April 9th, purchased 400,000 ounces of silver for delivery at the New Orleans and Philadelphia mints.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains at 3 1/2 per cent. During the week, the bank lost £368,286 bullion; but the proportion of its reserve to its liabilities was raised from 44 1/8 to 47, against 45 1/4 per cent at this date last year.

METALS.

NEW YORK, Friday Evening, April 10.

The Board of Managers of the Metal Exchange, on April 8th, adopted some important amendments to the trade rules, reducing the size of contracts and original margins. The minimum quantities to be dealt in will now be 100 tons of iron, value \$1700; five tons of tin, value \$2000; 200 boxes of tin plate, value \$900; and 12,500 pounds of copper, value \$1250. The margin to be deposited on each contract for iron will be \$200; tin, \$75; tin plate, \$50; and copper \$75. Mr. F. L. Lehmann, of Naylor & Co., has been elected to fill a vacancy in the Board.

Copper.—This metal continues the most notable of the market. This market has been within a day or two quite firm, and is advancing.

We quote Lake 10 65c. offered, 10 80c. asked. At even the highest of these figures, probably not more than 100,000 pounds could be bought, while bids have been made at 10 65c. without takers. Orford is firm at 10 50 @ 10 75c.; Baltimore, 10 1/2c.

The trustees of Pope, Cole & Co. have made a proposition to pay eighty cents on the dollar of the \$500,000 unsecured liabilities, of which \$100,000 is to be paid in cash, and the remainder on time. The assets are larger, and there is a probability a settlement will be made on that basis. We are informed these copper works will resume full work May 1st.

The Russian orders, which amount to from 10,000 to 15,000 tons each spring, are placed on the opening of the Baltic. We expect at least a portion of them here, for we can ship as cheaply to the German ports, through which it will have to go in case of war, as to England.

Chili Bars have again "beat the record," and this morning were quoted in London £44 2s. 6d. This evening, however, they had recovered to £44 7s. 6d. During the week, £44 15s. on the 9th; £45 2s. 6d. on the 8th; £45 7s. 6d. on the 7th and 6th.

The continued low prices are closing the mines in

Australia and in this country, and will probably cause such a number to close as will affect the market. Officers of the Wallaroo Company announcing a general reduction in wages and expenses at their mines, state that the company has been running without profit for the past nine years, and that the company must largely reduce cost or stop altogether. There should be no hesitation as to what to do in the case of a company that has made no profit in nine years. Many of the other mines in the Wallaroo District are also closing, or have already stopped.

The decline in price has closed, or is about to close the following of our Lake Superior mines. We give the amount of copper produced by each last year:

Osceola (will close in May)	4,247,630 lbs.
Allouez	1,920,000 "
Pewabic (legal complications)	227,834 "
Conglomerate	1,152,224 "
Hancock	562,636 "
Mass.	481,306 "
Phoenix	572,427 "
Ridge	74,030 "
St. Clair	175,619 "
Wolverine	751,763 "
Peninsula	1,237,700 "

Total..... 11,389,259 lbs.

This was last year about one sixth of the Lake output. This year, of the remaining mines, only the Calumet & Hecla will increase output to any extent. That it will make up this deficiency is scarcely probable.

There were exported during the week 430,194 pounds of copper, 1,746,000 pounds of copper matte, and 998,900 pounds of copper ore.

Tin.—The following transactions at the Metal Exchange during the week: April 9th, 10 tons, April, 17 35c.; 10 tons, March, 17 25c.; 20 tons, April, 17 35c.; April 10th, 10 tons, April, 17 30c.

The market is without interest. London cables today, £77 15s. spot; £78 10s. three months. The imports for the week were: Of tin, 454,616 pounds; of tin plates, 68,949 boxes.

We quote tin 17 30 @ 17 35c., and tin plates dull and nominal, 4 37 1/2 asked.

Lead.—This market is quiet to the point of stagnation. A couple of hundred tons sold in the early part of the week at 3 60c.; but corrodors have the impression that even this price can not be maintained, and, as they are making no money, they buy only for immediate necessities. We quote 3 55 @ 3 60c.

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

In sympathy with other markets, an increasing dullness has characterized our lead market. There has been a weak feeling all around, carrying down the prices to 3 37 1/2c. for Hard lead, 3 42 1/2c. for Soft Missouri lead; Desilverized not obtainable below 3 50c. Sales only of retail character.

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

The market is featureless and dull, and prices are unchanged. Demand is only moderate, and but very little doing. Business has been quiet, and of a limited character, with quotations at 3 42 1/2c.

Spelter.—This is dull and nominal at 4 25c. for Domestic, and 4 1/2c. for Foreign. The imports during the week were 10,932 pounds.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 10.

American Pig.—The pig-iron market is in a dull and unchanged condition, with prices as we have quoted for some time past. No. 1 X Foundry, \$18; No. 2 X, \$17; Gray Forge, \$16, good Lehigh brands, with 50c. to \$1 more than these prices for special brands, and 50c. to \$1 less than these figures for poorer brands. The advices from other parts of the country also report the market as extremely dull. A number of furnaces have blown out since the beginning of the year to such an extent that the present estimated weekly capacity of all the furnaces now in blast is about 7000 tons a week of charcoal iron; 20,000 tons a week of anthracite iron; 45,000 tons a week of coke iron.

The capacity of the furnaces in blast and out is about as follows: Charcoal, 30 per cent in; 70 per cent out. Anthracite, 40 per cent in; 60 per cent out. Coke, 45 per cent in, and 55 per cent out. Average, 42 per cent in, and 58 per cent out.

These figures show a great reduction in our make of pig-iron, as compared with that of a year ago, and even as compared with our make at the commencement of the present year.

Scotch Pig.—There is no change in price of this

article, but the imports recently have been somewhat larger. During the past week, they have amounted to 734 tons. Prices vary according to brand, from \$18 for Eglinton to \$21 for Coltness. The cable quotations are very steady at 42s. 6d. to 53s. for these brands respectively, and the usual variations for others. The Scotch furnaces are all losing money, and several are going out of blast. Two Coltness, two Calder, one Govan, one Dalmellington furnace have blown out.

Spiegel.—The imports during the week have amounted to 1619 tons. Prices remain unchanged at \$25.50@26.

Steel Rails.—These are still dull, and quotations remain at \$26@27—a figure at which most of the mills are losing money. Some of the companies are practically out of the market, saying they will not sell below \$28. We hear of sales at \$26 and \$27.

Philadelphia. April 9.

[From our Special Correspondent.]

Pig-Iron.—Sales since writing of last report have been confined chiefly to car-load lots. There is a surprising indifference among founders to the importance of carrying reasonable stocks. One company resolved to take three months' orders at about cost price for a good iron, and made offers to old customers for suitable future deliveries, but could not find buyers. Consumers will run no risks, as they say, but in truth they are or soon will be running risks they do not count on. Foundry irons particularly are hard to move. One sale of Standard No. 1 was closed on Monday at \$17.50. Some few brands can not be had under \$18.50. Specials are all well in hand. Cheap irons are neglected. Forge irons are freely offered at \$14.50@16. The market has not been much troubled with Southern irons of late.

Bessemer Iron.—Two or three arrivals have taken place, and some is on the water. Quotations, \$18.50@19.50. American is selling well.

Scotch Iron.—Several small sales for mixing were made yesterday and to-day.

Muck-Bars.—One or two makers are holding a rather superior article of Muck-Bar at \$28.

Blooms.—The manufacturers of anthracite blooms report a very sluggish demand.

Manufactured Iron.—The aggregate makes a fair showing in city mills up to to-day. Building operations have begun. Shipments have started. Things are moving better. Prospects are fair. Actual transactions are still light. Nearly every thing done is between \$1.50 and \$1.80, yet business is to be found under and beyond these extremes. Blacksmith shop trade is picking up. Medium iron runs at \$1.60@1.65. Refined is firm at \$1.70@1.80. Our local manufacturers will not make more than they can sell.

Nails.—The manufacturers have a good stock of orders on hand. None is short. Some large consumers have been holding back under the notion that prices would of necessity weaken. A few exceptional sales at low prices strengthened their suspicion, but the market may be considered strong at about card rates. In fact, the retail business suits the manufacturers better than in car-load and larger lots, because better rates are paid for small than large lots.

Plate and Tank-Iron.—There is a larger consumption than during the winter months, but every thing is done in a retail way, and the manufacturers therefore find fault. Plate averages \$2.@2.10; Shell iron, \$2.40. The locomotive-works are taking very little material. One New Jersey and one New York locomotive-works have booked good orders, and some other concerns have gathered up some fair business, aggregating nearly one hundred in all. The car-works and ship-yards are very indifferent buyers.

Structural Iron.—One foreign inquiry for some 6000 tons is on the market, and several manufacturers will bid on it. The demand for domestic purposes is light but regular at 2@2.10c. for Angles, 2½c. for Tees, and 3c. for Beams and Channels.

Sheet-Iron.—Manufacturers report better business with finer weather, and firmer quotations on small orders, though no advance has been or will be made.

Wrought Pipes.—An occasional large order is booked, but the run of business is on small orders, although, as in nails, better figures are secured. The discounts continue as they have been. The present week brought to a termination a half-dozen negotiations that will go far to stimulate confidence. Cast pipe makers are also closing important contracts.

Steel.—Merchant steel is active. Slab steel is becoming an important product. Quotation, \$32, delivered.

Steel Rails.—More business has been secured than reported. The Pennsylvania mills have had inquiries, and one of them offers at less than \$26; one an offer at mill figures, but payment in bonds. Buyers imagine it is far-seeing wisdom to higgie and delay. Small lots are \$27.50@28. Makers admit there is a good deal more business hanging around the market than is secured.

Old Rails.—Small sales continue to be the order of the day at \$18@18.50 interior delivery. The small supplies enable holders to exact about their own terms.

Scrap.—Selected, \$19; No. 1, \$18; No. 2, \$17; Cargo, \$16; Machinery, \$14; Cast, \$8@10. Demand good for Selected and No. 1.

Ores.—Ores vary from 7½ to 8½ per unit. Nothing can be done at present, owing to the general expectation among shipping interests abroad of a demand for transport services. When they name prices, they are out of all reason, but generally they will not listen to offers for carrying ore. Besides, it is entirely too early for business, but the uncertainty as to foreign wars and the consequent need of shipping, which would advance freights this way, postpone negotiations. Fortunately the demand for ores is not particularly urgent at this time.

Pittsburg. April 10.

The iron market is duller than for a long time past, and prospects for business in pig this week are not very bright, most of the sales having been already closed for car-load lots only. The fact is, the unsettled condition of mining and labor generally have demoralized trade in every department. The outlook among the iron manufacturers is not very encouraging, and among the men the uneasiness regarding the future is even more marked, a serious apprehension being felt that their demand for the present scale will not be conceded. The wire men have had a meeting, at which nothing important was done, and will hold another in two weeks. By the new producing process introduced at Carnegie Union mill, over 50 puddlers have been thrown out of employment. Schoenberger, Blair & Co. will erect a 5-ton converter for their nail mill, and it is rumored that Charles Cook & Co. will do the same. Schoenberger's old mill resumed work 9th. Four steel barges, built by Caswell & Co. for Captain Eads, are completed.

The Metal Exchange in New York has received the following report to-day :

Sales :

1000 tons Gray Forge Lake ore.....	\$15.50 4 mos.
150 " " " " " " " " " " " "	17.50 "
100 " Bessemer " " " " " " " " " "	18.00 4 mos.
100 " Foundry No. 1 " " " " " " " " " "	17.50 "
500 " Gray Forge Native ore.....	15.25 "
50 " " " " " " " " " " " "	15.50 cash.
100 " Foundry No. 1 " " " " " " " " " "	17.00 "
50 " " No. 2 " " " " " " " " " "	16.50 "
50 " Mottled " " " " " " " " " "	15.00 "
100 " Foundry No. 1 Charcoal.....	23.00 "
100 " Cold-blast Charcoal.....	26.00 "

Louisville. April 9.

[Reported by GEORGE H. HULL & Co.]

The market for pig-iron in the last week has been quiet with very few sales. This condition seems to result from buyers having all they need for immediate use and not from any want of confidence in prices. Stocks at furnaces are light, and there seems to be no immediate prospect of a change, though, if the present dullness should continue for two or three months, as against the additional amount of iron produced, it would be very apt to have its effect upon the market. We hear of large sales and better demand from St. Louis and vicinity, but the market here is not as good as one month ago.

We quote for cash in round lots as below :

PIG-IRON.

Southern Coke, No. 1, Foundry.....	\$16.50@17.50
" " " " " " " " " " " "	15.50@16.50
Hanging Rock Coke, No. 1, Foundry.....	16.00@17.00
" " " " " " " " " " " "	21.00@21.50
Southern Charcoal, No. 1, Foundry.....	18.00@19.00
Silver Gray, different grades.....	14.00@15.25
Southern Coke, No. 1 Mill, Neutral.....	13.75@14.25
" " " " " " " " " " " "	13.25@13.50
" " " " " " " " " " " "	13.25@13.50
" " " " " " " " " " " "	12.00@13.00
White and Mottled, different grades.....	12.00@13.00
Southern Car-Wheel, Standard Brands.....	25.00@26.00
" " " " " " " " " " " "	20.00@22.00
Hanging Rock, Cold-Blast.....	24.00@25.00
" " " " " " " " " " " "	20.00@21.00

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 10.

Anthracite.

The production of anthracite for the week ended April 4th was 433,917 tons, and from January 1st, 5,422,214 tons, as compared with 756,881 tons and 6,128,591 tons in the corresponding periods last year. This shows a decrease for the year of 706,377 tons.

The quota agreed upon by the coal companies, aggregating 30,000,000 gross tons, was distributed as follows :

Jan.	May.	Sept.
Feb. 1,500,000	June.	Oct.
March 1,800,000	July.	Nov.
April. 2,400,000	Aug.	Dec.

The several circular-price lists that we gave last week we summarize in the following table :

QUOTATIONS FOR ANTHRACITE PER TON OF 2240 POUNDS.
F. o. b. at Tide-water Shipping Ports.

LOCALITIES.	Lump.	Broken.	Egg.	Stove.	Chestnut.	Pea.
	\$	\$	\$	\$	\$	\$
At Hoboken.						
Scranton.....	3.40	3.40	3.40	4.00	3.75	2.65
Kingston.....	3.40	3.40	3.40	4.00	3.75	2.65
Pittston at Newburg....	3.45	3.35	3.35	3.90	3.70	2.60
Lackawanna at net.....	3.25	3.25	3.25	3.85	3.60	2.65
At Port Johnson.						
Wilkes-Barre.....	3.40	3.40	3.40	4.00	3.75	2.65
Honey Brook.....	4.80	3.65	3.65	4.00	3.65	.....
Plymouth R. A.....	.....	3.65	3.65	5.00	4.00	.....
Upper Lehigh.....	.....	3.75	3.75	4.20	3.90	2.70
Old Comp'y Lehigh.....	4.80	3.85	3.85	4.10	3.80	.....
At Elizabethport, N. J.						
Hard white-ash.....	4.25	3.50	3.50	4.10	3.65	2.55
Free-burning W. A.....	.....	3.40	3.40	4.10	3.65	2.45
North Franklin W. A.....	.....	4.10	4.10	3.65	2.45	.....
Schuylkill R. A.....	.....	3.85	4.50	3.85	2.45	.....
Shamokin W. A.....	.....	3.65	4.45	3.75	2.45	.....
Shamo in R. A.....	.....	4.25	4.75	3.85	2.45	.....
Lorberry.....	.....	4.25	4.75	3.85	2.45	.....
Lykens Valley.....	5.25	5.50	5.75	5.50	.....	.....
At Port Richmond.						
Hard white-ash.....	4.00	3.15	3.15	3.85	3.40	2.30
Free-burning W. A.....	.....	3.00	3.00	3.85	3.40	2.20
North Franklin W. A.....	.....	3.85	3.85	3.40	2.20	.....
Schuylkill red-ash.....	.....	3.50	4.15	3.50	2.20	.....
Shamokin white-ash.....	.....	3.60	4.10	3.40	2.20	.....
Shamokin red-ash.....	.....	3.90	4.40	3.50	2.20	.....
Lorberry.....	.....	3.90	4.40	3.50	2.20	.....
Lykens Valley.....	4.90	5.15	5.40	5.15	.....	.....

As we then stated, the actual prices for free-burning coals were not those quoted, but the so-called net prices of the Delaware & Hudson Canal Company. There is scarcely any effort made this week to conceal this fact, and we may therefore quote the following as about the selling prices of FREE-BURNING COALS f. o. b. at shipping ports :

Lump, Steamer.....	Chestnut.....	\$3.50@3.75
Grate, and Egg, \$3.15@3.30	Pea.....	2.25@2.50
Stove.....	Buckwheat.....	1.85@2.20

These prices are from 15 to 30 cents a ton below the recent "lists," and are perhaps from 30 to 50 cents below average opening prices last year. This will represent from \$10,000,000 to \$15,000,000 smaller receipts for the whole year, should the same difference be maintained throughout the year.

But the entire profits on anthracite mining last year did not amount to this sum, and, as a rule, wages and the other items of cost of production remain practically unchanged. Where will the dividends come from this year? or in which items will cost be reduced?

Yet, at an average net selling price of from \$3 to \$3.25 per ton, there is a fair profit on the necessary investment for doing the business.

The Delaware, Lackawanna & Western Railroad freights from the mines to New York are \$1.70 per ton this month. From this it is said the average price received for coal by this company in March was \$3.40 per ton.

The condition of the market is unchanged. Stove and chestnut sizes are in fair demand, the manufacturing sizes very quiet, and new orders scarce, buyers and even some sellers believing that prices can not be advanced from present quotations. So there is no inducement to lay in stock.

The demand for blast-furnace fuel is much less than at this time last year, the demand being now about 22 per cent less for anthracite furnaces than it was then—and unfortunately there is as yet no improvement apparent or much even probable for some time to come in this industry. Whatever improvement has come has been in the direction of coke iron, while the anthracite and charcoal iron production diminishes

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.	NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	April 4.		April 6.		April 7.		April 8.		April 9.		April 10.				April 4.	April 6.	April 7.	April 8.	April 9.	April 10.							
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.									H.	L.	H.	L.			
Alice, Mon.					1.85	1.80	1.75		1.75		1.85	1.80	800	Albion													500
Amie Con., Co.	.05	.03			.04				.04				1,800	Alta													
Argenta														Barcelona, G.										.60	.50	500	
Bassick, Co.														Bechtel Con., G.													
Belle Isle, Ne.														Belvidere													
Bodie Cons., Co.														Best & Fitcher, G. S.										2.40	2.35	300	
Breece, Co.														Big Pittsburg, S. L.													
Bulwer, Ca.		.38	.35					.39	.35	.42	.37		2,000	Bradshaw, S. L.													
California, Ne.														Bull-Domingo, S. L.													
Cal. & Hecla, Mich.														Jal., B. H., G.									1.60			153	
Castle Creek														Central Ariz., S.								.16	.13	.19	.18	1,000	
Chollar					3.00	2.95							300	Climax, Co.													
Chrysolite, Co.														Colorado Central										1.15	1.10	1,300	
Cons. Cal. & Va., Ne.	.05	.09	.60	.59	.62	.59	.66	.64	.97	.77	1.00	.85	17,312	Cons. Imperial													
Crown Point											1.60	1.50	400	Con. Pacific	.50	.45	.50		.50		.52	.40	.52	.51	4,000		
Dunkin, Co.					4.75						4.75	4.60	350	Dahlonega													
Eureka Cons., Ne.														Decatur													
Father de Smet, Dk.														Durango, G.													
Findley, Ga.														Eastern Oregon													
Gold Stripe, Ca.														Goodshaw, G.													
Gould & Curry, Ne.														Harlem M. & M. Co.													
Grand Prize, Ne.														Hortense, S.													
Green Mountain, Ca.														Kosuth													
Hale & Norcross, Ne.	7.63				7.63	7.00					10.50	10.38	500	Lacrosse, G.									.07		200		
Hall-Anderson, N. S.														Mariposa, Pref., G.									.09		2,200		
Homestake, Dk.					2.20	2.15	2.20		2.40	2.20	2.35	2.20	4,800	Com., G.													
Horn-Silver, Ut.			2.29											Mexican, G. S.		.80		.90	.85							400	
Independence, Ne.														Mono													
Iron Silver, Co.	1.10		1.10	1.05										New Pittsburg													
Leadville C., Co.								.35	.33					Nooday													
Little Chief, Co.					.25						.34			North Standard, G.													
Little Pittsburg, Co.														N. Horn-Silver, S. L.													
Martin White, Ne.					.80	.75			.80	.75			500	Orin't'l & Miller, S.	.10											1,200	
Navajo, Ne.					1.10								500	Rappahannock, G.									.10	.11	500		
Northern Belle														Red Elephant, S.													
North Belle Isle, Ne.														Ruby, of Arizona													
Ontario, Ut.														Silver Cliff, S.													
Ophir					.85								200	Sonora Con.													
Plymouth	16.75	16.63	17.00	16.75	16.25	16.13	16.25	16.13	16.38	16.25	16.38	2,001	South Bodie, G.														
Quicksilver Pref., Ca.					1.30	1.25			1.75	1.70			600	South Bulwer, G.													
Com., Ca.					4.25									South Elite													
Robinson Cons., Co.														South Pacific													
Savage, Ne.					3.75	3.50			6.00	5.63	5.50	870		State Line, 1 & 2, S.													
Sierra Nevada, Ne.	.92	.85					1.00		1.25	1.05	1.00	1,950		" Nos. 2 & 3, S.													
Silver King, Ar.			2.90		2.95				2.90	2.65	2.50	900		Sutro Tunnel	.19	.15	.18	.16	.19	.17	.20	.19	.23	.21	.21	92,400	
Spring Valley, Ca.									1.05	.95	1.00		2,400	Taylor Plumas													
Standard, Ca.			1.25	1.00	1.20				1.14	.10			900	Tioga													
Stromont, Ut.														Union Cons., G. S.	.80	.70			.85				1.00	.92	900		
Tip Top, Ar.											2.25		100														
Yellow Jacket																											

Tables giving dividends and assessments will be printed the first week of each month. Dividend shares sold, 41,208. Non-dividend shares sold, 1,5850.

and the trade does not improve. Those who control the anthracite trade must bear these facts in mind, and count on the fact that furnace and manufacturing coals must permanently remain at so low a figure that the profits on them will come only from increased production.

Messrs. Stickney & Conyngham are said to have taken the Staten Island ferry contract, 17,000 tons of egg and 3000 tons of pea—with it, it is assumed, Pennsylvania Railroad coal.

The receipts at Port Richmond last week were 22,000 tons, and shipments 31,000 tons. Receipts at Elizabethport 15,500 tons, and shipments 19,000 tons.

Freights are low, about \$1 from New York to Boston and Sound ports, and only 10@15 cents higher from Philadelphia. The Reading coal will naturally be shipped there.

Reading railroad and canal tolls for this year are understood to be on the basis of 38 per cent of the net price obtained f. o. b. at Port Richmond, and 43½ per cent. at Elizabethport, with a fixed minimum. There are said to be no changes in the percentages from last year's figures; but there is no minimum fixed except for pea, buckwheat, and culm, which will pay \$1 per ton tolls to Port Richmond, and \$1.25 to Elizabethport.

A strike is going on in the Hazleton region, and even Coxe Brothers & Co.'s men are out at Drifton. This appears to be due more to the meddling of the Knights of Labor with the matter than from any serious difficulty with the men. A reduction of 10 per cent in wages was recently made by Coxe Brothers, and no doubt will be accepted by the men, whom they have always treated with perfect justice and consideration.

The condition of the market, as reported above, shows that the reduction in wages will probably have to be made general if the companies are to make ends meet.

Proposals will be received until May 6th at the Acting Assistant Quartermaster's Office, U. S. Military Academy, West Point, N. Y., for 1900 tons of hard white ash anthracite coal.

Bituminous.

This branch of the coal trade is dull, but the movement of coals on previous contracts continues actively.

The New York Central contract, to which we have several times referred, was reported to have been closed, but we have reason to believe this information

is premature. The company uses about 850,000 tons a year, and last year it took about 130,000 tons by water. This year, it announces that it will not take any coal by water, shutting out Cumberland or Norfolk & Western coals. No doubt a great part of its order will go to the Beech Creek, Clearfield, or so-called "Vanderbilt coal." The distances from these mines to points on the New York Central lines are as follows:

From the mines to Jersey Shore & Pine Creek Rail-Miles.	
road Junction	75
Jersey Shore Junction to Stokesdale	75
Stokesdale to Geneva	93
Geneva to Lyons	103
Lyons to Albany	103
Albany to New York	142
Total	593

Even wheat at 18 cents per cwt. from Chicago to New York would pay better than carrying coals to New York by this route.

Vanderbilt coals are selling in this harbor at \$2.75@ \$2.80 a ton.

The National Line will contract on the 13th for a year's supply.

The manufacturers are still changing over from anthracite to bituminous coal, and we hear of some bituminous coal having displaced anthracite, with it, is said, very satisfactory results, for domestic use. Probably anthracite will hold its own in this field; but the mere fact that householders have changed with, as they claim, a great saving in expense, is a warning that even the great companies can not ignore. From such small acorns do great oak trees grow.

Freights are favoring the soft coals. From Baltimore to Boston, \$1.25; Philadelphia to Boston, \$1.10@ \$1.15.

Philadelphia. April 9.

[From our Special Correspondent.]

There is not the hurry for coal at tide-water that was expected to take place on resumption and with the ice out of the river. The prices do not seem to be properly equalized between New York and Philadelphia, particularly for stove coal. However, the receipts at tide-water are very light, and the bulk of the coal goes to replenish the empty yards on the line and in the city. What reaches here is loaded in vessels, and there is no accumulation. Stove of all kinds remains very scarce. It is likely that the quota of the Schuylkill region will be filled before the 25th, and by May 1st the stocks at Port Richmond will be as low as if not

lower than on April 1st. The disposition to buy from hand to mouth, if persisted in, will not be felt for several weeks yet. In the mean time, vessels are in excess of the demand, and freights are weak, ruling at present at \$1.10@ \$1.15 to Boston, and corresponding decline to other points East, with no change in Southern rates and no orders at all from that quarter.

Buffalo. April 9.

[From our Special Correspondent.]

On general principles, there is nothing of consequence to report relative to the coal and coke trade. Preparations are, of course, making for the opening of season's business at the wharves, trestles, railroad sidings, etc. Dealers report only a hand-to-mouth distribution, to fill up depleted bins at unchanged quotations. Stocks are light. The weather last night was very cold, but this morning has moderated, with prospects of a warm period.

The bituminous coal tonnage over the Rochester & Pittsburg Railroad for March was about 67,000 tons.

It is reported that Le Roy, New York, is to have a trestle for Lackawanna coal. The Lehigh Valley Company has bought ten acres of land at Lyons, New York, for the purpose of giving additional facilities for its coal trade and the storing of coal cars.

A producer states that, instead of the letting of the Grand Trunk coal contracts being the building up of a monopoly, the price obtained is barely the cost of placing the coal at Suspension Bridge, allowing nothing for taxes, interest, etc., to the railroads.

The residents of this section of New York State and the whole of Canada have enjoyed, since my last letter, another edition of winter; heavy snow and severe frosts alternating—and the coal dealer complacently smiles, rubbing his hands with glee, while *paterfamilias* groans and wrings his with pecuniary sorrow and deep-seated despair, wishing for the advent of spring. Yet Easter has passed, the eggs have been eaten, and the flowers faded!

The middlemen do not like the publication of the price-list for bituminous coal in the newspapers, for this and other markets. "Ten cents per ton is too small a profit," they say, and "We take all the risks."

The last ice item of interest is, that a fisherman of Port Dover, Canada, walked across Lake Erie from

COAL STOCKS.

Quotations of New York stocks are based on the equivalent of \$100. Philadelphia prices are quoted so much per share.

NAME OF COMPANY.	April 4.		April 6.		April 7.		April 8.		April 9.		April 10.		Sales from April 4th to April 10th inclusive.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
	Am Coal Co.												
Cameron Coal													
Col. C & I.													
Ches. & O. RR.	5	4 1/2	5	4 1/2	3		3 1/2				4		450
Consol. Coal													
Cumb. C. & I.													
Del. & H. C.	79 1/2	79	79 1/2	79 1/2	79 1/2	78 1/2	78 1/2	77 3/4	80 1/2	78 1/2	80 1/2	79 1/2	10,682
D. L. & W. RR.	104 3/4	103 1/4	104 1/2	103 1/2	104 1/2	103 3/4	104 1/2	104	106 1/2	104 1/2	106	104 1/2	128,885
Elk Lick Coal Co.													
Lehigh C. & N.	40 1/2	40	40 1/2	40			41 1/2	40 1/2	41 1/2	41			562
Lehigh Valley RR.	58 1/2	58	58 1/2	58 1/2			59	59	59	59			377
Leh. & W. B. C. & I. Co.													
Maryland Coal				7 1/2									100
Montauk Coal													
Morris & Essex	120		120	119 1/2			120						450
New Central Coal													
N. J. C. RR.	33 1/2	33	33 1/2	32 1/2	32 1/2	32	33 1/2	32 1/2	35 1/2	34	34 1/2	34 1/2	38,555
N. Y. & S. Coal													
Penn. Coal													
Penn. RR.	53 1/2	53 1/2	53 1/2	52 1/2			54 1/2	54	54 1/2	54 1/2	54 1/2	54 1/2	2,248
Ph. & R. RR.	15	15	15	14 1/2	14 1/2				15 1/2	15	15 1/2	15	3,689
Spring Mountain Coal													
Westmoreland Coal							60						17

Total sales.
* Of the sales of this stock, 1,599 shares were in Philadelphia and 2,090 in New York.

Long Point to Erie, twenty-eight miles. For three or four miles, the ice was rough; but after that, for fifteen miles out, it was of glassy smoothness and apparently two feet thick. Within ten miles of Erie, the ice was heaved up to the height of forty feet in some places.

The propeller V. H. Ketcham has been chartered by Mr. Andrew Langdon, of this city, to load coal at the Erie docks, in order to allow the vessel to receive it directly from the cars and save stocking. The going rate has been kept quiet.

The prospects for early resumption of navigation have not changed during the week past. Heavy gales generally do more in the spring to break up ice than warm weather; but at present there is too much of the crystal covering on the lakes, preventing heavy seas.

Many boatmen on the Erie Canal are endeavoring to associate together and form a mutual towing company. The prospects for success are good.

There is the usual amount of speculation over opening freight figures on coal. Vessel-owners are asking 70c., and shippers offer 60c. The former say that there are no stocks West, and they will take no lower figures; the latter state that there is no coal here of any account in stock, and vessels will have to leave light if their terms are not acceded to. As a local newspaper says: "The condition of the lakes makes it unnecessary to hurry, but there is usually somebody on one side or the other ready to earn the lasting scorn of his associates by precipitating a rate before navigation opens."

A contract has been made to carry 15,000 tons of coal from Lake Erie ports to Marquette at 60c. a ton. Also for iron ore from Two Harbors, near Duluth, to Lake Erie points, at \$1.20 a ton.

The Northwestern Fuel Company has made a contract with Captain Davidson for the carriage of 75,000 tons of coal (hard or soft) from Lake Erie ports to Lake Superior ports during the coming season of navigation; said coal to be delivered at Marquette, Ashland, Duluth, or Port Arthur, at shipper's option. The rate has been kept private, but rumor says sixty cents per ton. If this is a fact, it is a pretty low figure.

The ice in the upper part of Buffalo River broke up yesterday afternoon, and accumulated at a point about half a mile from its mouth, where it is held fast.

STATISTICS OF COAL PRODUCTION.

Belvidere-Delaware Railroad Report for the week ended April 4th:

	Week.	Year 1885.	Year 1884.
Coal for shipment at Coal Port (Trenton)	880	538	3,649
Coal for shipment at South Amboy	6,818	118,454	143,568
Coal for distribution	16,571	227,829	210,372
Coal for company's use	3,083	60,259	49,637
Total	27,352	407,080	407,226
Increase			
Decrease		140	

Comparative statement of the production of anthracite coal for the week ended April 4th, and year from January 1st:

Tons of 2240 lbs.	1885.		1884.	
	Week.	Year.	Week.	Year.
D. & H. Canal Co.	60,357	700,614	112,865	786,107
D., L. & W. RR. Co.	95,944	965,815	112,048	1,097,801
Penna. Coal Co.	22,200	258,189	37,524	242,277
L. V. RR. Co.	84,498	1,095,176	156,452	1,328,775
Penna. RR.:				
North & West Br. RR.	19,522	271,076	15,987	209,663
S. H. & W. R. RR.	3,727	32,259	2,683	49,548
P. & R. RR. Co.	157,669	2,025,283	306,540	2,300,946
P. & N. Y. RR.	*	73,822	12,782	113,474
Total	433,917	5,422,214	756,881	6,128,591
Increase				
Decrease		706,377		

* Reports not received.

The above table does not include the amount of coal culled and sold at the mines, which is about six per cent of the whole production.

Total same time in 1880..... 5,332,185 tons
" " " 1881..... 6,300,608 "
" " " 1882..... 5,946,195 "
" " " 1883..... 6,774,357 "

The increase in shipments of Cumberland Coal over the Cumberland & Pennsylvania Railroad and branches amounts to 19,193 tons, as compared with the corresponding period of 1884.

Comparative Statement of the Production of Bituminous Coal for the week ended April 4th and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

	1885.		1884.	
	Week.	Year.	Week.	Year.
Cumberland Region, Md. Tons of 2240 lbs.	56,680	529,108	59,896	504,752
Barclay Region, Pa. Barclay RR., tons of 2240 lbs.	*	68,242	5,984	92,653
Broad Top Region, Pa. Huntington & Broad Top RR., tons of 2240 lbs.	3,946	42,233	4,723	51,345
East Broad Top				
Clearfield Region, Pa. Snow Shoe	3,313	56,049	5,798	67,114
Karthauss (Keating)	1,828	41,360		
Tyrene & Clearfield	58,876	806,206	55,052	726,357
Allegheny Region, Pa. Gallitzin & Mountain	7,135	130,142	7,298	113,220
Total Eastern and Northern shipments	131,758	1,673,338	139,751	1,555,441
Pittsburg Region, Pa. West Penn RR.	6,281	69,004	5,380	87,931
Southwest Penn. RR.	2,815	28,255	2,859	40,748
Pennsylvania RR.	144	50,881	5,359	71,101
Westmoreland Region, Pa. Pennsylvania RR.	7,424	244,465	21,764	324,809
Monongahela Region, Pa. Pennsylvania RR.	3,622	49,533	1,975	43,914
Total Western shipments	20,286	442,138	36,337	568,509
Grand total	152,044	2,115,476	176,088	2,123,950
Increase		8,474		

* Reports.
† Considerable gas-coal shipped East, of which no division is made in report.

Comparative Statement of the Transportation of Coke over the Pennsylvania Railroad for the week ended April 4th, and year from January 1st:

Tons of 2,000 pounds.

	1885.		1884.	
	Week.	Year.	Week.	Year.
Gallitzin & Mountain (Allegheny Region)	3,593	48,677	2,471	35,340
West Penn. RR.	1,246	6,245	147	23,634
Southwest Penn. RR.	40,240	483,413	46,172	572,292
Penn. & Westmoreland Region, Pa. RR.	3,474	66,373	4,173	54,014
Monongahela, Penn. RR.	2,150	20,943	2,159	20,174
Pittsburg Region, Pa. RR.				120
Snow Shoe (Clearfield Region)	90	4,016	516	6,924
Total	50,793	629,667	55,638	712,498
Decrease		82,831		

FREIGHTS.

Coastwise Freights.

Per ton of 2240 lbs.

Representing the latest actual charters to April 4th.

Ports.	From Philadelphia.		From Elizabethport, Fort Johnson, South Amboy, Hoboken, and Weehawken.
	From Philadelphia.	From Baltimore.	
Alexandria	.80@.90		
Annapolis			
Albany			
Baltimore	.58		
Bangor			
Bath, Me.	1.00	1.30	1.00
Beverly	1.15		1.10
Boston, Mass.	1.10@1.15	1.25@1.35	1.00
Bristol			
Bridgeport, Conn.		1.20	.55
Brooklyn		1.10	
Buffalo, N. Y.			
Cambridge, Mass.	1.15	1.40	1.00
Cambridgeport	1.15	1.40	1.00
Charleston, S. C.	1.00	1.25	
Charlestown	1.15	1.30	
Chelsea	1.10	1.25	1.00
City Point			1.00
Com. Pt., Mass.		1.40	1.60
E. Boston	1.10@1.15		1.00
East Cambridge	1.15		
E. Greenwich, R. I.			.80
Fall River		1.20	.75
Galveston		2.50	
Gardiner, Me.			
Georgetown, D. C.	.80@.90		
Gloucester	1.25		
Halifax			
Hartford			
Hackensack			
Hudson			
Lynn	1.35		
Marblehead			
Medford			
Millville, N. J.			
Milton			
Newark, N. J.			
New Bedford	1.10	1.25	.85
Newburyport		1.40	1.15
New Haven		1.20	.55
New London		1.20	.70
New Orleans			
New-Berne			
Newport			.75
New York		1.10	
Norfolk, Va.	.60		
Norwich		1.25	.75
Norwalk, Conn.		1.25	.60
Pawtucket		1.25@1.40	
Philadelphia			
Portland, Me.	1.00*	1.25	
Portsmouth, Va.	.60		
Portsmouth, N. H.		1.35	1.15
Providence	1.10	1.15@1.20	.75
Quincy Point			
Richmond, Va.	.70		
Rockland, Me.			
Rockport			
Roxbury, Mass.	1.10		
Saco			
Sag Harbor			
Salem, Mass.	1.15@1.25	1.25	1.00
Saugus			
Savannah		1.50	
Somerset		1.25	
Staten Island			
Trenton			
Troy			
Wareham		1.30	
Washington	.80@.90		
Weymouth			
Williamsburg, N. Y.		1.10	
Wilmington, Del.			
Wilmington, N. C.		1.20	
St. Thomas, W. I.		2.25	
Key West, Fla.			

* And discharging. † And discharging and towing. ‡ 3c. Per bridge extra. § Alongside. ¶ And towing up and down. † And towing. ** Below bridge.
Market firm. Vessels in demand.
BALTIMORE, April 9, 1885. GEORGE W. JONES & CO