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On another page will be found a very interesting and valuable letter upon the cost of producing copper. Our correspondent, who modestly signs himself "Copper," is thoroughly familiar with the subject which he discusses. There is scarcely any one in this country who is more familiar with it, and his views will unquestionably attract much attention. We have several other interesting communications on the same subject which will appear in our next issue, and we invite correspondence from those who are familiar with it, whether from a mining, metallurgical or financial standpoint. The subject is one deserving the most careful attention, and is of interest to a vast number of investors.

OUR highly esteemed contemporary, the *American Machinist*, in a recent issue denounced the ENGINEERING AND MINING JOURNAL for publishing the card of a concern advertising "coupon books." Now, while the advertiser stated in his card that by using his coupons "you can completely control the patronage of your hands at the store," as a matter of fact it does nothing of the kind. The coupons are simply a convenient form of store checks such as are in common use in nearly all the mining districts, and as far as we can see there is absolutely nothing dishonorable or dishonest about them; on the contrary, they appear to us to be rather convenient substitutes for the ordinary store checks. It does not follow in any way that they control the patronage of the workmen, nor does it follow at all that the company should have any interest in the store. They are simply orders in convenient form which men can use at a store and that are paid for in advance by being charged against the workmen, rather than collected at the end of his month. It would have been wiser had our contemporary investigated the matter a little before speaking so rashly. There are plenty of abuses which would properly absorb all its energy and all its virtuous indignation, and we would suggest that it investigate and denounce some of those and not waste so rare and precious a commodity on so harmless a subject as the coupon book.

THE meeting of the American Institute of Mining Engineers, to be held at Baltimore, Md., from Tuesday, February 16, to Saturday, February 20, promises to be very interesting, a number of valuable papers having been announced and excursions to the iron and steel works, oil refineries and copper smelters in the vicinity of Baltimore arranged for. The principal topic for discussion at the meeting is to be "Phosphates" and from present indications this is likely to be considered from all points of view. The following papers bearing upon the subject are to be presented: "Southern Phosphate Deposits," by GEORGE H. ELDRIDGE, United States Geological Survey; "Notes on the Geological Origin of Phosphate of Lime in the United States and Canada," by WALTER B. M. DAVIDSON, F. G. S.; "A List of Minerals containing at least one per cent. of Phosphoric Acid," by PROF. WM. B. PHILLIPS; "Phosphate Chemistry as it Concerns the Miner," by THOMAS M. CHATAED, United States Geological Survey. Mr. ELDRIDGE is in charge of the corps from the United States Geological Survey at present at work in the Florida phosphate fields, and his paper will be awaited with special interest. As most of the men whose names are known in connection with the phosphate deposits of South Carolina and Florida have promised to attend the meeting, which is to be held in the center of the superphosphate manufacture, there should be an extremely interesting and valuable interchange of views.

THE new mining camp, Creede, situated in the southern part of Colorado, is now the center of attraction in that State, where it is heralded as a second Leadville. For the past six or eight weeks there has been a rush thither, and already the population of the place is said to exceed 2,000 - this in the midst of winter, when the ground is covered deep with snow, and prospecting is almost impossible on that account. There is evidently a solid foundation for the boom, however, as the mines which have been opened are already producing from ten to twelve car loads of ore, or from 100 to 120 tons, daily. The excitement reminds some old timers of Leadville in '78 and '79; yet the scenes of the Leadville boom can never be repeated, such a difference has 13 years wrought in conditions in Colorado. Those who trudged wearily and heavily laden down through the snow of Mosquito Pass in 1879 can now ride to Creede in a Pullman sleeping car. The papers which reach us from Creede give the usual accounts of new strikes and sales of mines and prospects, speculation in town lots, notices of the opening of shops of various kinds, liquor saloons, gambling rooms and dance houses - all typical accompaniments of the typical mining boom, from that of Virginia City in 1859 to Leadville in 1879. Creede, variously known as Amethyst, Jimtown and Creedemore up to a fortnight ago, has now been christened formally after the prospector who discovered the mines. Two daily papers, the *News* and the *Amethyst*, have been established, and the map of the camp published by the latter in its second issue, January 23rd, shows almost as intricate a checkerboard of rectangular claims as a map of Fryer Hill, Leadville, or Aspen Mountain. Will the new camp prove to be such a bonanza as either of those or will the bubble burst like that of Robinson and Kokomo, in the Ten Mile, time only can tell.

THE anthracite coal trade has been treated to a sensation during the week past. The Reading Railroad Company, which recently was bankrupt and despised of all the other companies, has girded its loins and come out a complete master in the contest which has for a long time been going on between the competitors for the anthracite tonnage of Pennsylvania. In our coal trade and stock market reviews will be found the details of the transaction by which this road has secured control of the Lehigh Valley and New Jersey Central Railroads and has obtained a potent, if not controlling, interest in the Delaware, Lackawanna & Western. This transaction, which places directly under the Reading management about 54 per cent. of the anthracite coal produced in Pennsylvania, or if we include the Delaware, Lackawanna & Western, about 69 per cent., was undoubtedly a very able move by President McLEOD of the Reading and reflects the highest credit on him. It has greatly improved the financial rating of that company and it may improve the coal trade.

How far the deal will be of benefit to the consumers of coal remains to be seen. It is more than probable that they will have to pay higher prices for anthracite. It should not be forgotten, however, that a very small thorn is sufficient to create a great irritation in the flesh, and a comparatively insignificant independent producer may utterly disconcert the plans of the strongest combination. It is the small surplus of coal offered that regulates the price of the whole product, and experience thus far has shown that there is only one sure way of controlling an industry and maintaining prices and that is by owning the entire output. The Reading, including the Delaware, Lackawanna & Western, controls not more than 69 per cent. of the anthracite trade and the remaining 31 per cent. is far more than sufficient to control the market price of anthracite. That a portion of this interest will act in harmony with the Reading cannot be doubted, but that it will all so act is certainly open to question.

ALUMINUM FOR CULINARY UTENSILS.

On another page we publish an article by Prof. GEO. LUNGE, of Zürich, Switzerland, "On the Action of Certain Liquids on Aluminum," which deserves careful attention. Some time ago Messrs. LUBBERT and ROSCHER, two German chemists, published an account of some experiments undertaken by them to determine the action of certain vegetable acids upon aluminum. The results of their work led them to the conclusion that aluminum was unfit for chemical laboratory purposes, for cooking utensils, for canning material, and many other uses, being corroded by nearly all the vegetable acids commonly met with. Such a statement made immediately after the adoption of aluminum for the manufacture of certain military equipments, including canteens, by the German Government, could not fail to excite surprise.

Prof. LUNGE, whose attention was called to the matter, went over the details of Messrs. LUBBERT and ROSCHER's experiments and discovered that many of their manipulations had been conducted in a faulty manner, as he sets forth in his present article. Repeating the experiments after his own methods, careful and scientific as always, he has arrived at the very opposite conclusion to that of Messrs. LUBBERT and ROSCHER, and declares that, aside from the fact that the solubility of aluminum in the most effective vegetable acid, is insignificant, the salts of aluminum formed are by no means poisonous.

Really scientific investigators will appreciate the criticisms which Prof. Dr. LUNGE makes upon the hasty work of Messrs. LUBBERT and ROSCHER, and the conscientious care with which he performed his own tests. A chemist engaged upon such a problem may make mistakes and may draw improper conclusions, but there is no excuse for mistakes made through carelessness or slovenly analytical methods. Prof. LUNGE's results will no doubt supersede those of Messrs. LUBBERT and ROSCHER, and aluminum, that much overrated and underrated metal, will be applied more generally to the manufacture of culinary utensils, and the like, for which it appears to be singularly well adapted.

THE PRODUCTION OF QUICKSILVER IN CALIFORNIA.

The report of the Quicksilver Mining Company, of New Almaden, Cal., for the year ending December 31st, 1891, is the most unfavorable statement made by that company during the past 21 years. The production of quicksilver was smaller than in any preceding year, being but 68 per cent. as great as in 1890, while in value there was a still more important decline, the average price of quicksilver having been \$12.06 per flask lower in 1891 than in 1890.

In 1890, 22,649 tons of ore were roasted, and in 1891, 25,548 tons, but the average yield of the ore during the latter year was only 1.22 per cent., against 2.02 per cent. in 1890. On the other hand the expenses in 1891 were very nearly as heavy as in 1890; the yield of quicksilver being so much less the cost of production rose from \$33.87 per flask to \$48.62, and for the first time in 21 years the mines were operated at a loss. The deficit amounted to \$57,523.96, which was \$6.97 per flask.

There seems no doubt that the New Almaden mines are now upon the verge of exhaustion, and that within a few years the quicksilver mining

industry of California will be a thing of the past, notwithstanding the remarkably able and economical management of the mines. The production of the California mines reached its maximum in 1879, when 79,396 flasks were produced. Since that time the output has diminished steadily. In 1881 the yield was 60,851 flasks; in 1891 it had fallen to 22,904 flasks. (ENGINEERING AND MINING JOURNAL figures, Jan. 2, 1892, 21,022). Hon. J. B. Randol, manager of the Quicksilver Mining Company, in our statistical number estimated that the output of 1892 would fall below 15,000 flasks, which, in view of the condition of the New Almaden mine, seems extremely probable.

The quicksilver mines of California have had a glorious past and have returned large profits to their owners. From 1850 to 1891, both years inclusive, they produced 1,590,674 flasks, or 121,696,561 lbs. of quicksilver valued at \$71,508,021. Of this amount the New Almaden mines, owned by the Quicksilver Mining Company, produced 924,659 flasks, or over 58 per cent. In 1881 the product of this company was 42.8 per cent. of the total, and in 1891 36 per cent. With the approaching exhaustion of the California mines it would seem that we are likely to see higher prices of quicksilver this year. No figures have yet been compiled showing the world's production of quicksilver in 1891, but the output of the Almaden mines of Spain was probably about 47,500 flasks against 50,035 flasks in 1890. The mines of Spain and California are the largest producers and turn out about 70 per cent. of the total amount of the world's quicksilver.

THE FREE COINAGE QUESTION.

The Committee on Coinage, Weights and Measures has reported to Congress a bill providing for the free coinage of silver on the ratio of 16 to 1 with gold, with some impracticable conditions that when France gets ready to reopen its mints to free coinage, our ratio is to be reduced to 15½ to 1 and our dollars recoined. If there were any probability of such an act becoming law it would be worth while to discuss it. It could scarcely pass the Senate, and would certainly be vetoed by the President. The political newspapers are fighting over the question because it very greatly affects the prospects of the political parties in the next campaign. The question of most importance is the effect this free coinage bill necessarily has upon our commerce and industries, wherever it is taken seriously as an indication of what we are actually going to do.

THE ENGINEERING AND MINING JOURNAL has frequently pointed out, citing as proof the best statistics that have been compiled, that the reason for the decline in the price of silver is to be found in the overproduction of the metal. The cost of producing silver has been reduced and there are a sufficient number of producers who can profitably supply the world's demand at prices below those which are even now ruling. The mere fact that one or half a dozen countries have adopted free coinage does not increase the gold value of the metal in the open markets of the world. Free coinage in Mexico, in India and in many other countries has no effect upon the London price of silver, neither would free coinage in this country affect it except adversely, and that because it would take away the only large purchaser of silver who is willing to buy it with gold or its equivalent.

In the report to the Census on the world's production of gold and silver the statistics compiled by all the principal authorities were published and analyzed, and in that analysis as well as on several occasions in the columns of the ENGINEERING AND MINING JOURNAL, it was pointed out that our mint statistics appear to omit certain productions of silver which the highest authorities in Europe include. Soetbeer is unquestionably the best authority in Europe on the production of the precious metals, and in his last report he puts the silver production of the world for 1889 at 4,237,000 kilos. or nearly 400,000 kilos., or, say 10,500,000 ounces more than our mint report gives. An underestimate of this kind is certainly sufficient to mislead our legislators, and we beg to point out that it would be well for them to study the statistics of Mr. SOETBEER in arriving at a conclusion as to the proper course to take in the silver question. In a letter which we have received from Mr. ROBERT BASSERMANN, of Manheim, referring to the statistics which we published in our statistical number of the 2d January, he makes the following remarks upon silver:

"Mr. Soetbeer published his last statistics in *Jahrbuecher fuer National-Oelonomie*, Jena, April, 1891. He puts the silver production of the world for 1889 at 4,237,000 kilos. Mr. LEACH estimates it only at 3,842,000 kilos., or 10 per cent. less. Mr. LEACH persists in ignoring the great quantities of silver that are being extracted from German lead and copper ores, the Mansfield Company alone producing 86,000 kilos. pure silver from their own ores a year. Besides, such ores as the Rio Tinto pyrites and many others contain small quantities of silver which altogether escape the notice of Mr. LEACH. If your countrymen would view the silver production in the light of Mr. SOETBEER's figures they would understand more readily why the price of silver was doomed to come down.

"As for the new International Silver Congress the Washington Cabinet is trying to call together, this will be a complete failure, the sentiment in

Germany, England and France being altogether opposed to bi metalism."

Mr. Bassermann is a very reliable authority, and we commend what he says to the attention of our Congressmen, who evidently need light upon this important subject.

BOOKS RECEIVED.

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

- A Manual of Mining*, based on the Course of Lectures on Mining delivered at the School of Mines of the State of Colorado. By M. C. Ihl-seng, C. E., E. M., Ph. D. Published by John Wiley & Sons, New York, 1892. Pages, 423, Price, \$4. Illustrated.
- Annual Report upon the Improvement of Delaware River, Pennsylvania and New Jersey, Schuylkill River, Pennsylvania and rivers in Southern New Jersey; Harbor Improvements in Delaware River and Bay; Construction of Pier at Lewes, Delaware; Delaware Break-water, Delaware, in the Charge of C. W. Raymond*, being appendix G of the Annual Report of the Chief of Engineers for 1891. Published by the Government, Washington, D. C., 1891.
- Comptoir Minéralogique & Géologique*. By F. Pisani. Published by the Author. Paris, 1891. Pages, 45. Illustrated.
- Les Phosphates de la Floride*. By M. Victor Watteyne. Published by the Author. Brussels, 1892. Pages, 49. Illustrated.
- Pocket Companion*, for engineers, architects and builders, containing useful information and tables appertaining to the use of wrought iron and steel, as manufactured by Messrs. Carnegie, Phipps & Co., Limited, Pittsburg, Pa. Edited by C. L. Strobel, C. E., and F. H. Kindl, C. E. Pages, 334. Price \$2. Illustrated.
- Quaternary Geology of the Hudson River Valley*, with Notes on Brick Clay and the Manufacture of Brick. By Frederick J. H. Merrill. Published by the author, Albany, N. Y. 1892. Pages, 55.
- Report on the Geology and Mineral Resources of the Central Mineral Region of Texas*. By Theo. B. Comstock, F. G. S. A. Published by the State. Austin, Tex., 1891. Pages, 664. Illustrated.
- The Manual of American Water Works 1890-91*. Published by the Engineering News Publishing Company, New York, 1892. Pages 384. Price.
- The Scientific American Cyclopaedia of Receipts, Notes and Queries*. Edited by Albert A. Hopkins. Published by Munn & Co., New York, 1892. Pages, 675. Price, \$5.00. Illustrated.
- The Ventilation of Buildings*. Second Edition. By Alfred R. Wolff, M. E. Published by the Author. New York. 1892. Pages, 32. Price 25c.

CORRESPONDENCE.

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

Quartz from Utah.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: We send you a sample of a mineral found in Utah in immense quantity, but are unable to find out what it contains. Can you give us any light on the subject?

SALT LAKE CITY, Utah, Jan. 30.

EDWIN MALQUIST.

Of the samples accompanying this letter the glassy mineral is quartz, or silica. Whether it contains gold or not can only be determined by assay. As silica it is probably valueless in Utah. The only use for it is in glass making, but the demand for this purpose is not large, as at the present time most of the silica used for this purpose is obtained in the form of quartz sand. Fifty or sixty years ago the silica for the finer grades of glass was procured by crushing and washing flint and quartz like the sample. This process is still used in districts where good sand cannot be cheaply obtained. Bohemian glass is made almost exclusively from quartz so prepared. By far the largest portion of silica used by glass makers to-day is sand. The second sample is a semi-decomposed feldspathic granite consisting of quartz and little mica and feldspar in the process of kaolinization.—[Ed. E. & M. J.]

The Size of Lead Refining Furnaces.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: It would interest the writer, and possibly other people as well, if some of your correspondents would say what are the largest improving furnaces in use in lead works in the United States, and what are the results of using them.

In this country the largest furnaces in use for this purpose are those erected by Mr. W. M. Hutchings at the works of Walker, Parker & Co., Bag-ill, and still more recently at the works of Cookson & Co., Newcastle-on-Tyne, where a furnace is now in use loading over 140 tons of metal per charge. One was built previously which holds 90 tons, and this appeared to be about the limit for a furnace of the ordinary type, as in order to have sufficient heat at the flue end the bridge end had to be rather too hot. In his latest furnace Mr. Hutchings uses a grate at each end and takes the flue off in the centre of the arch. The result is eminently good; a nice, uniform, moderate heat is obtained with the same fuel expenditure and much less corrosion of furnace. All these large furnaces erected by Mr. Hutchings have 2-in. boiler plate casings, properly supported and secured, and no flaw or failure of any sort has ever occurred with any of them. At Cookson & Co.'s works there are furnaces of 30, 60, 75, 90 and 140 tons' capacity.

ENGLAND, Jan. 29, 1892.

ENGLISH METALLURGIST.

The Cost of Producing Copper.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have read your interesting article in the issue of February 6th on the cost of producing copper and I believe your conclusions as to costs are fairly correct. Your article will surprise many persons who have relied upon the representations made through ignorance or intent to deceive, by speculative dealers in the bonds and stocks of mining companies, as to the low cost at which copper could be produced.

The method adopted by you if it could be carried through a long enough period, and if allowance could be made by deducting from the receipts the money expended in the purchase of land, would be as nearly absolutely correct as any human estimate can be. Of course where improvements in methods are going on an average cost will always be somewhat higher than the present cost. But there is no doubt that costs are nearly always under rather than over-estimated. One idea especially is rarely thought of which you hint at in your article, namely the cost to stockholders as against the cost to the mining company. I believe in England land is valued on 20 years' purchase. That is land is worth twenty times one year's rental or income. The value of mining properties, however, are, or should be, estimated on ten year's purchase. On this basis the Calumet & Hecla Company to be worth the price indicated by the present market price of the stock should earn \$2,600,000 a year, or 10% on the market price of its capital stock. This is exactly 4 cts. a pound on its last year's output of copper. It is to meet this item and reduce this element of cost that mining companies who feel assured of very large supplies of ore keep on increasing their output. If for instance the Calumet & Hecla could and would turn out 130,000,000 lbs. copper instead of 65,000,000 lbs. this item of 4 cts. would be reduced to 2 cts. If there was an unlimited demand for copper and the market price did not vary, and if the supply of ore was absolutely unlimited, it would of course be economy for every mine that could to largely increase its output. But the law of supply and demand comes in and at the moment that the supply actually does, and to-day, even when it threatens to exceed the demand, prices drop at a rate which very soon wipes out the estimated saving. As an illustration: assuming the actual cost of Calumet & Hecla producing its copper and selling it to be 8 cts. a pound and on a product of 50,000,000 lbs. to market this at 13 cts., a pound, it will show a profit of \$2,500,000. On a production of 100,000,000 lbs. copper the market price would certainly not exceed 10c., in which case the actual profit on the year's transactions would not exceed \$2,000,000 a year, and yet if the operations were to be continued at this rate the actual life of the mine would only be half what it would be in the other rate, and the amount to be charged to sinking fund for replacement of capital must be twice as great, and the amount left for the stockholders as interest and profit proportionally less. The policy of the Calumet & Hecla for many years has been to invest each year a portion of its profit in dead work on the mine. In other words, in one year it has paid part of the expense necessary for the extraction of the ore in the next or some following year. This has taken the place of a sinking fund to represent the capital consumed by the withdrawal of ore, and in estimating the cost of copper each year, if it would keep its sinking fund intact, it must add these amounts to the actual year's expenditures. On this basis, which is a fair one, I believe the actual cost of Calumet & Hecla copper is not less than 9½c., and I do not believe copper in any other mine at Lake Superior, even with the most improved methods, can be produced for a less sum.

I am fairly familiar with the cost of mining and the different methods of smelting in the West. I do not believe to-day, after making allowances for silver values, any mine in Montana can lay ingot down in New York sold under an absolute cost of less than 9½c. Some of the mines cannot do as well as this. In Arizona I think the average cost is fully as great. Of course there are times when one of the pockets of rich ore is reached when the cost is much less than this sum, but after this pocket is exhausted the expenditures go on during the period while another is being searched for, which will bring the average cost fully up to this basis.

Perhaps the fairest way to look at the copper situation would be to assume what capital would be necessary to consolidate the producing mines of this country, and it is clear this would require at least \$100,000,000. On the ten-year purchase theory, to make this property a profitable investment, \$10,000,000 over and above mere working cost would be required. As at least 300,000,000 lbs. of copper must be produced by this country to satisfy our own consumption and the demands for export, 3½ cts. a pound is the average profit which must be made to secure this sum. If all the copper required were produced by the three or four mines that can produce the cheapest in this country, an average price of 13 cts. must be secured to make the copper mining industry a reasonably profitable one. To maintain this average 13½ cts. must be obtained for Lake and 12½ cts. for casting coppers, and this is about the average price which copper maintains. Whenever the bears, taking advantage of periods of depressions, take the market and secure materially lower prices, the average is later restored by unnecessarily high prices, and it would be interesting to consumers of copper if they would study out who the people are that are benefited by these fluctuations. They would find they are invariably the speculators, the producers and consumers of copper alike suffering from the operations of these gentry.

For one who is interested in the copper market I thank you for the care and attention which you are devoting to this subject, and I believe you will accomplish a great deal of good.

NEW YORK, Feb. 11, 1892.

COPPER.

Mr. Dickson, U. S. Consul at Gaspe, Nova Scotia, reports that the petroleum borings in the Gaspé basin have not proved successful during the past year. Three wells have been sunk to a depth of 3,000 ft. without striking oil in paying quantity; in one of them a small show of oil was found at a depth of 2,000 ft. An expert from England has been sent out to examine the country on behalf of the capitalists who have been advancing money to carry on the exploitations with a view to the formation of a company. The report of the expert has not been made public, except that he is said to have advised that it was of no use going greater depths than already attained, viz., 3,000 ft.

THE PHOSPHATES OF FLORIDA.*

By Francis Wyatt, Ph. D.

The topographical aspect of Florida is that of a very low-lying and gently undulating peninsula, its highest point being no more than 250 ft., and the average height about 80 ft. above the level of the sea. The elevated points or ridges are composed entirely of sand, and are covered with a very luxuriant growth of tall pines. The depressions or valleys, especially when situated along the coast, are composed of a mixture of calcareous marls and sand, from which outcrop, at irregular and frequent intervals, large and small boulders of limestones, sandstones and phosphate rock. These valleys are principally known in the country as "hommock land," and are said to be very fertile. When uncultivated, however, they are covered with a dense wild growth of vegetation characteristic of the swamp.

Without pausing to consider the climatic conditions, which are sufficiently well known, and which, besides, are outside the scope of our work, and passing at once to the prominent geological aspects, we may say that the entire State of Florida appears to us to be underlaid, at greatly varying depths, with upper Eocene limestone rock, and that its first emergence must, in our opinion, be consequently dated from that period. We have based this opinion on the careful examination of many artesian wells that have been practiced in several directions, and it is well sustained by the one at Lake Worth, which was completed in June, 1890, and of which the following detailed particulars have been published by Mr. N. H. Darton, of the United States Geological Survey:

0—400 ft.—Sands with thin layers of semi-vitrified sand at 50 ft. and 60 ft.

localities the massive phosphate graduates into the limestone, usually by short transitions, and many areas have been discovered in the phosphate belt and under the conglomerate in the Bartow region where the limestone is only partially phosphatized. In the mines at Dunellon the massive phosphate is apparently continuous with the limestones, but there are occasional casts and impressions of the middle Tertiary mollusca undoubtedly lying as they were originally deposited. Mr. Darton further says that the origin of the phosphate of lime is not definitely known, but that it seems exceedingly probable that guano was the original source, and that the genesis of the deposits is similar to that of the phosphates in some of the West Indies. Two processes of deposition have taken place, one the more or less complete replacement of the carbonate of lime by phosphate of lime, and the other a general stalactitic coating on the massive phosphates, in cavities, etc.

The apparent restriction of the rock phosphate deposits to the western "ridge" of Florida may have some special bearing on their genesis, but at present no definite relationship is perceived. The aggregate amount of phosphate rock distributed in fragmentary condition in the various subsequent formations is very great, greater by far than the amount remaining in its original position, and it is possible that the area at one time included the greater part, if not all, of the higher portions of the State. As this region apparently constituted a long, narrow peninsula or archipelago during early Miocene times, it is a reasonable tentative hypothesis that during this period guanos were deposited from which was derived the material for the phosphatization of the limestone, either at the same time or soon after.



MAP OF THE RIVER AND PEBBLE PHOSPHATE REGION OF FLORIDA.

Places marked thus * are now in full work. Scale about 12 miles to the inch.

400—800 ft.—Very fine-grained soft, greenish gray quartz sand, containing occasional foraminifera and waterworn shell fragments.

300—850 ft.—No sample.

850—860 ft.—White sands, with abundant foraminifera of four or five species.

904—915 ft.—Gray sands containing sharks' teeth, small waterworn shell and bone fragments, sea urchin spines and lithified sand fragments

915—1,000 ft.—No sample.

1,000—1,212 ft.—Samples at frequent intervals. Vicksburg limestone, containing orbitoides in abundance throughout, together with occasional undeterminable fragments of molluscan casts, corals and echinoderms. It is a creamy white, hard, homogeneous limestone throughout.

Nor do we rely upon the artesian wells alone, for the Vicksburg limestone also appears as an outcrop at the surface in many localities, and has been specially noticed in Wakulla and Franklin counties, west of Tallahassee, in Marion and Citrus counties, in Tampa Bay and on the banks of the Manatee and Caloosahatchee rivers.

In the opinion of Mr. N. H. Darton, above mentioned, the phosphates of Florida belong to three formations, distinctly separate stratigraphically, and each represents a long interval of geologic time. The rock phosphates appear to be the deeply eroded remnants of the phosphatized surface of the middle Tertiary limestone; the conglomerate deposits overlie these limestones unconformably, and in the Gainesville region, at least, appear to be Miocene in age, and the river drift deposits are apparently entirely subsequent to the great mantle of Pleistocene white and gray sands which covers the entire peninsula to a greater or less depth.

Excepting in its light color the rock phosphate is a physical counterpart of the brown limonite iron ores of the Appalachian limestone valleys, and the deposits have very similar structural relations. In a number of

Our own conclusions were published in the ENGINEERING AND MINING JOURNAL of August 23d, 1890. We then argued and still believe that during the Miocene submergence there was deposited upon the upper Eocene limestones, more especially in the cracks or fissures resulting from their drying up, a soft, finely disintegrated calcareous sediment or mud.

The gradual evaporation of these Miocene waters brought about the formation, principally in the neighborhood of the rock cavities and fissures, of large and small estuaries. These estuaries were replete, swarming with life and vegetable matter—fish, molluscs, reptiles and marine plants. They were, besides, heavily charged with gases and acids, and their continuous concentration ultimately induced a multiplicity of readily conceivable processes of decomposition and final metamorphism.

In our opinion they constitute the origin of our Florida phosphate of lime, and disregarding all other hypotheses, we consider that we are practically contemplating:

1. A foundation of upper Eocene limestone rocks very much cracked and fissured, the cracks having a general trend northeast and southwest.

2. Irregular beds, pockets or banks of Miocene deposits, dried and hardened by exposure, and alternately calcareous, sandy or marly; generally phosphatic, and sometimes entirely made up of decomposed organic debris, the phosphoric acid being combined with various bases (lime, magnesia, iron, alumina, etc.).

After the disappearance of the Miocene sea there came some gigantic disturbances of the strata. There were upheavals and depressions. The underlying limestones were probably again split up, and the Miocene deposit was broken and hurled from the surface into yawning gaps and from one fissure to another.

Now come the Pliocene periods, or end of the Tertiary, and then the seas of Quaternary age, with their deposits and drifts of shells, sands

*From the "Phosphates of America," by permission of the Scientific Publishing Company.

clays, marls, bowlders, and other transported materials, and the accompanying alternate or concurrent influences of cold, heat and pressure.

If we take the whole of these phenomena broadly into consideration we must be led to conclude that those portions of the phosphatic Miocene crust which did not fall into permanent limestone fissures or caverns at the time of the disturbance of the strata became at length very thoroughly broken up and disintegrated. They were rolled about and intermixed with sand, clay and marls, and were deposited with them in various mounds or depressions, in conformity with the violence of the waters, or with the uneven structure of the surface to which they were transported.

Occasionally this drifting mass found its way into very low-lying portions of the country, say into those regions where considerable depression was brought about by the sinking and settling of the recently disturbed mass. At other times it was rolled to and deposited on slightly higher points. In the first of these cases we find a vast and complete agglomeration, comparable to an immense pocket of broken-up phosphate rock finely divided into phosphate debris, sands, clays and marls, all heterogeneously mixed in together. In the second case we find the phosphate in large bowlders, sometimes weighing several tons and intermixed with but relatively small proportions of any foreign substances.

Considering these phenomena, we reach the conclusion that the features in the Florida deposits of phosphate to be most particularly emphasized, are that the formation consists essentially of:

1. Original pockets or cavities in the limestone filled with hard and soft rock phosphates and debris.
2. Mounds or beaches, rolled up on the elevated points, and chiefly consisting of huge bowlders of phosphate rock.
3. Drift or disintegrated rock, covering immense areas, chiefly in Polk and Hillsboro counties, and underlying Peace River and its tributaries.

these facts, warranted in declaring that the Florida phosphates of high grade occur in beds of an essentially pockety, extremely capricious, uneven and deceptive nature.

Sometimes the pockets will develop into enormous and deep quarries, and probably yield fabulous quantities of various merchantable qualities. At other times they will be entirely superficial, or will contain the phosphate in such a mixed condition as to render profitable exploitation impossible.

An excellent, and indeed typical, example of this superficiality is afforded by one of our recent examinations, in which the geological conditions did not differ in any essential particular from those described. The area investigated may be thus represented:

| 5,120 ACRES OF LAND. | | | |
|----------------------|---|---|---|
| A | B | C | D |
| E | F | G | H |

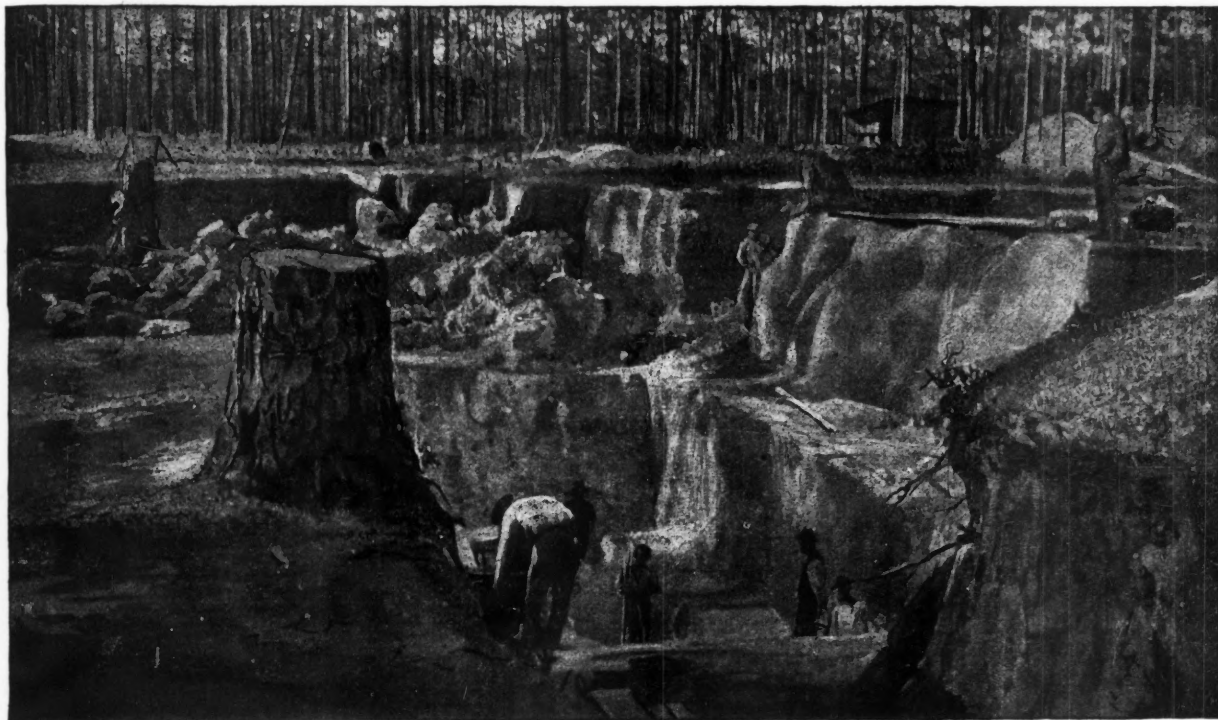
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Each division representing 640 acres.

Very fine phosphate indications were scattered more or less all over this tract, sometimes in the form of big bowlders outcropping at the surface, sometimes in the form of small debris, brought up from below by the mole or the gopher. A local "expert" had estimated that it contained millions of tons, and our own first impressions of it were of the highly sanguine order. A systematic exploration was, however, at once instituted and carried out; first by boring all over the tract with a 20-ft. auger, and then by sinking confirmatory pits at short intervals to a depth of 15 ft. to 20 ft.

The result of our work was extremely disappointing, and may be briefly summarized thus:

A.—No phosphate in workable quantities. B.—A small basis or pocket of good phosphate, covering an area of about 15 acres. C.—No phosphate in workable quantities. D.—No phosphate in workable quantities.



MINING "BOWLDER" MATERIAL FROM MATRIX OF SAND AND CLAY; EMPIRE STATE COMPANY'S MINES, CITRUS COUNTY, FLA.

As we have already remarked, the work of exploration or prospecting has now extended all over the State in each of these varieties of the formation; actual exploitation on the large scale by regular mining and hydraulic methods has also been commenced at various points; and we have been able to make a very careful study of the workings on several occasions, with the result that the theories we first formulated have been in every way confirmed.

In several of the mines, notably in those of Marion and Citrus counties, there are immense deposits of phosphatic material, proved, by actual experimental work, to extend in many cases over uninterrupted areas of several acres. The deposits in each case have shown themselves to be combinations of the "original pocket" and the "mound" formation, and the superincumbent material, or overburden, is principally sand, and may be fairly said to have an average depth of about 10 ft. The phosphate immediately underlying it is sometimes in the form of enormous bowlders of hard rock, cemented together with clay, and sometimes in the form of a white plastic or friable mass resembling kaolin, and probably produced by the natural disintegration of the hard rock by rolling, attrition or concussion. The actual thickness of the deposits is too variable to be computed with any accuracy into an average, but in one case which specially interested us the depth is 50 ft., and only a little over two acres of the land have already yielded more than 20,000 tons of good ore, without signs of exhaustion.

Directly outside the limits of these combined "pockety" and "mound" formations the deposits of phosphate seem to abruptly terminate, and to give place to a unimportant drift, which sometimes crops out at the surface, and which may be followed in all directions over the immediate vicinity without leading to another pocket of exploitable value.

Since the same geological phenomena are prevalent in nearly every section of the country, with the exceptions of Polk and Hillsboro counties, where they are somewhat modified, we consider ourselves, in view of

E.—Large quantities on surface, leading to a very large pocket, covering about 35 acres. Very much mixed-up material, principally phosphate of low grade. F.—No phosphate in workable quantities. G.—No phosphate in workable quantities. H.—The highest point the tract—very densely grown, big bowlders of phosphate and sandy conglomerate on surface. Fifteen small pockets of phosphate, ending in limestone at a depth of 13 ft.

The total acreage covered by these widely scattered phosphate deposits was set down at 83 acres, and the character, quantity and composition of the phosphate itself, as shown by the pits dug and by the material extracted from them, were estimated after experiments to be as follows: Bowlder material, large and small after screening, 13% of the mass; debris and whitish phosphate, soft and plastic, 29%; sand, clay, flints and wastes, 58%.

AVERAGE ANALYTICAL VALUE OF THE PHOSPHATES (AFTER SUN DRYING).

| | Bowlders. | Debris, etc. |
|--|-----------|--------------|
| Phosphoric anhydride (P ₂ O ₅)..... | 37.00% | 30.00% |
| Oxides of iron and alumina (clay)..... | 4.25 | 7.50 |

After this analysis of the bowlder material had been made, the remaining lumps were all broken up with a hammer into pieces averaging 1½ in. in size and very carefully washed, with constant shaking on a 14-mesh screen held under a stream of water. After being thoroughly dried in the sun the washed material was put through a hand crusher, then ground to the fineness of 70 mesh and submitted to analysis. The results, which have a most important bearing on the vexed question as to the form of combination in which the iron and alumina of these phosphates chiefly occur, were in this case as follows: Phosphoric anhydride (P₂O₅), 38.10%; oxides of iron and alumina, 1.73%.

The thickness of the phosphate bed varied in different places from 3½ ft. to 27 ft., but was found to have an average of about 8 ft. Assuming that this thickness would yield, say, 5,000 tons to the acre (a conservative

computation), we reach a probable total of 415,000 tons for the entire tract, of which, according to the experiments summarized above, about 55,000 tons might be high-grade "boulder," containing, say, 8% of bone phosphate, and about 125,000 tons debris and seconds, containing from 60% to 65% of bone phosphate.

The capriciousness exhibited in this instance is not at all exceptional or singular, but has been confirmed in several others, and it is not quoted in any deprecatory sense, but as an example of the necessity for exercising unusual care and discretion when making expert examinations.

In the case of the "pebble" or "drift" deposits this caution needs not perhaps to be so extremely precise, for, as we have already stated, these are marked by unusual regularity in the chief centres of their occurrence. The extensive area in which they have been found may be roughly said to take its point of departure in Polk County, a little to the south of Bartow, and thence, with a gradually narrowing tendency, to practically continue to within a very short range of Charlotte Harbor.

As will be seen from the map, the country is very flat and swampy; it is intersected at frequent intervals by the Alafia, Manatee, Peace and other rivers, and by numerous small rivulets and streams. Pit-sinking and boring is now going on over an area of many hundreds of miles, and so far as we have been able to ascertain the prospectors have succeeded in demonstrating that this section of Florida is virtually underlain with a nodular phosphate stratum of a thickness varying from a few inches to 30 ft., and covered by an overburden that may be fairly averaged at about 80 ft.

NOTES ON THE MINING OF THIN COAL SEAMS IN MISSOURI AND KANSAS.*

By Arthur Winslow, State Geologist of Missouri, and Leo Gluck, Assistant.

The data from which the following article is prepared are derived chiefly from a study of the mines in Lafayette County, Mo., where the coal bed is about 20 in. thick, and from an inspection of such at Leavenworth, where the coal is 22 in. thick, and at Osage City, Kan., where it

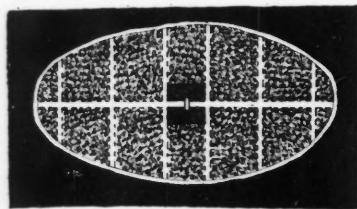


Fig. 2.—Method of starting work by long wall with a weak and brittle roof.

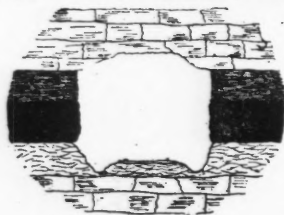


Fig. 4.—Cross section illustrating the manner of driving entries.

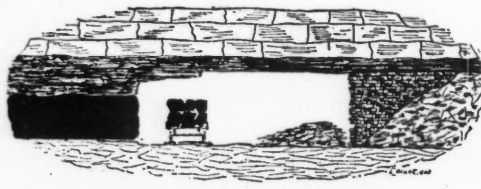


Fig. 5.—Cross section illustrating the method of mining coal.

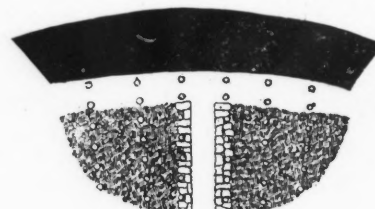


Fig. 7.—Pillar work and gob packing with a weak roof.

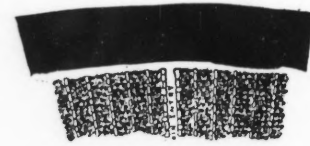


Fig. 6.—Pillar work and gob packing with a strong roof.

is only 14 in. thick; these three localities being in the districts in which such thin beds are most extensively operated.

The general system of mining adopted is the long wall method. The prominent recommendation of this method is that it admits of all the coal in the mine being excavated, none being lost in pillars, as in the pillar and room method. Hence the amount of coal taken out in the former case, from any given area is greater than in the latter case.

In the past the belief was general that a tough and somewhat flexible roof was an essential condition for the successful use of the long wall method. The conditions in Missouri and adjoining States necessitated, however, a removal of this restriction and, as mining progressed, a system of long wall working has developed by which the coal is taken out from under comparatively weak and unstable roofs. We hence recognize a division of the process of mining these thin beds into the following two parts:

First, where the roof is strong and flexible.

Second, where the roof is comparatively weak and brittle.

The former condition is, of course, the preferable one, and, under the latter conditions, work cannot be prosecuted when the roof is extremely soft and weak, and it is always more expensive and somewhat more dangerous than with the first. An essential condition with either method is that there be enough material available, either from the roof or floor, to supply the packing necessary for partially supporting the roof. This will be better understood after the following description of the methods of work is read.

The ideal location in these flat beds, where the question of drainage is not the preponderating one, and when the system of mining alone is considered, is at the center of the property, or more properly, in the center of the coal area.

METHOD OF MINING WITH A STRONG AND FLEXIBLE ROOF.

With the most approved practice, when the roof is strong and flexible, the following is the general line of procedure when the mine is operated by a shaft.

From the bottom of the shaft four entries are driven in the coal at right angles to each other for a distance of from 20 ft. to 50 ft., this distance depending on the character and strength of the roof, the depth of

the coal beneath the surface, upon the nature of the underlying clay and also upon the anticipated period of operation of the shaft. From the ends of these rudimentary entries crosscuts are then driven connecting the former with each other, as is illustrated in Fig. 1.

From the exterior sides of these cross cuts the coal is next mined radially from the shaft, the main entries advancing with the face and being kept open by gob walls and packing. This process continues until the face has advanced some 800 ft. and until the distance between the ends of each two adjacent entries is about 1,200 ft. When this stage is reached the face is still pushed forward in the same direction as before, but instead of one entry being left open and packed, two are now left, which radiate from the main entry, one on the right hand side, one on the left hand side, each at an angle of 45° with the original direction of this main entry. In the angle between these two new entries a triangular gob wall is built, as a permanent pillar, and beyond it the mining of the coal continues as before. When this has proceeded to such a distance that the haul along the face of the coal to the entries again becomes excessive, bifurcation of the entries is again resorted to, although the angle at which the new entries separate from the original direction will be different from what it was in the first case.

The process continues until the limit of the property is reached, unless the coal be at such a shallow depth that it is more economical to sink a new shaft than to have a very long underground haul.

An illustration of the general process of mining above directed an outline sketch of the map of a mine operated by this method is presented in Fig. 1. The position of the shaft and of the adjacent pillars will be readily recognized, the packing of gob is indicated by the irregular shading, while the face of the coal is plainly shown by the black band surrounding the whole.

METHOD OF MINING WITH A WEAK AND BRITTLE ROOF OR "THE ROOM" METHOD.

When the roof is comparatively weak and brittle, a method of mining is pursued which differs from the last described in that less space is left between the advancing face and the packing which follows it. Thus,

while in the former case a track is laid along the face between the entries over which the coal is pushed in boxes, in the latter case no track is laid along the face, but the coal is removed directly along numerous subordinate entries. By this means much less open space need be left at any one time between the packing and the face, with consequent less strain upon the roof.

The general mode of proceeding is as follows: From the foot of the shaft entries are driven in opposite directions for a short distance in the coal. As soon as a sufficient length of face is exposed for mining operations to proceed, the coal is attacked on both sides of the entry along the whole length. As the face advances the waste material or gob is thrown behind, and at the same time ways are left with packed walls on both sides at intervals of about 40 ft. With the best practice these passage ways are run at right angles to the main entry. Between two passage ways, along the main entry, walls of packing are carefully built. The interval between two such is known as a room and is generally operated by one miner.

The general plan of thus starting such work is shown in Fig. 2. At a distance from the shaft of about 100 ft. cross entries parallel with the room ways are started, on each side of the main entry, which are kept open by packed walls continuously to the limits of the workings. Between these cross entries the rooms are continued in a direction at right angles to the main entry, while, beyond these cross entries, rooms are now started parallel to the main entry. Each room is made about 200 ft. long, and beyond this cross entries are opened from which new rooms are started. This method is more difficult to describe than the last. A study, however, of the diagram, Fig. 3, will make the method of work plain. The double broken lines there shown are entries, whereas the single solid lines are roomways. Between these are the packing and gob. The heavy black band around the margin is the face of the coal. The object in having the various entries and in not running the rooms to an indefinite length is manifestly to limit the distance which the miner has to push his boxes of coal, and together the various boxes into entries at frequent intervals.

The two methods of work above outlined are both with shafts. With drift mines the method of working is the same, only the length of face subtends a smaller angle than with the shaft mining.

DETAILS OF LONG WALL MINING.

Having now given a description of the general principles of mining in these thin coal beds, we will proceed to a discussion of the details,

* Abstract of Appendix A of the report of the Geological Survey of Missouri for 1890-91.

Methods of Driving Entries.—The method of entry driving in these coal beds varies with local conditions. As the coal bed itself is not sufficiently thick for a traveling way to be confined to it, is generally necessary to cut down the roof, or to take up the floor in order to acquire the requisite height. The section of such an entry is illustrated in Fig. 4. In the larger mines a height of about 6 ft. is usually desired in the main entries. In the mines at Osage City, however, the entry is cut only 4 ft. high and 4 ft. wide, but here the roof is a soft shale, and generally falls down so that a height of 6 ft. to 8 ft. prevails. The entry is driven narrow here so as to prevent heavy roof falls. In the Leavenworth mines the dimensions of the entry are 5 ft. wide at the base, 4 ft. at the top and 6 ft. high. In Lafayette County the height of the entry is about 5 ft. and the width varies up to 12 ft. with the double track entry; the roof here is self-supporting, and there are not the same restrictions to the width of the entry that prevails in mines with weaker roofs. In minor entries and room ways, and also in very small mines where mules are not used, very little roof or bottom is taken out, and the height in many cases is only about 3 ft. or 4 ft.

Entry driving in the solid coal is only done at the beginning of the work, through the pillar at the foot of the shaft. Beyond this the entry work consists in packing the walls on each side, brushing down the roof or taking up the floor and laying the track. The method of doing this and the attendant cost vary with different conditions. In the vicinity of Lexington the entry is driven through the pillar by first undercutting the coal to a distance of 18 in. or 24 in., and then shearing the coal on each side of the entry to a corresponding depth. The rib of coal thus left is then wedged down and removed. The coal bed here is less than 2 ft. thick, and between it and the overlying limestone roof rock there are only a few inches of shale. Hence, in order to acquire the requisite height for hauling in the entries, the clay underlying the coal is lifted to a depth of 2½ ft. In places where there is more shale between the cap rock and the coal less of the underlying clay is taken up, and the roof

props are necessary at the face he puts these in place, but they are furnished him by the company ready for setting. The undercutting is generally done in the clay under the coal, and is about 4 ft. high at the face, tapering toward the end. Where the underlying material is excessively hard, however, or where there is little or no clay, the cutting is done directly in the lower bench of coal. This is, of course, objectionable in that it causes waste of coal. The length of face worked by one miner varies from 30 ft. to 60 ft., and the length of cut per shift varies from 10 ft. to 40 ft., according to the character of the underlying material, the thickness of the coal and other minor conditions. A cut of about 20 ft. is perhaps a fair average. With the strong roof, where a track is laid along the face, the distance between the face of the coal and the gob packing is generally about 7 ft., and this must be kept clear by the miner.

With the weak roof, where no track is laid along the face, the space is generally not more than 3 ft. In Lafayette County and in the Leavenworth mines the miner is paid at the rate of about 4 cents per bushel (\$1 per net ton) for the clean coal which he mines. In the Osage district about a cent more per bushel is paid in consideration of the thinness of the bed and the consequent increased difficulty of mining.

Methods of building pillars and packing gob. The method of supporting the roof is different in the two systems described in the preceding pages. Where the roof is a strong one a heavy and well packed wall is carried along by the miner on each side of the entries. Between these, continuous pillars, less carefully packed, are carried along at right angles to the face, as the work advances. These pillars are built of the heavier and larger blocks of waste material, and in between them the smaller and loose material is shoveled.

The plan of work above described is well illustrated in Fig. 6. The distance between each pillar is generally about 6 ft., the wall itself is usually about 2 ft. thick, and it is tightly wedged with the roof at the top. The miner who works adjacent to the entry builds the entry wall, generally without extra pay. The difference between this wall and the others

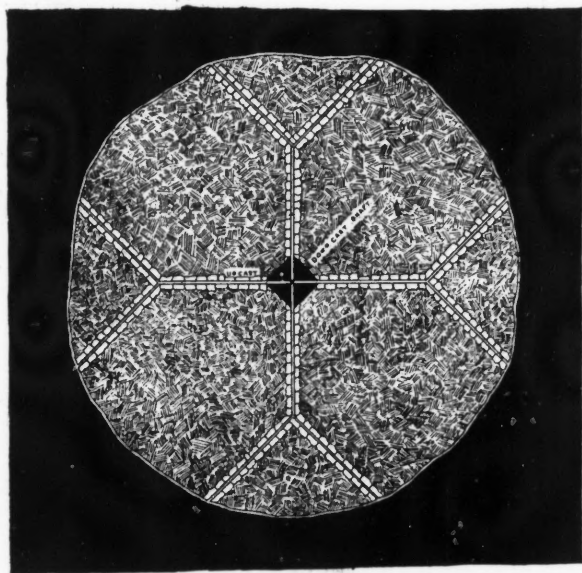


Fig. 1.—Plan of mine operated by longwall method in strong and flexible roof.

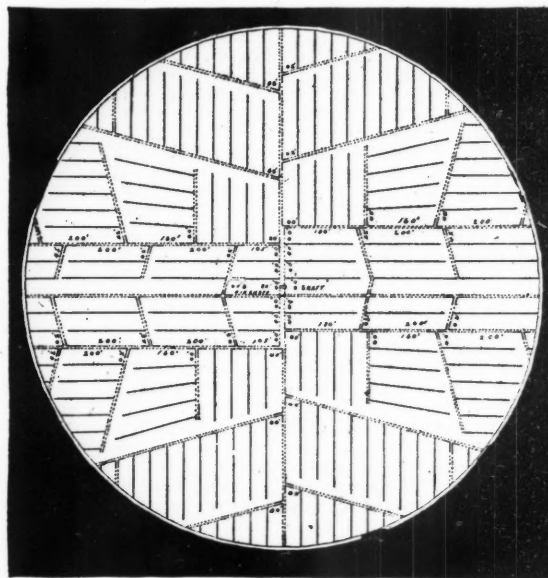


Fig. 3.—General plan of mine operated by longwall method with a weak roof.

shale is brushed down. Elsewhere, as in the Leavenworth mines, where there is no roof rock, but a large body of shale immediately overlying coal, the requisite height of entry is obtained entirely by brushing the roof. Under conditions such as some time obtain near Corder, in Lafayette County, where the overlying shale and the underlying clay are both thin, the roof rock is shot down in part. This lifting of the bottom clay, or brushing and shooting of the roof is necessary, both in the entry beyond the solid pillar as well as in the latter.

The cost of thus driving an entry varies with the different conditions. In the vicinity of Lexington the removal of the coal in the entry through the pillar costs about \$5 a running yard. The lifting of the tough, hard bottom clay to a depth of 3 ft. in entries costs about \$2.50 per running yard. In the vicinities of Corder and Higginsville, where the roof rock is shot down to a height of about 3 ft., the cost is about \$2 a running yard.

At Leavenworth and about Osage City, where fissile shale overlies the coal, \$1.25 a yard is paid for brushing down the roof, in the main entries, to the height of about 4 ft. above the coal. In the short room ways in these mines, the miner brushes down the roof to a height sufficient for man haulage, without extra pay. Tracklaying is done by the companies in the main entries; and such props as are necessary there are also furnished by the company. In the room ways the miner lays the temporary track there used, and the company furnishes the necessary material.

Method of Mining Coal.—The method of mining the coal is essentially the same in both of the systems previously defined. The coal is undercut along the whole face to a depth of about 18 in. or 24 in., and is wedged down, or falls from the weight of the superincumbent strata. These general conditions are illustrated in Fig. 5. The practice is for a certain length of face to be assigned to each miner and he is paid at a fixed rate for the amount of coal which he gets out. The undercutting is done, in almost all cases, by hand, no machine cutter having been successfully used in such mining in the districts examined.

In addition to the work of undercutting and wedging the miner has, further, to load the coal and sometimes to push it to the entrance; to pack the gob, to keep his room way open and to lay the track in these room ways and to move it along as the face advances. He further furnishes his lamp oil and all tools, and keeps the latter in repair. When

is that it is made of the larger blocks, is more carefully packed, and is built with a smooth face toward the entry. The proximity of the miner to the road head is thought to be a compensating consideration for the extra work of building this wall; in some cases, however, a small extra allowance of pay is made for this work.

In mines with weak roofs pillars are carried only along the entries, and, in the room ways between these props are placed in rows running vertically to the face. In the Osage district of Kansas each prop in such a row is 18 in. apart, and each row is 2½ ft. to 3 ft. from the adjoining one. As the work proceeds the entry walls are built of the larger material and the loose material is thrown in around these rows of props. This general plan of work is illustrated in Fig. 7.

The method of hauling.—In the larger mines hauling in the entries is generally done with mules. They haul the coal in trips of several cars, the number being dependent upon the grades encountered in the entries. In some large mines, where the grades are very slight, or the coal dips toward the outlet, the cars are run out singly by the miner, and this is generally the case in small mines. The capacity of the cars is generally about one-half a ton or less, they being small and low on account of the limited working space. The track in the entries is generally a light T rail, spiked to wooden ties. Where the track runs along the face, the rails are the same, but they are tied together by iron bars. As the face advances the whole track is moved forward by the miners. This track between two entries is not connected at the middle, but has loose ends. As it advances with the face, the distances between the diverging entries necessarily increases and, to allow for this, additional lengths of track are added from time to time. The entry track and face track are connected by a flat iron plate on which the cars can be readily transferred from the one to the other. In some mines, where the entry is wide, a switch is laid at each road head, where empty cars or boxes are stored and full cars can pass each other. Further, in mines with soft roofs, where the cars come from a large number of different points, turnouts are provided in the entries, where empty trips coming in can pass the full one going out. The transfer plate at the road head is not advanced with each moving of the face track, but, generally, remains in the same place for two or three days, the face track being curved back to meet it. Along

the room ways, in mines with weak roofs, only temporary tracking is laid of wooden strips 1½ in. X 3 in. in section.

In mines with strong roofs, the empty cars are all run in along the face track, to the various places of work, by the "pusher," and are then filled by the miner. After the cars are filled they are removed successively from the face track to the entry track by the pusher, beginning with the car nearest the entry. As each full car is removed an empty one to replace it is brought in, and is temporarily turned up off of the track so as to allow the full ones beyond to pass by, as they are pushed out.

In mines with weak roofs the car is run to the end of each roadway, and is then loaded by the miner, who either shoves each block of coal separately to the face of the roadway, or slides it on small sled-like buggies to such roadways and there loads it on to the cars.

Method of Ventilating and Draining.—The system of ventilation in these mines is extremely simple; in fact, it is one of the points recommending these methods of long wall work that, when properly prosecuted, the mines are so easily ventilated.

In some cases the entire fresh air current is carried from the downcast shaft out one of the entries to the face; it is then split to the right and left and carried around the whole face to the end of the opposite entry, along which it returns to the upcast shaft. In other cases the air current is split at the beginning, at the foot of the downcast shaft, and is then carried in opposite directions to the face, where each current is again split to the right and left. These currents then pass along the face around a quadrant of a circle, where two from opposite directions unite and pass back along one entry to the upcast shaft. The entries which are off the line of the main currents are generally cut off from these currents by brattices or doors, and are generally ventilated by the occasional opening of the doors or by the leakages through the brattices. In some cases small side currents are kept up constantly along side entries which are much used.

The draining of many of the mines, in which the system of work is carried on, is a very simple matter, inasmuch as little or no water accumulates in them. Where water exists it is drained toward a sump, located at a low point, and is thence pumped to the surface. For drawing the water to the these sumps, small ditches or drains are dug along the entries, and, in some cases, small drain tile is used. A large amount of water in connection with such mining is an especially serious objection, inasmuch as it tends to weaken the roof, to soften the underlying clay and to produce excessive settling and squeezing throughout the mine.

Concluding Remarks.—The fact that, with the methods of mining which have been described, all of the coal can be removed from the ground has already been referred to as the chief recommendation. The ease of ventilation has also been referred to and the simplicity of the plan of work further recommends it to use. It is desirable, however, in order that the best results may be reached, that the work be prosecuted regularly and uniformly, so that the face advance equally in all directions and preserve approximately the shape of a circle. If this is not done the coal will not split off freely at some points along the face, while elsewhere it will split off before a sufficiently deep undercut has been made. Further, unequal settling resulting from this irregular work will produce inequalities in the floor and roof, which become obstructions in hauling the coal along the face. A greater fracturing of the roof is also liable to result, accompanied by all of the attendant difficulties. All of such long wall mining, however, causes a greater or less fracturing of the roof. On this account, it is not generally practicable to carry it on when the mining is near the surface and when the surface is a wet one. An excessive amount of water is admitted to the mine in such cases. It can also not be practiced at a shallow depth when the overlying property is of great value, for the reason that the effects of the settling may be transmitted to the surface and cause serious damage.

Nothing has yet been done towards the introduction of rope haulage in Missouri and Kansas. The reasons generally given are that the properties worked are too small and the amount of coal available too little to warrant the introduction of an expensive plant. Further, the shallow depths at which the coal is found in many places makes it cheaper to have frequent openings from the surface than to haul the coal far underground, by power or otherwise. At the Mendota mine in the northern part of the State, where the coal bed is nearly 3 ft. thick, rope haulage is already successfully used, but here both the pillar and room as well as the long wall method are practiced.

Machine cutters have been experimented with to a limited extent in Lafayette County, but not with success. The Harrison machine was used. The chief reasons given for the failure of the experiment are the lack of competent and willing labor and the excessive amount of refuse which the cutters made. The coal bed here was only about 18 in. thick, however, and the cutter took out nearly a foot of clay. This, together with the overlying shale which came down with the coal, was more than could be disposed of in the mine, and hence had to be hauled to the surface at excessive cost. At the Mendota mine machinery cutters have also been introduced and are successfully used. We do not feel, at present, at all convinced that with some form of machine especially adapted to these thin beds, machine cutting may not be in the near future successfully prosecuted.

ON THE ACTION OF CERTAIN LIQUIDS ON ALUMINUM.

Written for the Engineering and Mining Journal by Prof. George Lunge, Ph. D.

Some months ago a paper was published in a German pharmaceutical journal by Lübbert and Roscher on the behavior of aluminum toward a number of liquids with which that metal might come into contact when made into canteens, cooking vessels, surgical instruments, etc. The conclusions reached by those two observers would be detrimental to the application of aluminum for any use in which it may come into contact with liquids intended to pass into the human body. Before such a conclusion, momentous as it would be for the extension of the use of aluminum in many directions, can be accepted as valid it ought to be verified by other observers, especially as neither of the above named gentlemen is a chemist in the proper sense, one being a medical man and the other a pharmacist fresh from his studies.

The method employed by Lübbert and Roscher is anything but trustworthy. In the first instance they did not make any quantitative estima-

tions, but confined themselves to qualitative observations, which may be very deceptive, as some of the substances employed were probably not free from alumina; secondly, they worked exclusively with aluminum foil, which is well known to be much less resisting to chemical action than compact sheet aluminum.

This induced me to take the matter in hand, in conjunction with my demonstrator, Mr. Ernst Schmid, and I will now give a short account of our results:

Our experiments were all made with commercial rolled sheet aluminum, 1 mm. thick, from the Neuhausen works, of the following composition: 0.44% combined silicon, 0.11% crystallized silicon, 0.25% iron; traces of copper; 99.20% aluminum (by difference). The sheet was cut up into strips of such a size that they could be conveniently introduced into the flasks serving for our experiments. Each strip was freed from sharp edges by a file and was thoroughly cleaned in order to lay bare a real metallic surface and remove the excessively compact surface produced by the rolling process. They were for this purpose treated, first with concentrated solution of caustic soda, then with water, then with dilute sulphuric acid, again with water, scrubbed with a brush and distilled water, rinsed with alcohol and dried in an oven. Three such strips were accurately weighed, hung by means of small holes, upon a glass hook, in such manner as not to touch one another, and introduced into the flasks containing the liquids to be tested. Each flask held about 400 c. c. of liquid and was closed by a cork through which passed the stem of the glass hook. After leaving the whole for six days at the ordinary temperature of the room, the strips were taken out-rinsed with distilled water, freed from any adhering alumina, by means of a soft brush, rinsed with alcohol, dried and weighed. The loss of weight was referred to the aggregate surface of the three strips (about 180 square centimetres) and is in the following table reduced to 100 square centimetres. Each liquid was tested at least twice in order to guard against accidental mistake. In a few cases, where the nature of the liquids presented no special difficulties, the alumina was, moreover, determined gravimetrically in the liquid after the experiments with results closely approximating those found by ascertaining the loss of weight of the aluminum. The following table gives the results of our experiments.

| Liquids experimented upon. | Loss in weight. | | | | Liquids experimented upon. | Loss in weight. | | | |
|-----------------------------------|-----------------|-------|-------------|---------------------------------------|---------------------------------|-----------------|-------|-------------|---------------------------------------|
| | A mg. | B mg. | Average mg. | Reduc'd to a surf. of 100 sq. ct. mg. | | A mg. | B mg. | Average mg. | Reduc'd to a surf. of 100 sq. ct. mg. |
| Ordinary claret .. | 4.1 | 3.3 | 3.7 | 2.84 | 1% solution of citric acid..... | 2.3 | 2.6 | 2.5 | 1.90 |
| " " hock..... | 4.0 | 4.5 | 4.3 | 3.27 | 5% lactic acid..... | 6.1 | 6.3 | 6.2 | 4.77 |
| Brandy .. | 1.6 | 1.2 | 1.4 | 1.08 | 5% butyric acid..... | 1.7 | 1.7 | 1.7 | 1.31 |
| Pure 50% alcohol..... | 0.8 | 0.8 | 0.8 | 0.61 | Coffee..... | 0.6 | 0.7 | 0.7 | 0.50 |
| 5% solution of tartaric acid..... | 1.9 | 2.4 | 2.2 | 1.69 | Tea..... | 0 | 0 | 0 | 0 |
| 1% solution of tartaric acid..... | 3.6 | 3.1 | 3.4 | 2.58 | Beer..... | 0 | 0 | 0 | 0 |
| 5% acetic acid..... | 4.3 | 5.7 | 5.0 | 3.85 | 4% boric acid solution..... | 2.3 | 2.3 | 2.3 | 1.77 |
| 1% " "..... | 6.2 | 5.2 | 5.7 | 4.38 | 5% carbolic acid..... | 0.1 | 0.5 | 0.3 | 0.23 |
| 5% solution of citric acid..... | 2.8 | 2.8 | 2.8 | 2.15 | 1% " "..... | 0.8 | 0.5 | 0.7 | 0.49 |
| | | | | | ¼% salicylic acid..... | 7.3 | 9.2 | 8.3 | 6.35 |

In very few of the cases was any action outwardly visible. In the case of brandy and alcohol, where the quantitative action was extremely slight, the surface of the aluminum showed a few fungus-like excrescences, probably formed by alumina, and caused by accidental flaws in the sheet. Lübbert and Roscher found that alcohol, ether and all similar liquids had no action at all on aluminum foils, so that the observation made by us would appear to be due to an accidental cause. Only in the last case, that of a solution of salicylic acid, did the aluminum lose its bright surface and become dull.

From our experiments the following conclusions may be drawn: The action of coffee, tea (both of which had been poured in hot), and beer is zero or practically so; that of brandy is also extremely slight; the action of acids and acid liquids (wine, sour milk, fruit-juices, etc.) is more pronounced, but even in this case far too slight to cause any alarm whatever. Taking the worst case found, that of acetic acid, we find a maximum attack of less than 5 milligrammes per 100 square centimetres in 6 days. Now a canteen holding a litre (or nearly a quart), has an inner surface of about 600 square centimetres and an aluminum weight of about 200 grammes. Such a canteen would in the very worst case lose 5 milligrammes in a day, even if it were always full, or 1 gramme in 200 days, and only in 55 years would it be reduced to half its weight. This is certainly too trifling a work to be practically considered. Nor is there the slightest danger of any injurious action upon the human body by such traces of aluminum compounds, seeing that our food contains very much more of these. Moreover, aluminum compounds are not poisons in the ordinary sense, to be compared to compounds of arsenic, mercury, lead, copper compounds, etc.; they cannot act injuriously unless quantities a hundred times larger than those we have found were regularly entering into the human stomach.

The final conclusion must, therefore, be this: that aluminum may, without any fear, be employed for canteens or any other vessels serving for holding articles of food at least at the ordinary temperature.

Natural Coke in Australia.—A discovery of natural coke, a very close resemblance to the manufactured article, has been discovered at the Brelli Pass Mines, New South Wales. The seam, which occurs in a coal measure covering 550 acres, is composed partly of a coal of about the same description as ordinary Australian coal, and this coke. The junction of the two is clearly defined, and can be traced through the entire workings. In comparison with the manufactured article, the natural coke is a little the heaviest, and contains less fixed carbon and a much smaller percentage of ash and sulphur. It is said that it burns without smoke, and can be mined much cheaper than the cost of manufactured coke.

MARBLE QUARRYING.

Written for the Engineering and Mining Journal by G. W. Perry, Ph. D., State Geologist of Vermont.

"The next 25 years is to be an age of marble," said an architect. He spoke especially of the interior finish of buildings. Not only for its beauty, but also on the score of cleanliness and durability, it is very desirable for this purpose. The variety of colors is so great that almost any desired effect may be secured. Vermont produces white, black, green, gray, blue and red, in many combinations, thus surpassing any country in the world in the variety and beauty of its marbles. The cost is but little more than hard wood, if the latter is to be well finished and cared for. This low price is the result of modern methods of quarrying and working the stone, thus enormously increasing the production. In 1890, in Vermont, nearly one and a quarter millions of cubic feet was taken out. The depth and extent of the great quarries in the vicinity of Rutland are known only by a few.

The invention of the diamond drill and the channeling machine changed all methods of marble quarrying. As marble lies in a solid mass and breaks irregularly and with difficulty it cannot be split or rifted out like some other kinds of stone. Therefore it is necessary to cut almost or entirely around a block, a long and tedious process by hand drills. When a quarry was worked by hand, one with a slight dip was valuable, as



SHELDON QUARRY, WEST RUTLAND, VT., SHOWING HAND WORKINGS ON THE RIGHT. DEPTH TO THIS FLOOR 150 FEET.

deep openings could not be made; but now, the greater the dip the more valuable, because the sooner sound stock will be found. Then the blocks were very small, just large enough for the tombstones of those days, and they must, therefore, conform to the grain of the stone. Now they range from 5 to 20 tons in weight, while, for special purposes, much larger blocks are taken out. Then the stratification was followed of necessity after the unsound material near the surface was blasted off. In the Sheldon Quarry the old hand workings may be seen on the right, showing the dip to be about 60°. As before said, the stone lies in one solid mass, the lines simply showing the cutting of the blocks. It has been found by experience that it is not best to blast off even the unsound stock lying near the surface, as the shock is likely to shatter the stone for some distance below, and if the effect does not show at once, cracks are apt to appear upon exposure to the weather. The machines are put at work upon the top of the deposit, and the unsound blocks are patiently taken out and thrown into the dump heap. The opening made is not very large, as the marble is sounder and more valuable at a depth. By means of the machines it is possible to cut under the side walls, thus making the floor of the quarry much larger than the top, great columns and buttresses being left as supports.

The channeling machine is a little locomotive, running upon a narrow gauge steel track. As it travels it strikes on one or both sides of itself with a set of five drills set at different angles. Thus going back and forth upon the floor of the quarry it cuts a channel about 1½ in. wide and to a depth of 6 ft. A double machine will cut as much as 50 men. There is thus cut a long block still fast on its bed and at the ends. The machine is now turned around and the long strip cut into blocks about 8 ft. long, which are now free, except at their beds. One of these must be partially sacrificed in order to make a working place from which the others may be operated upon. A hole is drilled in the center of one of them to a depth a little below the channel and a small blast of powder then will

easily lift it. In the opening thus made a diamond drill is placed and holes are drilled about half through the blocks under their beds, when they can be easily wedged off. When once the first has been taken out then all others on that floor can be broken into blocks by the diamond drill or the gadder, these being broken along the lines of stratification, instead of at right angles with the surface.

It is evident that the old rope derrick, turned by hand, would be useless here, especially when it is remembered that some of the quarries have reached a depth of nearly three hundred feet. By means of powerful steam derricks, with immense steel cables, the blocks are raised to the surface, placed on the cars and taken to the mill, or sent over the world. About fifteen minutes suffices to raise a block of the largest size from the deepest quarries.

As several colors and qualities are found in one opening, those blocks not just now in demand are piled up near the track for future use. Beside the good stock, a large quantity of unsound or undesirable marble is taken out and carted to the dump heaps, which at West Rutland cover several acres to a depth of 25 ft.

FAILURES IN "BOOMED" TOWNS.—I.

Written for the Engineering and Mining Journal by H. S. Fleming.

Ever since the commencement of the boom which was so largely instrumental in building up Birmingham, Ala., there have been imitators of the methods there used throughout the country, and more especially in the Southern States. Land, town and coal and iron companies were formed in most of the towns in or near the Southern ore belt, but as the success of Birmingham was not an assured thing prior to 1882, these companies did not meet with much encouragement. During 1883, 1884 and 1885, as the rapid growth of a few of the more prominent of these towns—Roanoke, Chattanooga and Birmingham—gave confidence to capitalists, there were strong efforts made by the land companies, etc., throughout the South to bring their particular territories before the public. Capitalists encouraged by the success of a few, were rapidly taking up promising investments. Old people and young, in moderate or indigent circumstances came from the North to these boom towns in the hope of making their fortunes; those who made a little money by speculating in real estate wrote to their friends encouraging them to come and they to others, the speculative fever carried before it many conservative and able business men.

The town companies invited people from all the large northern cities, and to secure their attendance at the land sales formed a series of excursions. The plans upon which these were conducted were of various kinds, calculated to secure a large number for the trip and take the chance of interesting them when once at the town. Some gave their visitors entire freedom from expense; others divided expenses with them. The following copy of a circular issued by one of these companies represents the general run of inducements given:

Ala., Dec. , 1889.
The success of our various excursions, and the continued application from friends for others, has induced the management to arrange for an excursion to leave Boston about the 1st of January, 1890. We have many letters inquiring and planning to accompany such an excursion. This circular is sent to every stockholder, giving them an opportunity, if they desire, to accompany us.

I shall be at the House, Boston, Mass., about the 10th of December, and will be glad to hear from you or your friends.

The entire expense of the trip from the time we leave Boston until our return, including five days at a banquet, and excursion to Birmingham, with all expenses attending the same, including sleeping and eating accommodations for the entire trip will be but \$60.00 for the round trip. It is intended to spend a portion of the day at some of the large cities en route, both going and coming, and to make this the best midwinter excursion that has ever left New England.

The management of the Coal and Iron Company desire a representative party of our friends, who may be or are interested in our enterprise, and will provide accommodations accordingly.

On each excursion thus far, a number of ladies have accompanied us, and provision will be made for them on this excursion on the same terms as for others. If any wish to come to remain, price for tickets, including all accommodations until we reach , will be \$30, such tickets entitling the holder to thereafter providing for themselves.

The rapid growth of , the usual opportunity for investments, the incoming of people, and the opportunity to visit a milder climate during the month of January, together with the large returns made by investors, make it of especial interest to all our friends and investors in the New England cities.

We invite your early attention and consideration of this matter. Please correspond promptly with the undersigned, in order that your name may be entered upon the list up to the limit of 200.

Please observe that this number was readily obtained for the last excursion, and we have every reason to believe that the number will be quickly secured, therefore please be prompt in response to this circular.

The stockholders of the Coal and Iron Company are requested to use their influence in securing such names as will give added strength, capital and importance. It being the intention through this excursion to encourage liberal investment in our industries and property.

General Manager.

The average visitor on these excursions is the man of comparatively limited means who has earned all he has by hard labor. The desire to accumulate a fortune rapidly is a failing of most persons and when confronted with the golden schemes of town boomers it takes a cool head to avoid being wrapped in their net; the purchase of a few lots by means of a small cash payment and notes for long time is, apparently, an easy means of adding a little to his capital, as there is always a prospect of being able to sell before the notes become due. Real estate agents are not slow in showing how others have profited, and in the present days of town lot sales it is not unusual to find that the originators have sold lots to themselves for the express purpose of inspiring confidence and keeping the price up; there is always much excitement and speculation during these excursions, and the self-conceit of the average man is flattered by the attention paid to him by officials of prominent enterprises; if a man of some means and not caring to invest in real estate, he is shown the advantages of buying stock in some of the large factories, mills or whatnot which may be in process of erection or merely of organization, and if his influence is deemed valuable in his native place he may be voted a few shares and made director in an enterprise; there are a thousand and one expedients resorted to for the purpose of inducing anyone inclined to be sceptical, to join in the crowd. Once in he is apt to become as enthusiastic as anyone and throw caution to the winds;

it is an odd sight to see men who, at home, have the reputation of being systematic and conservative in all business matters, running about among the real estate offices and button-holing friends on the street to explain the advantages of this or that, or to concoct some scheme for increasing the apparent value of such interests as they may have. A person who has not visited these towns during the most exciting days of the boom cannot conceive the unbounded enthusiasm even over things which are absurdly wrong, or the reckless expenditure of money on unnecessary things.

The companies originating the boom generally set the example of lavish outlay of money; much has, of course, to be spent in laying out lots, streets, grading, drainage and necessary improvements. In order to encourage the location of enterprises more must be done than merely giving a free tract of ground, and this is generally in the shape of taking or placing stock and advancing money; every plausible (though often improbable) scheme is encouraged and seconded; and not infrequently those who hold positions of trust, and should honestly exert themselves for the interests of the stockholders of their corporation, consider the occasion as one in which they are justified in taking all they can for themselves. This applies equally to the officials of the parent company, and the industries fostered by it. While this applies to a large number of towns there are some in which the interests are faithfully looked after, and frequently those who try to do their duty honestly are met with strong opposition by those around them who wish to fill their own pockets.

There is another important matter which must be referred to as bearing an important part in all these boom towns, and upon which the success of the place in a large measure depends, viz., reports by engineers on the resources, mineral or otherwise, of the surrounding country. The parent company or projectors of the enterprise generally secure the services of gentlemen whose professional integrity is well known, and have reports made also by specialists in particular lines; these reports, when coinciding with the views and wishes of the projectors, are published and duly advertised, but when showing a state of things which it is not deemed advisable to make public are carefully suppressed, or in some cases, such extracts published as might give the impression that all was favorable. In some cases, and it is with the greatest reluctance that it is acknowledged, men calling themselves engineers have been bought body and soul, and allowed themselves to be merely the mouthpiece of their employers, who were using all means, without regard to truth or honesty to further their ends.

The depression in trade since 1889 has caused many failures among the "boom" towns and the gradual withdrawal of investors from this field; spasmodic efforts have been indulged in at various times, by towns already started, to secure fresh capital to tide them over the tight place, and a few attempts have been made and some few carried through, to start and boom new places; generally, however, these have finally resulted in disaster to all concerned. The majority of the small towns in Virginia, North Carolina, Tennessee, Georgia and Alabama which have been "boomed" after the usual method are now in great financial depression; the parent companies which backed the towns are in a state of collapse, ably seconded by the large majority of such enterprises as were established in them. Nothing is more dismal than the sight of one of these places with factories and works deserted, stores and houses vacant and the invariable "fine and commodious hotel" with perhaps half a dozen guests.

Two prominent examples of "boom" towns which were advertised at an expenditure of thousands of dollars are Middlesborough, Ky., and Fort Payne, Ala., the former has not yet proved a complete failure, but the latter has. For the past year it has been dead, and the prospects are that it will be buried before long. The ENGINEERING AND MINING JOURNAL warned the public when this property was brought out. Some data regarding these, secured by personal inspection in the fall of 1890 at the former and in the summer of 1891 at the latter place may be of interest and possibly of value to the prospective investor.

Middlesborough is located in the extreme southeastern corner of Kentucky, within a mile of the point where Virginia, Kentucky and Tennessee meet in Cumberland Gap, and is completely surrounded by the Cumberland Mountains and its spurs. The low land in which the town lies is called Yellow Creek Valley from a small stream of that name which follows a winding course through the valley, finally emptying into the Cumberland River, some 15 miles away. This creek rises during the spring from the rains and overflows its banks, converting the valley into a swamp and flooding the main streets of the town; the channel is now being straightened and cleaned out so as to allow the water to drain off more readily and prevent the recurrence of this objectionable feature as much as possible.

It is but a few years since the English syndicate now owning Middlesborough, purchased the land in and around Cumberland Gap and located its town in this valley, and the great changes and improvements which have been made show what can be done with almost unlimited money at command. The original promoters of the enterprise called themselves "The American Association, Limited," with capital stock of \$2,000,000. Within this large wheel many smaller ones were set moving; the "Middlesborough Town Company," with a capital of \$2,000,000, was the first, and took into its hands the building and improvement of the town, etc.; the "Rectification of Yellow Creek and Sewage System Company" was formed for the purpose of dealing with that matter; and then railroad, hotel, electric light, water and other companies followed, all being ramifications of the parent association and under its control.

In order to build up the town large inducements were offered industries to locate there; agents were secured in different cities, who received a percentage on the capital stock of any satisfactory concern they could get to come; manufacturing plants were offered free land, immunity from taxation, the purchase of stock by the English supporters if the plant would enlarge and increase its capital stock; sometimes a clear cash bonus was offered, and various other inducements calculated to reach the pocket book, rather than the business judgment, of the concern they sought to draw.

Such inducements naturally brought many enterprises to the place, and almost without exception, upon locating there, the capital stock was greatly increased, sometimes doubled, trebled or more, and the new stock thus issued taken by the friends of the association. Among the concerns which came were some that were not far from bankruptcy in their old place, which were glad enough to get the addition of fresh capital without

troubling themselves much as to the advantages or otherwise which Middlesborough presented as a manufacturing center; indeed, this latter might be said of a number of the establishments which located there.

In this manner the association and its friends spent many thousands of dollars in drawing to the place the industries shown further on, and while their presence undoubtedly gives an increased value to the surrounding property it does not prove that their location is an advantageous one from a manufacturing point of view; even granting that raw material is so abundant and cheap as has been said by the promoters of the towns these establishments have all to build up a trade in opposition to older concerns and this in a country where the demand is comparatively limited. The tendency has been in most cases to erect large works and spend most of the money on them and the machinery, leaving but little for working capital; with this against them and hampered by the interest due on such large capital, and maybe on bonds also, it does not seem that good business judgment has been displayed. Smaller establishments placed on a paying basis with sufficient working capital to tide them over the first struggle for existence would have not only given more confidence in the place but would also have brought other enterprises in without the lavish expenditure of money which has taken place. Nothing detracts so much from the appearance of a town as half finished or idle works, and the natural supposition is that the owners did not have sufficient confidence in the place to put them in operation.

A list, taken from a circular published by the town company, shows the industries and the high capitalization referred to. It summarizes as follows: Industries, \$15,731,000 capital; land companies, \$4,920,000; banks, \$1,600,000; building companies, etc., \$1,300,000; railroads, built and projected, \$32,222,000; total, \$55,773,000. Of the item of railroads, by far the larger part of the capital is in roads "projected" and a considerable number of these are never likely to go further.

The Watts syndicate completed its furnaces and steel plant some time ago but has not yet gone into operation; other of the companies have done a certain amount of work, some plans are completed, some nearly so, others with only foundations laid, and again others no further than the issue of stock and election of officers.

(To be continued.)

Mexican Copper Shipments.—The amount of Mexican copper shipped to England in 1891 is given in a London paper as 3,516 tons, an increase over 1890 of 181 tons. This copper comes mostly from the Boléo mines.

The Metallurgical Works in France, in 1889, produced the following amounts of the various metals: Pig iron, 1,734,000 tons; zinc, 17,982 tons; lead, 5,372 tons; copper, 1,622 tons; nickel, 330 tons; antimony, 316 tons; gold, 400 kilos; silver, 80,942 kilos; aluminum, 14,840 kilos.

The Collieries of France produced, in 1889, 22,460,000 tons of stone coal, 1,392,000 tons of anthracite and 452,000 tons of brown coal; of which Pas de Calais produced 8,614,000 tons, Nord 4,719,000 tons and Loire 3,325,000 tons. The imports were 9,981,000 tons; exports, 943,900 tons; consumption, 33,511,000.

Discovery of Calcium Tungstate.—A discovery of economic importance has recently been made by Mr. W. F. Ferrier, B. A. Sc., of the Canadian Geological Survey, in specimens collected some years ago. The specimens were procured from an opening made for gold on a quartz vein in the township of Marlow, Beauce County, Province of Quebec, near the State of Maine boundary line. They are found to hold scheelite or calcium tungstate, of a yellowish-white color, resembling blende so much as to be mistaken for the latter. It is the intention of the owners to develop the property.

The Mineral Resources of Pomerania.—There are no minerals or metals of any consequence at present mined in Pomerania, with the exception of small quantities of ironstone and a little salt, according to a recent consular report. Lime is found on the Dicvenow River, and the Island of Rügen has inexhaustible beds of chalk. Brown-coal pits have been opened at Podejuch, on the northern edge of the Bahn plateau; in the Valley of the Oder at Dahlow, Trampke, and in the western part of the lake district; and on the shores of the Baltic at Zaskenzien, in the district of Lauenburg.

Hermets Basic Lining for Converters.—Large blocks of pure non-siliceous limestone or magnesian limestone are burned in any suitable furnace, the sole condition maintained being regularity so that they remain intact. When burned they are ready to cut up. The blocks have a great tendency to absorb moisture and must be kept hot and free from damp currents. They can be cut easily in bricks of the required size by a small band saw, and the waste is saved for use in the succeeding basic operations. The bricks must be placed quickly in the converter and if necessary liquid pitch or tar used to make them adhere, although often they will stick when merely rubbed together.

World's Production Tin.—*Zeitschrift für Angewandte Chemie* gives the following statement of the production of tin in the world, in the ten years from 1880 to 1890:

| Country. | 1880. | 1882. | 1884. | 1886. | 1888. | 1890. |
|-----------------|--------|--------|--------|--------|--------|--------|
| Cornwall..... | 8,907 | 9,500 | 9,300 | 9,000 | 9,300 | 9,500 |
| Banca..... | 3,638 | 4,400 | 4,193 | 4,346 | 4,253 | 5,164 |
| Billiton..... | 4,000 | 3,900 | 3,800 | 3,800 | 5,600 | 5,600 |
| Straits..... | 11,000 | 11,760 | 16,992 | 19,243 | 23,817 | 27,460 |
| Australian..... | 9,149 | 10,120 | 8,835 | 7,505 | 7,100 | 5,713 |
| Bolivia..... | 300 | 350 | 400 | 300 | 1,000 | 1,800 |

The figures are given in English tons of 2,240 lbs. = 1,016 kilos.

Aluminum Flash Lights.—M. Villon proposes to use aluminum instead of magnesium for flash lights, with the advantage that an exceedingly intense light is obtained without smoke. Aluminum powder is mixed with chlorate of potassium and sugar, in which condition it can be ignited, giving an intense light, but is somewhat dangerous. This powder may be burned in a spirit lamp, or, if a flame of much more brilliancy is required, in a light supplied with a jet of oxygen. The light has high actinic power and may be used in photography as is the magnesium light. The most convenient way of obtaining a very intense light, according to M. Villon, is to use a lamp provided with a jet of oxygen at the center of its flame, into which powdered aluminum mixed with a quarter of its weight of lycopodium and a twentieth of its weight of nitrate of ammonium can be projected by means of a tube furnished with an air ball. This gives an exceedingly intense light, without smoke.

DECISIONS AND RULINGS OF THE SECRETARY OF THE INTERIOR AFFECTING THE MINING INDUSTRY.

Reported for the Engineering and Mining Journal.

MINING CLAIM—PUBLISHED NOTICE—RIGHT OF WAY ACT OF JUNE, 1872—MINERAL PATENT.

1. The published notice of application is sufficiently definite in the matter of showing the connection of a mining claim with the public survey where it identifies said claim by connecting the same with a corner of a patented town site which is also the corner of a patented placer claim, both of which are connected with a government mineral monument.
2. The object of publishing a notice is to afford to all parties claiming adversely an opportunity of presenting their claims and, therefore, the notice should sufficiently identify the claim for that purpose.
3. A mining claim in conflict with a prior grant to a railroad company for station purposes, may pass to a patent, subject however to the right of occupancy by the company as to the part in controversy.
4. A survey of a mining claim is "incorporated" in the patent by law. It is then finally and permanently fixed and determined beyond possibility of alteration. The patent is a quit claim deed from the United States and is recorded upon its public records, and is notice to the world of all it contains.—*In re Eugene McCarthy and the Denver & Rio Grande R. R. Co.* [Rendered Jan. 27; prom. Feb. 9, 1892].

COAL LAND—EXPERT TESTIMONY, ETC.

In determining the character of land alleged to be mainly valuable for coal the extent of the deposit may be shown by the testimony of geological experts and practical miners, taken in connection with the actual production of coal.—*Rucker et al vs. Knisley* [Ren. Jan. 28; prom. Feb. 9, 1892].

A NEW TYPE OF THE SULLIVAN DIAMOND DRILL.

One of the most interesting features of the advancement in mining processes is the increased use of the diamond drill. The favor in which it

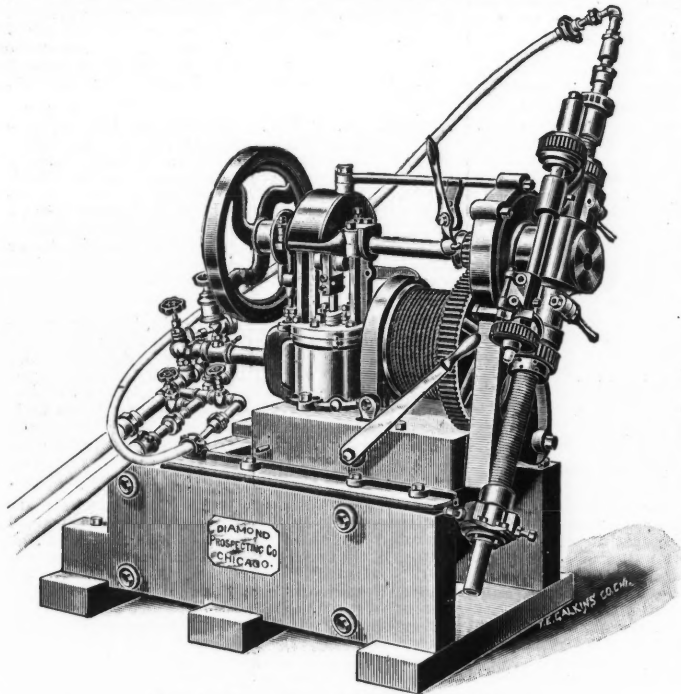


FIG. 1.—SULLIVAN "S" DIAMOND DRILL.

is regarded among mining men is especially marked in Colorado, where 25 or 30 leading mining companies have purchased, of the Diamond Prospecting Company, of Chicago, "Sullivan" Diamond Drills within the last two or three years. The latest "Sullivan Diamond Prospecting Core Drill" is shown in the accompanying cut of the "S." Drill, Fig. 1. This drill is designed for either surface or underground work, and will be found especially convenient for examining new property and afterward for developing the mine and locating new ore bodies. It has a hoist and frame for convenience in surface work, and its "friction" feeding device, used on some other types of Sullivan Diamond Drills, is the safest, most economical and most compact arrangement for underground work.

OFFICIAL REPORTS.

Quicksilver Mining Company, of California.

According to the official report of this company, just issued, the production of the New Almaden mines in 1891 was \$8,200 flasks of quicksilver, valued at \$324,718.19, or an average of \$39.60 per flask; miscellaneous earnings amounted to \$16,461.75, making a total of \$341,179.94. Thus the year's operations showed a loss of \$57,523.96, or \$6.97 per flask. In 1890, the output was 12,000 flasks valued at \$620,007.96, or \$51.66 per flask, and the total earnings \$688,010.48. The total profits for the year were \$281,536.47, or \$23.51 per flask.

The expenses in 1891 were divided as follows: Mine and hacienda pay rolls, \$268,516.11; miscellaneous taxes, and ore account reduced, \$60,799.29; supplies consumed, \$69,388.50; total, \$398,703.90; total cost per flask, \$48.62, net cost per flask (ascertained by deducting amounts to credit miscellaneous and account increased), \$46.57. In 1890 the total cost per flask was \$33.37, and the net cost \$28.20, while the average for 21

years, 1871—1891 inclusive, has been \$25.09 and \$23.03, total and net respectively.

Since January 1, 1871, the company has produced 389,122 flasks of quicksilver, valued at \$14,132,838.47, and has received \$806,216.94 from miscellaneous sources. Operating expenses during the same period were \$9,766,050.79, leaving a balance of \$5,173,004.62. Of this balance, \$969,475.26 was expended in California, \$897,500.26 being for improvements at the property. Of the profits remitted to New York (\$4,203,529.36), the sum of \$3,475,083.05 was paid in dividends and on the funded debt, while the balance is accounted for by interest on funded debt, taxes, expenses, and assets in New York. The company is entirely free from debt. The dividend payments amount to \$1,975,083.05, including \$1.25 per share (\$53,641.25) paid on the preferred stock in 1891, which was the only dividend paid last year.

From July, 1850, to December 31st, 1891, the New Almaden mines produced 1,359,258,140 lbs. of ore, from which 914,088 flasks of quicksilver were distilled. The average yield of the ore during this period was 5.2%. For the past 10 years the average yield has been as follows: 1881, 3.1%; 1882, 2.97%; 1883, 2.87%; 1884, 1.93%; 1885, 2.07%; 1886, 1.69%; 1887, 2.38%; 1888, 2.4%; 1889, 1.73%; 1890, 2.02%; 1891, 1.22%. The highest average yield was in 1851, when it was 36.74%; from that figure the rate fell to 20% in 1863, and to 10% in 1866; in 1873, 4.87% was the average and since that time it has ranged generally between 2% and 4%. The rate for 1891 was the lowest in this period of 38 years, 3 months.

The product of Enriqueta from 1860 to 1863 was 10,571 flasks, and the total product of all mines on the company's property, 924,659 flasks of 76 1/2 lbs. each, or 70,736,413 1/2 lbs.

Hon. J. B. Randol, who has been the manager of the New Almaden mines for many years, describes the work in the mines, in his brief but admirable report, from which we have quoted, as follows:

The quicksilver mines and reduction works of New Almaden are situated 15 miles south of San Jose, Santa Clara County, Cal., in the Santa Cruz Mountains, at an elevation of 1,700 ft. above the sea. These mines were first worked for quicksilver in 1845, but the operations were on a small scale, and no record exists earlier than 1850. They have been the most productive quicksilver mines in the world, excepting only the mine of Almaden, in Spain. They are developed to a depth of 2,300 ft., and the workings extend horizontally over an area one mile square. From January 1st, 1864, to December 31st, 1891, the number of feet of drifting and sinking in the mines of the Quicksilver Mining Company, as shown by the records, amounted to 49.11 miles, at a cost of \$2,191,831.95. This does not include the excavation made in extracting ore during the period named, nor any expenses for the same; while for the ground opened up during the previous period (from 1850 to 1864) 15 more miles of drifting and sinking can be added. The reduction works consist of eight furnaces, include the most improved methods for working quicksilver ores, and may be considered as the most complete and perfect in every respect in the world.

The Mineral Production of Australasia.—The mineral products of Australasia in 1890 reached the value of £12,283,391, of which New South Wales contributed £5,003,903, or 40.74%, chiefly from silver, silver-lead, and coal. The proportion produced by Queensland was 20.5%, and Victoria stood in the third place with 20.5%. The total mineral production of Australasia up to the end of 1890 reached the enormous value of £428,125,250. More than half this amount, or £227,357,436, is due to the gold of Victoria, the total mineral production of that colony being equal to £228,620,009. The second place is occupied by New South Wales, with a production valued at £80,456,039, New Zealand being third with £55,529,645.

Calorific Value of Coal in Different Furnaces.—Knowing temperatures obtained in different furnaces and the quantity of CO₂ in any coal the calorific value of 100 kilos of the latter in the former may be determined. These values are given by a writer in *Zeitschrift Vereins Deutscher Ingenieur*, in the following table:

| | Calorific value of 100 kilos coal. Thermal units. | Quantity of coal used for 100 kilos. | | Difference. |
|---------------------------------|---|--------------------------------------|----------|-------------|
| | | Theoretical. | Actual. | |
| Steam boiler..... | 500,000—555,000 | 12.5—11.4 | 12—15 | 0.6—2.5 |
| Lime kiln..... | 450,000—575,000 | 19.1—15.3 | 18—30—43 | 2.7—11—24 |
| Sulphate oven..... | 450,000 | 19.1 | 35 | 16 |
| Chloride magnesium furnace..... | 450,000 | 25.8 | 90—100 | 64—74 |
| Soda furnace..... | 350,000 | 35.6 | 60 | 24.4 |
| Blende furnace..... | 350,000 | 8.2 | 18 | 26 |

Differences are principally due to radiation and convection of the different furnaces, and numerous minor sources of loss which cannot be enumerated.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects issued by the United States Patent Office:

- TUESDAY, February 9th, 1892.
- 468,393. Earth Excavator. Benjamin F. Johnson, Mansfield, O.
 - 468,396. Brick Machine. Joseph B. Mowry, Mansfield, O.
 - 468,404. Composition for Bricks. William Wade, Louisville, Assignor of one-half, by direct and mesne assignments, to Henry M. Morrow and W. N. Williams, both of Omaha, Neb.
 - 468,406. Ore Washer. Ernest E. Crepin, Chicago, Ill.
 - 468,332. Platform for Open Hearth Furnaces. Edward L. Ford, Youngstown, O.
 - 468,333. Metallurgical Plant. Edward L. Ford, Youngstown, O.
 - 468,340. Ore Separator. Henry Cane, Spokane Falls, Wash., Assignor of one-half to Walter Gerson, same place.
 - 468,341. Crushing Mill. Frank A. Huntington, San Francisco, Cal.
 - 468,382. Machine for Bending Metal Bars. Haas A. Schneekloth, New York, N. Y.
 - 468,399. Magnetic Separator. Erminio Ferraris, Turin, Italy.
 - 468,651. Brick or Tile Machine. Egbert M. Freese, Plymouth, O.
 - 468,655. Machine for Rolling Hollow Rods or Bars. John S. Griffin, Roslyn, Wash.
 - 468,736. Furnace for Roasting Ores. Charles M. Allen, Butte City, Mont., Assignor of one-half to George Labram, same place.
 - 468,738. Fishing Tool for Deep Wells. William F. Boyd, Alum Rock, Assignor to Charles M. Heeter, Butler, Pa.

PERSONALS.

Mr. Graham Pope, of Houghton, Mich., and a well known copper miner in the Lake region, has assumed charge of the Franklin mine, vice Capt. Johnson Vivian, resigned.

Mr. A. S. Dwight, late superintendent of the Colorado Smelting Company, of Pueblo, has been made manager of the Great Falls smelter of the Montana Smelting Company. Mr. W. H. Aldridge succeeds Mr. Dwight at Pueblo.

Mr. Wm. M. Curtis, mining engineer, is absent in Cuba making examination of every extensive deposits of iron ore in the interest of a Detroit Syndicate. His temporary address is Santiago de Cuba, in care of the American Consul.

Mr. H. P. Lillibridge, of Colorado Springs, Colo., was elected secretary and treasurer and a director of the Mollie Gibson Consolidated Mining and Milling Company, the Argentum-Juniata Mining Company, the Aspen Contact Mining Company, and the Bi-Metallic Mining and Milling Company, at their annual meetings held at Colorado Springs Jan. 29, 1892.

The *American Geologist* devotes its February number to a memorial sketch of the late Alexander Winchell, the eminent geologist, who died February 19th, 1891. Dr. Winchell was one of the founders and editors of the *American Geologist*, and one of its most able and voluminous writers. This editorial tribute will be received with pleasure by all who have heard Dr. Winchell in the class room and on the lecture platform, or have read his writings. An excellent engraving of him forms the frontispiece of this memorial number.

Mr. J. Howard Cowperthwait, of New York, has written a book of 240 pages octavo, which Messrs. Putnam now have in press, on the silver question. The subject is treated from every point of view as will be seen from the table of contents: Evolution of Money, Trade, and Finance—Movements of Prices—India and Her Silver Rupee—Prices and Wages—Labor-Saving Machinery—The "Debtor Class"—"Balance of Trade"—Foreign Exchange—Discussion with Silver Advocates—The Volume-of-Money Theory—Bimetallism; International Conferences; the Present Silver and Currency Law, with Arguments for its Repeal.

Mr. Andrew Carnegie delivered an address on the "Gospel of Wealth" in the Fourth Universalist Church, New York, on Sunday evening, February 7th. Among other things he said: "The gospel of wealth is comprised in a few words. Surplus wealth is a sacred trust which its possessor is bound to administer in his lifetime for the good of the community from which it was derived. The wealth gathered into one great stream is capable of doing more public good than if it had remained scattered in the hands of thousands, probably to be frittered away. To establish a Cooper Institute, of New York, or a Pratt Institute, of Brooklyn, a Drexel Institute, of Philadelphia, the Pratt Libraries, of Baltimore, to bestow a public park or hospital requires a great sum, which, dispersed among the masses, we make bold to say, would be productive of infinitely less good than if concentrated into the hand of one who considers himself the trustee of the poor and establishes such an institution. The only proper use of wealth is to administer it carefully in helping men and women to help themselves. The question arises: How are the hoarders who evade the gospel of wealth to be reached—those who fail to administer their surplus as a trust for the good of their fellows? The greatest care must be taken not to impair the forces of acquisition. The mainspring of enterprise is still selfish gain. The human being must not be restrained from gathering and laying up honey in the social hive, for the community is more interested in the accumulation of wealth than the individual who acquires it, for under present conditions wealth is the slave of genuine progress. We must let the worker alone during his life, but after his death the state should step in and demand its share of his hoard, through a graduated system of taxation. Every fortune left by a hoarder should contribute to the state in proportion to its size; small amounts left to those dependent upon the decedent being exempt, but the scale rising by steps until with enormous fortunes reaching into many millions it should be decreed that one-half goes to the privy coffers of the state."

OBITUARY.

Humphrey Rees, one of the oldest and best known miners on the Mother Lode, California, died on the 24th ult. at Sutter Creek, at the age of seventy years. He was a native of Wales.

Alfred E. Hyde, brother of Mr. E. A. Hyde, of the well known house of Forsythe, Hyde & Co., died at his residence, at South Evanston, Ill., on the 30th ult. For a number of years he had been identified with the firm of which his brother is a member and was widely and favorably known in the iron trade, in which he had been engaged for about ten years.

James Augustus Grant, the companion of Speke in his African explorations, died on the 11th inst. at his birthplace, Nairn, Scotland, aged 65. Lieut.

Col. Grant had attained his rank in well-fought battles in the Sepoy rebellion and in the Abyssinian campaign, but will be remembered in history chiefly on account of his journey with Speke, his old friend, into King Mtesa's territories and on Lake Victoria Nyanza.

Alexander Watt, well known as the author of a number of works on electro-metallurgy, died in London on January 15th. Mr. Watt was born in 1823 and was educated at Camden Town with the view of entering the medical profession. In 1839, however, he began the study of electro-metallurgy and electro-chemistry, and followed these studies as a profession. He made a number of improvements in the art of electro-deposition, which gained him no little fame and for years he was employed both as consulting engineer to works and as expert witness in important law suits. Besides being a contributor to numerous technical journals on the transactions of various scientific societies Mr. Watt, who was an indefatigable worker, was the author of "Electro-Metallurgy" and "Electro-Deposition," both well known authorities on the subjects of which they treat.

William Guy Peck died suddenly at his home in Greenwich, Conn., on the 7th inst. He was 72 years old. Prof. Peck was born at Litchfield, Conn., October 16th, 1820. He graduated from the United States Military Academy at West Point in 1844, and was brevetted Second Lieutenant of Topographical Engineers in the same year. He served under Gen. John C. Frémont in his third expedition; and during the Mexican war with the Army of the West under Gen. Stephen W. Kearney. While he remained in the army he was Professor in Natural Philosophy and Mathematics at West Point. He resigned his commission October 2d, 1855, and afterward became Professor of Physics and Civil Engineering in the University of Michigan. In 1857 he was elected Adjunct Professor of Pure Mathematics in Columbia College and in 1859 was promoted to the full professorship. He also filled the chairs of mechanics and astronomy in the same institution, having classes in both the School of Arts and the School of Mines. He received the degrees of A. M. and LL. D. from the Trinity College, Hartford, and that of Ph. D. from Columbia. He served as a member of the Board of Visitors to the United States Military Academy in 1868. He published, in 1859, "The Elements of Mechanics," in 1860, an edition of Ganot's "Physics," and was joint editor with Charles Davies of the Mathematical Dictionary and Cyclopaedia of Mathematical Science. He wrote several other text books in mathematics. Prof. Peck continued his work at Columbia College until about a week ago.

SOCETIES.

The Engineers' Club of Philadelphia held a business meeting on the 6th inst., with President James Christie in the chair, and about 50 members present. The president was authorized to appoint from the committee on land-locked navigation a sub-committee to co-operate with similar committees of the Philadelphia Trades League and of the New York Board of Trade and Transportation, with reference to a proposed ship canal across the State of New Jersey, and, at the suggestion of Captain Spencer C. McCorkle, chairman of the committee on land-locked navigation, appointed Messrs. Rudolph Hering, Foster Crowell, L. M. Haupt, and William Swift as the sub-committee. Mr. J. J. McKee exhibited a series of lantern slides, illustrating the progress of work upon the pipe lines of the East Jersey Water Company, and was warmly applauded. Mr. Clemens Herschel, the engineer in charge of the work, participated in the discussion which followed.

The executive committee of Engineering Societies, Columbian Exposition, has issued a circular announcing that engineering has been made an independent department in the World's Congresses to be held in 1893, under the auspices of the World's Columbia Exposition. Its conduct has been intrusted to a general committee of the auxiliary on Engineering Congresses, appointed by President C. C. Bonney, which consists practically of the committee already appointed by the engineering society, of the United States and Canada. It is proposed to assign the work of organization and management of the various divisions as follows: Div. A. Civil Engineering, to American Society of Civil Engineers; Div. B. Mechanical Engineering, to American Society of Mechanical Engineers; Div. C. Mining Engineering, to American Institute of Mining Engineers; Div. D. Metallurgical Engineering, to American Institute of Mining Engineers; Div. E. Electrical Engineering, to American Institute of Electrical Engineers; Div. F. Military Engineering, to Engineer Officers, U. S. A.; Div. G. Marine and Naval Engineering, to Engineer Officers, U. S. N. The order of proceedings, and the list of subjects from which selections may be made for the work of the congress, are tentative, and suggestions are cordially invited. There will probably be occasion for several joint sessions of two or more divisions, to discuss questions of general interest, and these together with the programme and the order of papers and discussion, to avoid duplication or mutual interference, will be in immediate charge

of the general committee of the auxiliary, in consultation with the officers of the several divisions. It is desired that the various bodies to whose care these several divisions are intrusted, shall take early steps toward organizing their division.

INDUSTRIAL NOTES.

The Haugh-Ketchum Iron Works, at Haughville, Ind., were destroyed by fire on the 7th inst.; loss, \$120,000.

The Rarig Iron Works, of Buena Vista, Va., made an assignment on the 10th inst., with liabilities of \$80,000.

The first steel plate from the West Superior steel and iron plant has been delivered to the whaleback shipyards.

The Chester Pipe and Tube Company, of South Chester, Pa., has placed the contract for its new building with the Berlin Iron Bridge Company, of East Berlin, Conn. The building will be 52 ft. in width by 170 ft. long and constructed entirely of iron, no wood work being used about the construction.

The Henry R. Worthington Company has been incorporated in New Jersey, with a capital of \$3,500,000. The company will conduct the pump business heretofore carried on by Henry Worthington in New York. The incorporators are Charles C. Worthington, of Irvington, N. Y.; William A. Perry, of Bay Ridge, N. Y.; Josephus F. Holloway, of New York; Theodore F. Miller, of Brooklyn, and Horace G. H. Tarr, of Montclair, N. J.

The Illinois Steel Company's stockholders held their annual meeting last week, and re-elected the old Board of Directors with the exception of O. W. Potter, who was succeeded by Robert Forsythe. The old officers were re-elected. The annual report shows net profits for the year of \$1,088,777, equal to 5.57% on the stock. A surplus of \$930,517 was carried forward from the preceding year, making the total profits to December 31st, 1891, \$1,969,294.

Messrs. W. & D. C. Thomson, of the Dundee Courier and Dundee Weekly News, have just ordered from Messrs. Hoe & Co., of New York, a large new printing press known as the Hoe's quadruple rotary. This machine will be the pioneer quadruple press in Scotland, and will be fitted with all the latest improvements applied to modern printing machines. It will be capable of printing a great variety of sizes from four pages to twenty four, at a speed of 50,000 eight-page papers per hour.

An English syndicate, it is said, has agreed to furnish the money to build the Mexican Northern Pacific Railroad. The road is already graded from Deming, 186 miles south, and will, when completed, be 1,400 miles long, having its terminal at Topolambo. There will also be spurs running to Chihuahua and Guadamas. Another spur or branch will be run from El Paso to connect with the main line at Corralitos, thus giving close connection with the Texas Pacific and other American roads.

The Edison General Electric Company held its annual meeting in New York on the 10th inst. The following board of trustees was elected: C. H. Coster, Thomas A. Edison, J. H. Herrick, Samuel Insull, Edward H. Johnson, A. Marcus, Carl Schurz, Francis S. Smithers, Henry Villard and J. Hood Wright. The annual report to the shareholders shows that the gross business of the company in 1891 was \$10,942,640, on which the profits, including \$271,592 written off against the cost of plants, were \$1,066,535. General receipts at the main office increased the net earnings to \$1,749,549. The net result of the year for the Edison General Electric Company alone was \$1,191,479. The general balance sheet shows a footing of \$21,507,234, against \$17,958,852 in 1890.

H. E. Collins & Co. inform us that Messrs. Witherbee, Sherman & Co., after using one Ball-Norton Separator in their concentrating works at Mineville, Essex County, N. Y., for seven months, have just put in operation a second machine. The Magnetic Iron Ore Company of Benson Mines, New York, after using three Ball-Norton Separators for a year, have just put in a fourth. Dr. H. K. Hartzell, whose separating plant burned, and together with it a Ball-Norton Separator, has ordered a second one to take its place. Wm. P. Shinn, proprietor of the Clover Hill Mine and Separator at Croton Falls, N. Y., has ordered a Ball-Norton Separator. The new Ball-Norton Separator has a capacity to treat 500 tons of ore daily.

Representative Andrew, of Massachusetts, introduced in Congress on the 8th inst. "A bill to reduce the duty on certain manufactures of iron and steel and on crude iron and waste iron and steel and iron ore." The text of the bill is as follows:

SECTION 1. That from and after the passage of this act there shall be levied, collected and paid upon the following articles imported into the United States from foreign countries duties as follows:

Upon beams, girders, joists, angles, channels, car truck channels, T T columns and posts, or parts or sections of columns and posts, deck and bulk beams and building forms, together with all other structural

shapes of iron or steel, when plain, six-tenths of one cent per lb., and upon the same when punched or fitted for use seven-tenths of one cent per lb.

Upon railway bars of iron or steel and railway bars made in part of steel rails, and punched iron or steel flat rails, four-tenths of one cent per pound.

Upon cast iron pipe of every description seven-tenths of one cent per pound.

Upon iron in pigs, iron kettles, spiegeleisen, ferro-manganese, ferro-silicon, wrought and cast scrap iron, and scrap steel an ad valorem duty of 5%. But nothing shall be deemed scrap iron or scrap steel except waste or refuse scrap iron or steel, fit only to be remanufactured.

SEC. 2.—And he it further enacted that from and after the passage of this act iron ore of every description shall be free of duty.

The bill was referred to the Committee on Ways and Means, and Mr. Andrew will appear before that committee to urge its passage as soon as the committee gives him an opportunity. Prominent iron manufacturers may also appear if the committee indicates a desire to hear them.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

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

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

No charge will be made for these services.

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

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

GOODS WANTED AT HOME.

- 2,559. A good second-hand tripod suitable for "Ingersoll steam rock drill." North Carolina.
- 2,560. Barb wire for fencing. North Carolina.
- 2,561. A small engine and saw-mill. Tennessee.
- 2,562. Shingle machine. Tennessee.
- 2,563. Two second-hand drills for working in marble quarry, one tripod and one bar drill; must be in good order. Tennessee.
- 2,564. Gin press, pulleys and belting. Georgia.
- 2,565. A plate planer, steam riveter and power blacksmith hammer, Illinois.
- 2,566. A small 30-in. or 36-in. round copper smelting water jacket furnace, with fittings complete; must be in good condition. Georgia.
- 2,567. A 9 x 12 cylinder Atlas engine and a 16 ft. long, 36-in. diameter steel 2-flued boiler with 30 ft. of stack. Louisiana.
- 2,568. A 4-sided planer and matcher. North Carolina.
- 2,569. Belting, shafting and pulleys. North Carolina.
- 2,570. Dry kiln, for 4,000 ft. daily; exhaust fan and blower. North Carolina.
- 2,571. A 25-h. p. return tubular boiler (3-in. tubes), half front, with all fittings complete. South Carolina.
- 2,572. An entire outfit of second-hand barrel heading machinery; also, a good wood turning lathe for making handles. Virginia.
- 2,573. A complete line of hoop machinery. Florida.
- 2,574. An outfit of machinery for a flour and meal mill with a capacity of 150 bbls. per day. Kentucky.
- 2,575. A second-hand Sullivan diamond prospecting core drill, size "E" (on frame, for surface prospecting), or size "M" (hand power). Virginia.
- 2,576. A machine to make two tons of ice in 24 hours and cool a meat room 14 ft. x 20 ft. x 8 ft. high to a temperature of 38°. West Virginia.

AMERICAN GOODS WANTED ABROAD.

- 2,556. Machinery for a mine, including a 25-H. P. and a 40-H. P. wood burning boiler on skids; a horizontal plunger pump 250 gallons per minute, tank of 40,000 gallons capacity; and 4,000 feet 4-in. wrought iron piping. South America.
- 2,558. Catalogues of water wheels, gigs, concentrators, wire tramways, chain elevators, calculators and electric mining machinery. Tasmania.

GENERAL MINING NEWS.

ST. LOUIS ORE AND STEEL COMPANY.—In the United States Court at St. Louis, Mo., on the 8th inst., a decree of foreclosure and sale of this company's property was made by Judge Thayer, on the petition of the Farmers' Loan and Trust Company of York. The property, which comprises the Vulcan Iron Works in Carondelet, a railroad at Grand Tower, Ill., and several coal mines, is to be sold next April. The company neither objected nor consented to the sale.

SOCIETE ANONYME DES MINES DE LEXINGTON.—The production of the mines of this company in December was \$72,100. The total production in 1891 was \$812,900, against \$626,200 in 1890.

It is rumored that a four foot body of 80-oz. ore has been struck on the 1,400-ft. level of the Lexington mine, at Butte, Mont. Prospecting at this level has been going on for over a year, and is the greatest depth attained in Butte.

ARIZONA.

The following statements, showing financial condition on the 31st ult. of Arizona mines listed on the San Francisco Stock Exchange, were filed last week: *Cash*—Crocker, \$4,437.50; Peerless, \$4,989.88; Silver King, \$631.49. *Indebtedness*—Peer, \$5,503.23, with bullion shipments to be received; Weldon, \$313.20.

GILA COUNTY.

OLD DOMINION COPPER COMPANY.—It will be ten years next June since the Old Dominion Company inaugurated smelting ore, from the Globe mine, on Pinal Creek, says the *Globe Silver Bell*. This was an important event in the history of the mining industry of Globe, marking the first really successful attempt to smelt copper ores in this district. The company had previously worked its mines near Bloody Tanks and smelted some ore there, but with indifferent success. In 1882 the output was 1,940,710 lbs., and the total production up to January, 1892, by the old and new companies, has been 50,351,645 lbs. The present works were constructed after plans furnished by the superintendent of the company, A. L. Walker. On Saturday, January 16th, the fires in the first furnace were lighted, followed the next day by the starting of the second furnace, and they have since been making an output of from 25,000 to 28,000 lbs. daily. The smelter has three furnaces, with a total capacity of 170 tons.

CALIFORNIA.

EL DORADO COUNTY.

(From an Occasional Correspondent.)

BARNES.—This mine has been taken up by San Francisco parties, after being idle for several years, and is now being unwatered. It has the reputation of being rich in places, but is an irregular and pockety ledge.

BLAIR.—The tunnel started on Weber Creek, nine miles from Placerville, and running north, has recently struck gravel showing good prospects. The extent of the channel is not known as yet. The tunnel is 1,500 ft. long.

BOBBY BURNS.—This is a property which was worked on a small scale several years ago; it has now been bought by Mr. Gonzales who is at present building a 10-stamp mill there. The ledge is located eight miles from Placerville, near the Lake Tahoe road.

CHURCH UNION.—This mine is kept running constantly. The mill of 15 stamps was built about three years ago and the mine has proved itself to be a rich and steady producer.

COLEMAN.—This mine, five miles south of Placerville, was shut down a month ago. It is reported it did not meet expectations.

DALMATIA.—The electric plant of this mine has been described in the *ENGINEERING AND MINING JOURNAL*. The mill has been running successfully the whole year, but is now shut down during the absence in London of the manager and superintendent, Messrs. Pearson and Husband. It is rumored that the interests of this, the American River Company, and those of the Sierra Nevada Land & Water Company will shortly be consolidated. The former owns the Dalmatia, the Boulder-Gopher, and the St. Lawrence on the Georgetown divide, while the latter has mines and water rights on the Placerville divide.

GENTLE ANNIE.—This large deposit of low grade ore has been successfully worked during the past year. The 10-stamp mill has been shut down for the last week owing to a break in the Placerville ditch.

HARMON & Co.—A few miles from Placerville and not far from "Fort Jim" Messrs. Harmon & Co. have erected a 10-stamp mill on a large low grade deposit between State and Serpentine. The mill started up two months ago, and it is generally believed that the enterprise will be successful.

MELTON.—A sale of this property at Grizzly Flat is in prospect; a representative of eastern capitalists has recently sampled the mine.

SHAW.—This mine, in the slate belt, near Mud Springs, has been running its Huntington mill with regularity for the whole year and with good success.

SIERRA LAND AND WATER COMPANY.—Work on the Pacific mine has been suspended. On the Harmon mine, north of the Pacific, some exploration work has been done, and a shipment of the ore is now being crushed at the True Consolidated mill.

ST. LAWENCE.—A Huntington mill has been put up on this property by the American River Company in order to work over the old dump. It is run by the electric plant six miles distant, which supplies the Dalmatia with power.

TAYLOR.—This mine now usually referred to as the "Idlewild" has proved itself to be a most excellent property. The Idlewild Company took

hold of it about two years ago and has since then opened up a large ore body. The 20-stamp mill is running steadily. An electric plant to run pumps and Burleigh drills will shortly be installed.

INYO COUNTY.

T. H. Watney, H. Walton, Thomas and J. Remfry, who have been inspecting the soda works at Owens Lake and the lands of Owens Valley, in Inyo County, have returned to London. They represent heavy English capitalists, and it is understood that they are favorably impressed with the soda and land properties and will recommend their purchase.

MONO COUNTY.

The following statements showing financial condition on the 31st ult. of Bodie mines, listed on the San Francisco Stock Exchange, were filed last week: *Cash*—Bodie Consolidated, \$14,788.04; Bulwer, \$15,334.45; Mono, \$5,853.79; Standard, \$29,039.47; Syndicate, \$2,291.10.

BODIE CONSOLIDATED MINING COMPANY.—According to the latest official letter from this company, the ore in upraise No. 1, above the 500-ft. level of the Jupiter shaft, still holds and is of good milling quality.

NEVADA COUNTY.

PROVIDENCE MINING COMPANY.—This company's mill has been started up with 15 stamps.

SAN BERNARDINO COUNTY.

According to the *Riverside Enterprise*, the tin mines continue to ship from 10 to 20 tons of pig tin each month. While there is not so large a number of men at work as formerly, the production of tin is steady. The ore found is rich, although the vein is not continuous at the depth which has been reached. About 100 men are constantly employed in the works.

COLORADO.

BOULDER COUNTY.

ORPHAN BOY.—A strike is reported at this property, near Copper Rock station on the narrow gauge road. The find is on the divide between Bald Mountain and Sugar Loaf, about a quarter of a mile south of the railroad station. The owners ran an adit 40 ft. long on the vein and struck this streak at a depth of 10 ft. It is very much like the Golden Age ore.

DOLORES COUNTY.

BLACKHAWK.—It is announced that this mine at Rico has been sold to Messrs. Otto Mears, Crawford and Posey for \$200,000. It is estimated that there is about that amount of ore in sight.

GUNNISON COUNTY.

YULE CREEK MARBLE AND MINING COMPANY.—This company has filed articles of incorporation for the purpose of constructing a line of railroad from the marble quarries at Yule Creek to connect with the Denver & Rio Grande Railroad. The capitalization of the company is \$1,000,000, and the incorporators are Frank O. Woods, Charles N. Perkins and R. L. Gaff; the directors are Morris J. Keck, W. E. Renshaw, J. Ridgway Wright, J. R. Beckley, W. R. Longshore, H. T. Alkins, Henry C. Terchard and G. Mortimer Lewis. The principal office of the company is at Colorado Springs, and operations will also be carried on in Pitkin County. The same gentlemen are named as incorporators and directors of the Yule Creek Slate and Mining Company, capitalization \$500,000.

HINSDALE COUNTY.

BROKER.—This mine at Lake City is making regular shipments as development work goes on. Next month shaft No. 1, now down 200 ft., will be sunk 65 ft. more and another level started.

LAKE COUNTY.

(From our Special Correspondent.)

A. Y. AND MINNIE.—Big bodies of ore are being continually operated in these mines, principally lead carbonate. No. 3 ore chute, which starts from the so-called "Sellers' upraise," on the north end of the property, has been followed from that point to the side line of the A. Y., and from this ore body about 1,200 tons per month are shipped, no effort being made to mine either the higher or lower grades of sulphide, in consequence of which the concentration mill has been idle for months. Parallel to this chute, but about 180 ft. to the north, another big ore body has been opened; with a dike of intruded porphyry between them, lies still another big ore chute. About 35 ft. from the top of a stratum of limestone that occurs at this point, a series of caves are met with in which some rare forms of mineral and fossils are found, while the sides and bottom of each of them are covered with cerussite and other lead crystals. These mines never looked better than they do to-day.

CRESCENT MINING COMPANY.—It is not a month since the main incline of the Crescent was taken hold of under lease, but already a strike of considerable importance has been made on the fifth level. In the early days the incline was pushed ahead without much attempt at prospecting outside of the regular contract, and at this point a lime horse was encountered. The present lessees, finding that this cut out the contact, went around it to the south and have now disclosed a 4-ft. vein of very fine lead carbonate, the silver value in which is much in excess of that usually found on Carbonate Hill.

IRON SILVER MINING COMPANY.—The old Iron mine is now being worked under a lease, the Me-

Keon shaft being used for the purpose, and some very good sulphide ore is now being mined from the so-called "11th level winze workings." At the Moyer considerable activity is noticed, the output amounting to about 1,800 tons a month. This also is of an iron sulphide nature, the lower grade stuff going to the concentrating mill on the property, which is now running full time. Elevators have just been built to carry the tailings out into California gulch, and everything is working smoothly.

MAID OF ERIN SILVER MINES (LIMITED).—Connections having been made between the 700-ft. level of the Maid of Erin shaft and the Wolfstone main shaft, the sinking in the latter has been resumed. It will be sunk a further 100 ft., when drifting to the east will ensue, in order to cut through the stratum known in this district as the "parting quartzite." This was cut in the shaft, and in the so-called second contact above it, some 40 ft. of sulphide ore was passed through. As everything here dips to the east, this will again be caught at a greater depth by drifting in that direction. As it is the intention to run all of the low grade sulphide ore through the new smelting plant built and managed by Mr. Austin, the inventor of the process, on the site of the old La Plata smelter, so work is now being done in the concentrating mill on this property. Some 600 tons of this class have been sent down to these works, and the process has been proved a success in its treatment of this grade of ore. Its cheapness, and ability to handle such low grade stuff, appears to lie in the fact that nothing is wasted, the slag being quite as good for fluxing purposes in the ordinary blast furnace, as the oxidized iron ore now purchased by the smelters for that purpose.

The Adams discovery shaft has a drift run from its 600-ft. level out to the East, which drift has passed the Standard shaft of the Wolfstone about 110 ft. It is to be continued onward in that direction cutting through some 55 ft. of an intrusive sheet of gray porphyry, upon the upper surface of which lies the contact upon which the Mahala folk are now working, and shipping at the rate of 100 tons a day.

SILVER CORD COMBINATION MINING COMPANY.—A strike having been reported as having occurred in the outer heading of the Silver Cord tunnel, the mine was visited by your correspondent. While no "strike" can be reported, a fine contact between the quartzite and the overlying blue Carboniferous limestone has been met with, which upon development may prove to be a valuable one. As the energies of the management are devoted to the progress of the tunnel, which only has about 300 ft. to go to make connection with the inner heading, it is hardly probable that any development of this contact will take place just at present. * * *

OURAY COUNTY.

AMERICAN-NETTIE MINING COMPANY.—The shipments from this company's mine for the month of January reached a total of 220 tons. The mine, notwithstanding the large call made upon it last month, is said to be looking very well.

PITKIN COUNTY.

MOLLIE GIBSON CONSOLIDATED MINING AND MILLING COMPANY.—Our exchanges have brought to us this week rumors of another very rich strike at this company's mine.

PRIDE OF ASPEN.—It is reported that a strike has been made in the face of the drift being run from the 160-ft. level of this property on West Aspen Mountain. The tunnel level of this mine continues to produce its 40-oz., ore and shipping uninterrupted.

RED JACKET MINING COMPANY.—A meeting of the shareholders of this company was held on the 5th inst. at St. Louis, Mo., to consider a proposition to purchase the Wilton Bell No. 2 lode now being worked by the company under lease at Aspen. The company has run the tunnel on this property to a distance of about 700 ft. with most encouraging indications of reaching the ore body on its claim; but the purpose of the directors is now to continue the tunnel enterprise through Copper Hill to the distance of 3,000 ft. for the purpose of tapping the extensive veins and chutes of ore which are thought to exist in the tunnel's course. To prosecute this work it was determined to purchase this claim, and for this purpose a company was organized to be known as the Highland Mining and Tunneling Company, of Aspen, Colo., with a capital of \$1,000,000. The Red Jacket Company still retains the leases on the three other claims, and every member of the company receives a similar number of shares in the new company as they held in the original organization.

SAGUACHE COUNTY.

AMETHYST.—This mine is said to be shipping 35 tons of \$80 ore per day.

ETHEL.—This mine at Creede is shipping an average of ten tons of ore per day, which assays 50% lead. A force of 20 men is employed.

LAST CHANCE.—This mine is making large shipments and is working 70 men. E. H. Crawford is the superintendent.

IDAHO.

CUSTER COUNTY.

A new gold discovery of much promise is said to have been made six or seven miles below Clayton.

SHOSHONE COUNTY.

IONE HAND, ONTARIO AND RUSTLER.—These mines are owned by Currie Bros. and Ramage. They have run a tunnel and tapped the vein at a depth of 65 ft. The vein when first struck was 15 in. wide. They then drifted 46 ft. on the vein and now have a face of 4 ft. of ore running from 50 oz. to 200 oz. in silver. It is dry ore, with no trace of lead.

PARROT.—This mine has closed down until spring. The tunnel is in some 1,300 ft. and they have about 150 ft. tons of ore on the dump. † †

ILLINOIS.

Advance sheets of the tenth annual compilation of coal production in Illinois give the following summaries: Number of counties in which coal has been mined, 57; number of mines and openings of all kinds, 918; number of tons of coal of all grades mined, 15,660,698; number of tons of lump coal, 12,960,224; number of tons of other grades, 2,700,474; number of acres worked out, 2,802.41; number of employes of all kinds, 32,951; number of miners, 26,059; average number of days of active operations, 215.6; aggregate home value of total products, \$14,257,024; average value of lump coal per ton at the mines, \$1.0084; average value of other grades per ton at the mines, \$0.4321; average price per ton paid for hand mining, \$0.71527; number of tons of lump coal mined by hand, 9,961,159; number of tons mined by hand and paid for by the day, 1,216,258; number of mining machines in use, 241; number of tons of all grades mined by the machines, 3,027,305; number of tons of lump coal mined by machines, 2,423,080; number of tons of other grades, 604,225; number of kegs of powder used, 261,392; number of men killed, 60; number of men injured so as to lose time, 367; number of tons of coal mined for each life lost, 261,011; number of tons of coal mined for each man injured, 42,672; number of employes for each life lost, 549; number of employes for each man injured, 90; number of new mines opened, including old mines reopened, 91; number of mines closed or abandoned, 104. The output for the year is greater than that of any preceding year by 321,860 tons of lump coal. The average value of coal per ton at the mines, as compared with 1890, is a decline of 1.09 cents per ton. The average of all prices paid per ton for hand mining shows an increase of 3.2 cents over 1890, though the present average is still 1.6 cents less per ton than the average of 1889. The percentages of total product mined by machines for four years are as follows: For 1891, 18.7; for 1890, 22.8; for 1889, 20.2; and for 1888, 18.9. The amount of powder used during the year has been greater by 11.1 per cent., or 26,146 kegs, than in any former year. An unusual amount of readjustment in the terms of employment was made necessary by recent legislation affecting the relations of owners and men, but, on the whole, the friction arising from this source has been less and compliance with the new laws has been more universal than was anticipated. During the month of May, however, suspensions were very general, and in some fields work was not resumed for several months. The longest and most serious interruption of business occurred in the Duquoin field, where the men were idle from May to September. Some impairment of the output of the State for the year has doubtless resulted from these causes.

INDIAN TERRITORY.

A bill extending the mining laws of Missouri over the Indian Territory was reported to the House of Representatives at Washington, D. C., on the 5th inst. This action was precipitated by the recent mine disaster at Krebs.

LEHIGH.—Fire started from an unknown cause on the 8th inst. in the stable of the Lehigh mine at Lehigh, at the entry to the slope. There were five night timbermen in the mine when the fire was discovered. The first intimation to those above ground that anything was wrong below was the signal to lift the cage. When the cage came up John O'Brien was the only man it. He and Bob Thompson and Jim Smith discovered the fire and started to make their escape. Before reaching the cage Thompson and Smith were overcome by the smoke. O'Brien assisted them until he became nearly exhausted, and finally was obliged to abandon them in order to save his own life. The other two timbermen escaped by an old shaft. Every effort was made to rescue the two men whom O'Brien had been unable to save, but to no avail.

MICHIGAN.

GOLD.

MICHIGAN GOLD COMPANY.—The force at this company's mine has been increased to 11 men. A cross-cut has been run 50 ft. south from No. 4 shaft to an 18 in. vein of quartz, and a drift started west on it. At this writing the quartz has increased in width. It carries gold, but it is of a pocket nature. The vein on the surface carries gold for nearly 200 ft. The air compressor has been put in operation.

COPPER.

The Boston Herald says there is a well founded rumor that a movement is on foot toward the restriction of copper production of the United States.

CALUMET & HECLA MINING COMPANY.—According to the Calumet Conglomerate this com-

pany in the spring will construct several new combined shaft and rock houses on the Calumet. Considerable difficulty is experienced in keeping Calumet shaft No. 2 in repair. At the time of the last fire the timber in this shaft was burnt out, and the hanging wall fell in so that it was necessary to cut down a new shaft. The hanging was so broken up at the time that it has been "coming in" ever since, and the repairing gang is kept continually at work, greatly to the hindrance of the rapid hoisting of rock. The 32d level has been reached in work of repairing. Calumet No. 4 is down to the 45th level. The pumping engine "Michigan" was started on the 3d inst. The rocking beam was repaired by putting in a brace rod and boring holes to relieve the strain and to stop any further breach. The work of driving piles for the extension of the Hecla mill is going on slowly on account of the frozen ground. The work on the Hecla sandwheel is progressing rapidly. The framework of the wheel is up and the rim nearly done. The buckets and the machinery for driving the wheel are yet to be put in. The launders for carrying off the sand will not go in before next summer, and the wheel will not be really needed until the four new heads are working.

CENTENNIAL MINING COMPANY.—The order has gone to the Lake, says the Boston Herald, to suspend work at this company's mine. The company can pay its debts and show a balance large enough, it is believed, to maintain the condition of the property and the organization. Perhaps, too, the expense of sounding for the Calumet lode with the diamond drill may be undertaken later. The Centennial has sunk to within about 700 ft. of the supposed location of the lode. It would cost \$18 per foot and some nine months' time to sink the balance of the distance. There is not money enough to pay the cost. Money has been spent in trying to develop a paying mine at a higher level instead of concentrating energies in sinking for rich conglomerate farther down: The Tamarack, Jr., has opened ground to within about 500 ft. of the Centennial boundary and found rich rock. Under a better copper market and changed conditions, the Centennial may delve deeper in the hope of striking the same rock.

HURON MINING COMPANY.—Felix Jellenik, of New York, et als. sought on the 8th inst. to obtain an injunction from the Superior Court of Massachusetts to prevent the sale of Huron stock on which there was a delinquent assessment of \$3 per share. The motion was denied. The delinquent shares were sold on the 8th inst., 152 lots, varying from five shares to three shares, each being offered. H. C. Sears bought ten shares at \$3.50, and Mr. Bateman 50 shares at \$3.25 and 2,675 shares at \$3. C. C. Dickey bought ten shares at \$3.40, and Mr. John G. Watson took all the rest at \$3.

WOLVERINE MINING COMPANY.—No. 2 shaft of this company's mine is now down 65 ft. below the sixth level. A drift has been started north at the sixth level, and some very good ground has been met with. The fifth level south of No. 2 is in 520 ft. from shaft, and has just encountered some very good ground. The fourth level is in 6.0 ft. south, the breast of the drift being in very poor ground. The rock from the stope in the second and third levels south of No. 3 contains considerable fine copper in spots. The stope in the second level north of No. 3, which in December made so good a showing, did not turn out so well last month.

IRON—MARQUETTE RANGE.

ARAGON.—This mine is producing 400 to 500 tons per day. There is but little water at present, but the flow is expected to increase somewhat in the near future, as they will begin the robbing of pillars in the upper levels.

CLEVELAND IRON MINING COMPANY.—This company is still searching for the ledge in the shaft being sunk to the west of Third street in the northern part of Ishpeming, which is down 82 ft. It is now cutting hard pan.

LUMBERMAN'S MINING COMPANY.—The situation at the Ludington mine is practically unchanged. The water is standing at 8 or 10 ft. below the seventh level and is not being lowered materially. A slight gain is made when everything works smoothly, but these gains are lost by the frequent stoppages necessary to repair some part of the machinery. From 80 to 100 tons of ore a day are being hoisted from the seventh level.

PITTSBURG & LAKE ANGELINE IRON COMPANY.—This company will install an underground ore conveyor at its East End mine, thus lessening the expense of a long haul.

IRON—MENOMINEE RANGE.

HAMILTON ORE COMPANY.—General Manager Jones states that the water in this mine is being lowered at the rate of one foot per hour. When it is said that 1,000,000 tons of ore have been extracted from the mine, and that the old stopes are full of water, an idea may be formed as to the volume which is to be pumped. The new plant of machinery has been started up. The boilers are 35 ft. long, hold 10 tons of water, and have a capacity of 1,400 gallons per minute.

In No. 2 shaft, which is 1,535 ft. deep, the water rose to 88 ft. below the collar of the shaft. The water in this shaft is evidently a local accumulation and will prove only a temporary embarrassment.

MONTANA.

Mr. Joseph Hogan, Inspector of Mines, and Mr. Jacob Oliver, his deputy, have made to Governor Toole their report for the fiscal year 1891, from which are gathered the following interesting facts: Thirty two fatal and twenty-five non-fatal accidents were investigated. Of the fatal accidents nine occurred in or about coal mines, and excepting the nine men killed in the Anaconda shaft on November 3d, the causes were nearly as numerous as the individual instances, being in the main due to the failure of the men to exercise caution or to avail themselves of the means provided for self-protection. Referring in detail to the Anaconda accident, he concludes: "I made a very careful examination, and from the information I received I do not think blame could be attached to anyone for this accident." While not criticising Mr. Hogan or the Anaconda Company, one cannot but feel that the conditions surrounding men engaged in mining should be of such a character as to utterly preclude the loss of nine human lives with "no one to blame."

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—The reduction works at Great Falls, belonging to this company, will be started, according to the Great Falls Tribune, about the first of March, by steam power, as the water power is not ready. Twenty-four gas producers have been constructed to use sand Coulee coal.

MEAGHER COUNTY.

SAPPHIRE AND RUBY COMPANY OF MONTANA, LIMITED.—The examining directors, Messrs. Streeter and Mallaby-Deeley, accompanied by an expert, Mr. J. D. Yerrington, of New York, have handed in their report to the company in London. They returned with stones to the quantity of 20,000 carats and report the property better than was represented. The precious crystals are found in situ in small seams of mica-schist which traverse the slate bedrock beneath the gravel deposits, as well as in the gravel itself. The bedrock stratum of gravel, according to the reports, is extremely valuable, some of it yielding at the rate of from \$1.00 to \$2.50 per cubic yard in gold. Twenty-five per cent. of the gems are worth cutting after rejecting the imperfectly crystallized corundums. The property the company proposes to acquire embraces 4,000 acres. The total sapphire bearing territory extends over 10 square miles. The specimens of sapphires and rubies which we have seen from these fields have not been of a very prepossessing character.

SILVER BOW COUNTY.

Joseph H. Ramsdell and wife have brought suit against William A. Clark for breach of contract during his lease of the Ramsdell Parrot mine. He claims that Clark did not pay him his share of the profit in full, and, moreover, left the mine in bad condition.

BUTTE & BOSTON MINING COMPANY.—This company is erecting another water jacket furnace of 100 tons capacity. It is employing about 400 men at the mines and smelter.

GLENGARRY MINING COMPANY.—Some beautiful ore is being taken out of this mine. One shipment of about 40 tons was recently made which was way up in the three figures. The station at the 450 level is completed, and cross cutting has just begun.

NEVADA.

The following statements showing financial condition on the 31st ult. of Nevada mines listed on the San Francisco Stock Exchange were filed last week: *Comstock Mines. Cash.*—Alpha, \$14,712.76; Alta, \$3,271.49; Andes, \$5,169.62; Benton Consolidated, \$75,324.59; Best & Belcher, \$9,794.70; Consolidated California & Virginia, \$35,163.71, with \$29,323.04 in unsold bullion, and further shipments to be made; Crown Point, \$11,125.79; Caledonia, \$9,361.33; Consolidated New York, \$4,833.30; East Sierra Nevada, \$784.20; Exchequer, \$296.58; Hale & Norcross, \$1,022.82, with \$4,281 due on pending assessment; Julia Consolidated, \$3,536.05; Justice, \$9,723.20; Kentuck, \$5,025.78; Lady Washington, \$8,329.48; Ophir, \$1,284.23; Potosi, \$1,612.78; Segregated Belcher, \$2,506.44; Scorpion, \$4,571.84; Sierra Nevada, \$8,198.44. *Indebtedness.*—Belcher, \$25,575.33; Bullion, \$900.31; Confidence, \$7,555.99; Chollar, \$37,186.47; Gould & Curry, \$9,729.90; Mexlean, \$1,021.09; Occidental Consolidated, \$12,512.01, with assessment, \$24,813.75, in course of collection; Overman, \$23,781.78; Savage, \$23,483.86; Utah, \$1,511.91; Union Consolidated, \$3,465.50. *Tuscarora mines. Cash.*—North Commonwealth, \$2,889.09; Independence, \$252.04. *Indebtedness.*—Belle Isle, \$12,515.13; Commonwealth, \$24,281.78; Del Monte, \$15,590.24; Diana, \$133.29; Grand Prize, \$5,450.49; Navajo, \$24,875.64; Nevada Queen, \$23,398.99; North Belle Isle, \$32,815.66; Union Mill Company, \$20,354.80. *Candelaria mines. Indebtedness.*—Holmes, \$40,515.94.

ELKO COUNTY.

BELLE ISLE MINING COMPANY.—No. 1 winze, No. 3 vein, extended 10 ft., showing good ore in the bottom. Have started a winze on No. 1 vein, 250-ft. level, which is showing some very fine ruby ore.

COMMONWEALTH MINING COMPANY.—Joint raise from No. 2 south intermediate drift on fourth level has reached second level, distance 105 ft. in

the vein, exposing ore about 12 in. wide, some of which is good grade; assays from \$18 to \$160 per ton.

DEL MONTE MINING COMPANY.—No. 1 raise from west drift second level reached the ore at 30 ft. It is good ore; assays, \$791.83 per ton. Started drift under the ore to connect with the line stopes. Face of drift is in 19 ft., with some ore in top. Distance through to stopes is about 50 ft. Extended 61 cars of ore.

NAVAJO MINING COMPANY.—According to the latest official letter from the superintendent the vein continues small in the south intermediate drift below the 350 ft. level. In the east intermediate drift the ore is not so high grade.

NORTH BELLE ISLE MINING COMPANY.—A crosscut has been extended 14 ft. westward from the north end of No. 3 drift, 400 level, through vein matter, cutting a seam of good ore on the hanging wall. No. 3 upraise, same level, still in good ore. South intermediate drift above the 400 shows good sized vein rich ore.

NORTH COMMONWEALTH MINING COMPANY.—No. 1 raise from west drift on second level has been advanced 20 ft. and is very close to the incline vein. Hoisted 52 cars second class ore; car sample assay, \$56 per ton.

(From our Special Correspondent.)

The sampling mill at Tuscarora is approaching completion and will be ready to receive ore when the sampling tube arrives from the East. The mill will be one of the best automatic sampling mills west of Denver.

COPTIS MINING COMPANY.—Above the first level a vein of high grade ore has been cut and now good ore is being extracted at four different points in the mine.

STOREY COMSTOCK—COMSTOCK LODGE.

SAVAGE MINING COMPANY.—The latest official letter from the superintendent says: "During the week we have hoisted 814 cars of ore from the 500, 750, 950, 1,100, 1,400 and 1,500 levels; shipped to the Nevada mill 632½ tons and milled 688 tons; average battery assay, \$20.35. Bullion yield for the week \$9,800. On the 1,500 level we are sinking in the ore below the sill floor and stoping some; these stopes show some good ore. On the Suro tunnel level the joint north drift with the Gould & Curry Company was advanced 15 ft., making the total distance 135 ft. from the Suro tunnel; face is improving. Have men on repairs and prospecting on the different levels."

SIERRA NEVADA MINING COMPANY.—Superintendent McDonald made the following report of operations in the mine during the past year: At the date of my last annual report the northwest drift from the shaft station 630 ft. level, was extended 200 ft. This drift was continued in a northwesterly direction for a distance of 362 ft. through a porphyry formation, making the total distance from shaft 571 ft. From this point a west crosscut was started and continued to the west wall of the vein, a distance of 163 ft., without showing any encouraging features. A north lateral drift was run on the foot wall for a distance of 66 ft. and discontinued.

Work was resumed in the west crosscut on April 13th, since which time it has been advanced 1,372 ft., making a total distance of 1,535 ft. from northwest drift. A cross-section of the foot wall shows the first 500 ft. to be diorite, followed by quartzite and porphyry, alternating in streaks and hunches for a distance of 200 ft., when a separation of 15 ft. was encountered. This separation or vein is a mixture of clay, quartz and porphyry, yielding assays of \$2 or \$3. Continuing for 620 ft., the general character of the formation is diorite. At this point a stream of water measuring about ten miner's inches was encountered, which is decreasing gradually. The formation beyond this water crevice is porphyry of a more promising character than anything heretofore passed through in this crosscut. Kenosha Tunnel—The work of repairing and enlarging the Kenosha Tunnel for the purpose of exploring the Sacramento croppings on Cedar Hill, 500 ft. below the surface, was commenced June 1st, 1891. The tunnel was enlarged and repaired to its face, a distance of 800 ft., and further continued a distance of 148 ft., passing through hard porphyry with occasional streaks of quartz of low assay value. A drift was started north at a point 765 ft. from the mouth of the tunnel, and advanced 546 ft. The formation passed through is vein porphyry with some clay hunches of quartz. The face of this drift is still about 400 ft. from the point where the Sacramento croppings should be intersected. All operations were suspended here on December 10th, 1891. The joint Sierra Nevada-Union Con. west drift on the line between the two mines has been advanced 1,595 ft. This drift passed through a porphyry formation with occasional clay slips for a distance of 1,506 ft., when a clay wall 60 ft. in width was encountered, beyond which a well defined body of quartz 15 ft. wide was found, which yielded low assays.

(From our Special Correspondent.)

SAN FRANCISCO, Feb. 2.

The following statement shows the output from the Comstock mines last week, and amount

shipped to the mills, with the average battery assay values:

| Mine. | Tons extracted. | Tons milled. | Assay Values— Jan. 30. | Jan. 23. |
|--------------------|-----------------|--------------|---------------------------|----------|
| Belcher..... | ..... | ..... | ..... | \$18.31 |
| Con. Cal. & Va.... | 1,017 | 980 | \$32.48 | 31.47 |
| Hale & Norcross... | 1472 | 400 | 18.68 | 18.84 |
| Overman..... | 427 | 3394 | 16.75 | 16.12 |
| Savage..... | 1814 | 688 | 20.35 | 20.57 |
| Yellow Jacket..... | 1266 | ..... | ..... | ..... |

* Several carloads being saved daily. † Cars. \$ Car sample, \$18.50. ‡ Estimated.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—Bulletin valued at \$14,576.83 has been shipped to the Carson mint, making the total to date on January account \$60,622.27.

HALE & NORCROSS MINING COMPANY.—The trial of the suit of M. W. Fox against the directors of the company and others was resumed before Judge Hebbard on Tuesday. A stipulation was filed by plaintiff's counsel showing that opposing counsel, for the new defendants, Alvinza Hayward and W. S. Hobart, agreed to admit in evidence in the case against the Nevada Mill all the oral testimony in the main suit against the Hale & Norcross directors. Senator J. P. Jones being in the East, and also F. Newlands, representing the Sharon estate, action as against them was dismissed, they being beyond the court's jurisdiction.

The first interesting point reached in the further hearing of this remarkable case was when H. F. Wood, assayer of the Selby Smelting Works, testified that in May, last year, he made an assay of Hale & Norcross slimes, which showed a value of \$62.69 per ton, of which \$45.74 was silver. C. Severs, another assayer, also made two assays of slimes from the Hale & Norcross piles, one of which gave \$19.74, and the other \$24.47 per ton. This is the material which went to the Nevada mill as tailings, and which Evan Williams testified was of practically little or no value.

W. S. Hobart, the owner of one-fifth of the stock in the Nevada Milling Company, testified how he acquired his interest in this most profitable property. He stated that he never paid anything for his stock, but had got it through pooling stocks with J. P. Jones, S. Jones, Alvinza Hayward and A. C. Hamilton. For his one-fifth interest in the stock he got a one-fifth share in the Nevada mill. No assessment had ever been levied on the mill stock, but he remembered contributing something for improvements in the mill. As he was absent in Europe at the time he had no knowledge of the details of the conversion of the mining stocks into the ownership of the mill. He confessed that his associates managed the property and he presumed, on that account, all was right. He admitted, however, that in addition to the \$60,000, which A. Hayward testified he had in his possession for the mill, he had \$80,000 undistributed profits.

Upon being questioned regarding the several checks made out in favor of H. M. Levy, President of the Hale & Norcross, Mr. H. H. Hart was very evasive and reticent and was supported by objections on the part of his counsel. He stated that while not remembering why particular checks were paid he did remember talking the matter over in one instance and agreeing to pay the money on Williams' order.

"Do you mean to say," queried counsel, "that if Mr. Williams gave an order on you to draw \$10,000 in favor of Levy you would have done so without further inquiry?"

"I would," was the answer.

Being further pressed Mr. Hobart stated that he was told that there was an agreement by virtue of which Mr. Levy was to be paid a portion of the profits of crushing Hale & Norcross ores at the Nevada mill. He was to have one-eighth of the profits. Williams sent the orders to the office and the checks were drawn without hesitation.

The five checks were then introduced and identified. Particulars of these have already been given in the ENGINEERING AND MINING JOURNAL. (It may be remarked in passing, that H. M. Levy, who has been rusticated at the Washoe Club in Virginia City, for the past four months, thus putting himself outside the reach of the court, mysteriously disappeared last night. He is said to have been informed that a project had matured to kidnap him and transport him across the Nevada line into California for the purpose of subpoenaing him as a witness to testify regarding his share in misappropriating over \$2,000,000 of shareholders' money.) Alvinza Hayward testified some weeks ago that he kept no books with the Nevada mill, but W. E. Sell, a bookkeeper in his employ for 20 years, and a director of Hale & Norcross in 1889, had his attention called to one entry of \$11,000 paid by Hobart to Hayward as treasurer of the Nevada Mill, which scarcely sustained Mr. Hayward in his assertion.

M. W. Fox, the plaintiff in the suit, was asked by the defense if he had any spiteful motive in bringing the suit. As the pleadings, and not motives, are at issue, an objection was sustained. Counsel then tried to arrive at the end aimed at by a different question.

"Have you any motive other than the judgment prayed for in the complaint in bringing this suit?"

To this the Court said that, assuming that the plaintiff undertook to compromise the case and make some money for himself, there was nothing unlawful about it. If, however, this case should reach a conclusion and judgment be given the plaintiff, the Court would protect the interests of all the stockholders.

Mr. Fox then testified that the question of the

theft of \$2,000,000 in hullion from the Hale & Norcross mine was an open secret in Virginia City. He told Superintendent Keating in this city, and also in Virginia City, that he ought to take a shotgun and go down on the divide and stop Williams from stealing the hullion.

H. Zadig, of the stockbroking firm of Zadig, Wollberg & Co., declined to answer whether he had purchased any stock for the Nevada "mill ring" between 1887-1890.

Counsel then turned to an entry in the mill company's accounts showing the payment on May 12th, 1890, to Zadig, Wollberg & Co. of \$13,202.60, balance due for the purchase of 7,590 shares of stock purchased on account of Sam Jones and A. C. Hamilton, but really on behalf of the stock pool owning the mill. Witness, after objection had been overruled by the court, stated that the payment referred to was made for the purchase of 3,040 shares of Hale & Norcross, 1,050 Chollar, and 4,500 Potosi. On February 11th, 1890, he was also paid \$9,500 for the purchase of 1,500 shares of Hale & Norcross stock, ordered for the account of Hohart & Hayward.

Morris Rehlfisch, another stockbroker, also testified to dealings with the "ring."

A mass of interesting testimony was given by H. W. Tangerman, a Virginia City assayer, regarding the slime pits of the Nevada mill. He stated that the slimes had been accumulating for a year or possibly two years before November 24th, 1891, when he took a sample of the slimes. These he sent to San Francisco for assay, when it was found they were worth \$19.24 per ton. The witness then testified as an expert upon the cost of milling ores on the Comstock between 1887-90. He stated that the cost of crushing in water mills is \$3, and for steam \$3.50 per ton. In 1885, he continued, "I ran a mill on the Carson River, and carefully estimated the cost of labor, oil, quicksilver and wear and tear at \$2.35 per ton, but quicksilver was lower then than now."

Being asked if he had formed any estimate as to the amount of slimes in the reservoir witness stated that from March to August last year he had made at least 100 visits to the Nevada mill, and had made careful measurements of the contents of the reservoir when last there, and found it to contain between 19,000 and 20,000 tons of slimes.

Opposing counsel moved to strike out all Mr. Tangerman's testimony relating to his investigation of the slimes reservoirs between March and August, 1891, on the ground that the rulings of the Court that evidence relating to the issues subsequent to the filing of the suit inadmissible.

Attorney Baggett asserted that it had been demonstrated that the defendant conspirators had appropriated slimes belonging to the Hale & Norcross Company, and if they mixed some of their property with that of the company, to prevent the latter from regaining possession of it, then the rule of law is that they lose the whole of it.

The Court allowed the testimony to stand merely to show the value of the slimes in case it should be shown that any portion of them belonged to the Hale & Norcross.

Plaintiff's counsel then offered to submit the testimony of Superintendent Evan Williams of the Nevada mill, taken in the main suit against the Hale & Norcross directory as against his alleged co-conspirators, Hohart & Hayward and the Mill Company.

The offer roused the ire of the defense. It will be remembered that Williams' evidence was of a most important and damaging character, and it was not expected that it would be admitted without protest. Before adjournment the matter was not decided.

NEW MEXICO.

GRANT COUNTY.

About 200 claims have already been taken up on the alum deposit, near the Gila River, in the northern part of this county, and there is room for as many more, says the Silver City *Southwest Sentinel*. A road is to be built from Smith's ranch, on the Sapello, to the Gila, a distance of eight miles, and about a mile of new road will be built between the river and Gila Flat, in order to make a practicable route to the alum deposits. Mining will soon be commenced, and shipments will be made to the Silver City & Northern Railroad via Georgetown.

CONFIDENCE.—The shaft on this mine at Silver Creek is being sunk to the tunnel level and the connection will soon be made. A large amount of ore is now in sight, says the *Southwest Sentinel*. The tunnel is in ore for 900 ft., and there is a body of ore 6 ft. wide at the bottom of an 80-ft. winze.

NEW YORK.

CLINTON COUNTY.

ARNOLD ORE COMPANY.—This company's separator and shaft house at Ferson were destroyed by fire on the 7th inst. Loss, \$15,000.

OHIO.

Last year 481,075 bbls. of petroleum were inspected in this State and only 209 were rejected. Six years ago there was a well in northwestern Ohio; since then 7,705 wells have been sunk at a cost of \$15,000,000. Figures of production are unobtainable, the policy of the Standard Oil Company being to prevent correct ideas of the value of this field from becoming current. The present daily production is, however, about 48,000 bbls., or at the rate of 17,500,000 bbls. per annum.

PENNSYLVANIA.

COAL.

Charles T. Rainey, nephew of W. J. Rainey, the coke operator, has purchased the Nutt Farm of 164 acres in Jefferson township, from Mrs. Samuel Phillips and Alcinda Lynn for \$130 per acre. Also the adjoining farm from James Kefover for the same price. The land is underlaid with the river vein of coal, and is located within a half mile of the Monongahela River, and about the same distance from the Redstone Branch of the Pittsburgh, Virginia & Charleston Railroad.

The Philadelphia & Reading Coal and Iron Company gives notice to the holders of the following named divisional coal land mortgage bonds: Glentworth, maturing March 1, 1892; William Jones (William Bowers et al.), maturing April 1, 1892; Philadelphia & Mahanoy, maturing April 1, 1892; Shamokin & Bear Valley, maturing April 1, 1892; Swatara Company, maturing April 1, 1892; Big Schall (J. Van Reed), maturing May 1, 1892; and West Flowery Field (John R. Lessig), maturing May 1, 1892, that the company will extend the payment of the foregoing named bonds for five years from the dates at which they respectively mature, and will pay interest thereon at the rate of 6% per annum, payable semi-annually, during the period of such extension. The said principal and interest to be paid in gold coin, free of taxes. The holders are further notified that the privilege of thus extending their bonds will expire fifteen days prior to the dates of the respective maturities as above stated. The bonds not extended will be purchased at maturity at par by Messrs. Drexel & Co. and Brown Brothers & Co.

SOUTH DAKOTA.

LAWRENCE COUNTY.

HOMESTAKE MINING COMPANY.—The ten mines controlled by this company, according to the report of the State Inspector of Mines, produced in 1891 \$3,340,320 in gold. Production from other sources is placed at \$2,200,000, making a total for the State nearly double that of 1890.

TEXAS.

PARKER COUNTY.

TEXAS COAL AND FUEL COMPANY.—This company, operating at Weatherford, has recently erected a hoisting plant with a total capacity of 1,000 tons. The output of its Rock Creek mine is now being exclusively used by the local railroads. It is shown by analysis to be of good coking quality.

UTAH.

JUAB COUNTY.

MAMMOTH MINING COMPANY.—The stockholders of this company held their annual meeting on the 2d inst., at Eureka. There were 290,000 shares out of the 400,000 represented. The following officers were elected for the ensuing year: William McIntire, president; Samuel McIntire, vice-president; L. S. Hills, treasurer, and J. E. Corker, secretary. The board of directors are William McIntire, Samuel McIntire, L. S. Hills, J. A. Cunningham, H. P. Mason, W. L. Bradley and W. S. McCormick.

SUMMIT COUNTY.

MORNING STAR.—Six feet of ore is reported to have been uncovered in this mine.

WASHINGTON.

(From our Special Correspondent.)

The board of examiners of candidates for coal mine inspectors completed its work at Olympia on the 14th ult. It recommended to the Governor for appointment David Edmunds, of Franklin, as inspector for District No. 1, and Joseph James, of Carbonado, as inspector for District No. 2. For merit shown in their examinations, the board recommended the issuance of certificates for expenses incurred to Robert Pettigrew and Jno. H. Shaw. There were eight candidates examined. Mr. Edmunds will have charge of the mines in the northern part of the State while Mr. James will be inspector of those in the southern part. They will hold their positions for a term of four years, beginning Feb. 1, and they will receive a salary of \$1,500 per year with traveling expenses.

State Auditor Reed has sent a letter to all the coal mining companies of the State, calling attention to their failure to pay the tax, required by law, of 4 mills per ton on the output of their mines. This tax has not been paid since 1888, in which year the territorial treasurer and auditor held that the law providing for such taxation was repealed by the Act of February 2d, 1888, relating to coal mines, and Treasurer Blodgett declined to receive the taxes tendered by the companies. The taxing provisions are held by Auditor Reed to still be in force, and they appear as Sections 2,241 and 2,242 in the Hill code. The auditor therefore demands the prompt payment into the State Treasury of 4 mills for each ton of coal mined since the payment ceased. If payment is not made the county attorneys will be instructed to bring suit for collection of the sums due. The taxes collected will go into the fund which will be used in paying the salaries and expenses of coal mine inspectors, and for this reason it is believed that the law in question does not contravene the constitutional provisions that all taxation shall be uniform. †

KING COUNTY.

(From our Special Correspondent.)

This county has shipped about 4,000,000 tons of

coal and is estimated to contain 80,000 acres of land upon which workable seams exist. The principal working collieries are the New Castle and Franklin, operated by the Oregon Improvement Company; the Black Diamond, operated by the Black Diamond Coal Company; the Gilman, operated by the Seattle Coal and Iron Company, and the Cedar River, operated by the Cedar River Coal Company.

The New Castle Collieries, which are located on the Columbia & Puget Sound Railroad (owned by the Oregon Improvement Company), about 10 miles from tide water, though twice that distance by rail, has shipped over 2,000,000 tons of coal. It produces a high grade lignite which does not slack when exposed to the air. The principal workings are by means of a slope on a seam 11 ft. thick, dipping about 40°. While there is little danger feared from falls, etc., on account of the excellent roof, much annoyance and expense is caused because the character of the coal is such that it ignites easily, tending to make mine fires frequently. There are several other beds, some of which are worked and are over 20 ft. in width. The Franklin collieries, which are located on the same railroad, twenty miles southeast of New Castle, were practically opened in July, 1885, upon a seam dipping 45°. The coal is used both for steam and domestic purposes.

BLACK DIAMOND COAL COMPANY.—The plant operated by this company is situated on the Columbia & Puget Sound Railroad, three miles nearer tidewater than the Franklin mines. This mine, which was started in April, 1885, is opened by means of several slopes upon as many coal beds, varying in thickness from 4 ft. to 7 ft. The mine workings at the present time are principally upon one seam containing 6 ft. of clean coal; the slope on this seam has recently been sunk another lift of 450 ft. The payroll averages 275 men, and 500 tons are shipped daily; this may soon be doubled, as the company has chartered the new ship "Keweenaw" for its San Francisco trade. Heretofore it was compelled to rely upon sailing vessels and pay high freights. Now that the rates are reduced and a greater certainty for transports assured, the company expects to largely increase the output of the mines, San Francisco being the market for nearly the whole product. This company is a sister corporation to the Bellingham Bay & British Columbia Railroad, which is now extensively developing in the vicinity of Fairhaven.

CEDAR RIVER COAL COMPANY.—The workings of this company are situated on Cedar River, on the Columbia & Puget Sound Railroad, about 15 miles from tidewater. The coal is mined from a seam 11 ft. thick, dipping 20° to 30°. The mine has a daily output of 300 tons. Although this is a small plant, the operators have received great returns for their investment, demonstrating that coal mining in this State returns phenomenal profits.

OREGON IMPROVEMENT COMPANY.—This company has had much trouble with the negroes who replaced the white miners last summer during the strike; they have proven themselves to be a very disorderly and unreliable class, and since the removal of the militia there has been no end to the line of serious troubles.

SEATTLE COAL AND IRON COMPANY.—This company is an offspring of the Seattle, Lake Shore & Eastern Railroad, on which road the Gilman mine is located, 40 miles from tide water. The shipments from this mine dates from the latter part of 1888; in fact, it never shipped regularly until last spring. Not very much of the product is exported, it being used mainly to supply the home market. †

KITTITAS COUNTY.

(From our Special Correspondent.)

NORTHERN PACIFIC COAL COMPANY.—The Roslyn mine, which is the only colliery in this State in operation east of Cascade Mountains, is the largest producer in Washington. During the past year, ending December 1st, 1891, the product was 362,887 tons, mine No. 1 working 161 days, producing 196,728 tons, and No. 2, or Ronald as it is sometimes called, working 160 days and producing 166,159 tons. The production of 1890 was greater than last year, the output being over 425,000 tons. The falling off was due to unavoidable causes, but since last October the colliery has been shipping as much as 3,478 tons per day. During the year ending December 1st, 1891, a total of \$611,533.50 was paid for wages alone, while during December \$84,648.35 was disbursed for the same purpose. The present pay roll numbers 1,085 men. †

OKANOGAN COUNTY.

BLACK BEAR AND WAR EAGLE.—These mines with other claims were sold for about \$200,000. The mill erected on the Bear and Eagle has run 136 days since the middle of last July and in that time turned out \$36,000 in gold, being an average of \$27 per ton for the entire amount handled. The owners have realized a profit of \$6,000 after paying for the machinery and all other expenses. Additional machinery will be put up this spring and the milling capacity increased.

JOHN ARTHUR.—This mine has been sold for \$60,000, of which \$20,000 was cash and the balance is to be paid July 1st. It is located on Mineral Hill and is an extension of the Lone Star. Seattle parties secured the property. ††

STEVENS COUNTY.

BROADGAUGE, ORIENT AND LADY JANE.—These claims have been sold to Geo. J. Goodhue, representing Eastern capitalists, who have secured a half interest in the Broadgauge with the north and south extensions of the same, all of the Orient, and a three-fourths interest in the Lady Jane. Deeds for the above have been deposited in escrow. This company has ample means and will commence the development of this property at once.

O. K.—Messrs. I. N. Terry, P. M. Hocking, W. E. Dugan and Frank Brooker are owners of this mine. They have a tunnel 175 ft. long, which cuts the ledge at right angles. The ore shows sulphurets running high in silver and carrying some gold.

WHATCOM COUNTY.

(From our Special Correspondent.)

There are four diamond drills boring for coal in different parts of the County. That of the Bellingham Bay & British Railroad Company has been sunk 640 ft., and has cut several seams of coal, one of which is 7 ft. thick.

The rope drill recently brought from Pennsylvania for the purpose of boring for oil, is located eight miles north of Fairhaven in the Nooksack Valley; this drill has thus far sunk an 8-in. hole over 200 ft.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

WEST KOOTANIE DIVISION.

(From our Special Correspondent.)

NELSON, January 20th.

DANDY.—Ed. Springer, the foreman, reports this property looking better, the vein in the east drift from the cross-cut tunnel being 5 to 6 ft. wide and carrying more mineral than hitherto.

GRIZZLY BEAR.—It is believed that the ledge will be tapped in the course of a few days. The south cross-cut is now in 24 ft.

SILVER QUEEN.—This location, for which a crown grant was secured last year, and which is situated on the southeast fork of the Silver King lode, has become the property of the Silver Queen Mining Company, which numbers among its members prominent Montreal and Sudbury men. Active work is promised in the spring.

SLOCAN.—The official notice which appeared in the British Columbia Gazette dated December 31st, reserving all land within 10 miles of the Slocan Lake from the action of the pre-emption and land purchase acts, has caused much disappointment to those parties—20 or more in number—who had advertised their intention of applying for leave to purchase land in the prescribed district. Indignation meetings have been held, but the government shows no signs of yielding. The bona fide prospector and miner is elated rather than otherwise, for he feels that the attention of visitors this summer—and great numbers are promised us—will thus be given solely to the mineral wealth of the new district. Sales of interests in these recent locations are already being made to Spokane, Seattle and Tacoma parties, although the claims are at present practically inaccessible, owing to the absence of trails to the mines from Slocan Lake and the presence of several feet of snow. The snow near the lake will probably be gone by the middle of April, but there will be snow on some of the higher locations as late as the early part of July. There is a very large area on all sides of the lake as yet unprospected.

The Great Northern Railway has commenced tracklaying toward Bonner's Ferry, on the Kootanie River.

HOT SPRINGS CAMP.

DULUTH & ST. PAUL MINING COMPANY.—This company has been formed to work the Fourth and other claims near Coffee Creek. The capital stock is \$200,000 in \$100 shares, and the incorporators are John Graham, of Minnesota; James McNaught, of New York; E. C. Long, N. C. Thrall and F. Wilsey, of St. Paul; G. C. Howe and John H. Upman, of Duluth.

CANADA.

PROVINCE OF NOVA SCOTIA.

ANNAND.—This mine, together with the North British and two other gold mines at Montague, has been sold to an English syndicate for \$150,000. Speaking of the sale, the Halifax Herald says, it "means a great deal to the province, and will doubtless mark an important era in our gold-mining industry. The trouble with gold mining in Nova Scotia, besides that it is done in limited areas, is that the work is carried on in a 'hand-to-mouth manner,' as it were. The gold is taken out while it is in sight, but if the lead disappears no scientific, persevering attempt is made to re-discover it, and while a lead is being worked all else is neglected. The syndicate at Montague will have a very large area on which to work and with ample funds will thoroughly develop it."

UNITED KINGDOM.

ENGLAND.

A second shaft is now being sunk for the coal boring at Dover. The experimental boring has reached a depth of over 2,000 ft. and a total of 14 ft. 6 in. of coal found in a number of thin seams, one of which is reported to be 2 ft. 5 in. in thick-

ness. The preparations in progress at the works for extensive operations show that the promoters are convinced of the value of the discovery.

The dividends paid by the Cornish mining companies in 1891 were as follows:

| Mines. | Shares. | Per share. | Total. |
|-----------------------|---------|------------|---------|
| Carn Brea..... | 6,000 | £4 10 0 | £27,000 |
| Dolcoath..... | 4,700 | 4 5 0 | 19,975 |
| East Pool..... | 6,400 | 1 19 6 | 12,640 |
| Killfretth..... | 6,000 | 0 13 0 | 3,900 |
| Levant..... | 2,500 | 1 2 6 | 2,812 |
| Lovell..... | 7,200 | 0 4 6 | 1,620 |
| Tincroft..... | 6,000 | 1 12 6 | 9,750 |
| South Condurow..... | 8,123 | 0 2 0 | 612 |
| West Kitty..... | 6,900 | 1 13 0 | 9,900 |
| Wheal Greenville..... | 6,000 | 0 7 6 | 2,250 |
| Wheal Owles..... | 2,000 | 0 10 0 | 1,000 |
| Total..... | | | £91,459 |

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Feb. 12.

Heavy Chemicals.—The dullness reported of this market in our last issue continues unrelieved. The buying has been in small lots, just sufficient to meet current requirements. The old uncertainty as to a decline in prices still prevails in some quarters, and prevents buyers from feeling free to make contracts for future delivery at present figures. The largest consumers are well supplied and contracted for up to July. Meantime prices on the whole show but little change.

Caustic Soda.—Some sales on the spot are reported. We quote this week 60%, 3'10@2'20c.; 70%, 74%, 2'85@2'87½c.; 76%, 3'15@3'20c.; 77%, 2'92½@3c.

Carbonated Soda Ash.—The demand for future shipments has been very light, most of the glass men having contracted for their supplies extending over the first half of this year. A few small sales on the spot are reported at 1'55@1'60c. for 48% B. M. & Co. The 58% variety is quoted at 1'50@1'55c.

Alkali.—The demand for alkali continues very light and there is very little doing. Quotations are B. M. & Co., 48%, 1'55c. and 58%, 1'47½@1'52½c.

Bleaching Powder.—This market is quiet and dull with a few small sales reported at 2'15@2'20c.

Sal Soda.—There is nothing of special interest doing in this market. Quotations for the English article remain 1'12½@1'15c. Domestic, .95@1c.

Acids.—The good feeling reported of this market for some weeks continues practically unchanged. Manufacturers report a good volume of business, although not quite so large as it was last month. Still the demand is sufficiently great to insure steady prices. Reports from the East are to the effect that low prices for sulphuric acid are quoted, sales having occurred at 80c. for sulphuric acid in Connecticut. Competition is lively there, and two or three well known manufacturers are trying to outsell each other with as much zest as in the old battle days of the "combine." We quote this week for 100 lbs. of acid in New York in lots of 50 carboys or more: Acetic, \$1.60@2, according to quality; alum, lump, \$1.50@1.75; muriatic, 18", \$1; 20", \$1.12½; 22", \$1.25; nitric, 40", \$4; 42", \$4.50@4.75; sulphuric, 90c.@1.12½; oxalic, \$7.25@7.75. Blue vitriol is quoted all the way from \$3.25 to \$4.

Brimstone.—The market for Sicilian brimstone is very quiet. Quotations for goods on the way are \$29 for best unmixed seconds and \$28 for best unmixed thirds. Future shipments are a little lower, and \$28.50 for best unmixed seconds and \$27 for best unmixed thirds is quoted. January shipments to all ports in the United States aggregated 3,700 tons.

Fertilizers.—There is but little more animation in this market. There have been some sales during the week, but generally unimportant as to size or price. In all probability it will be a month before the spring trade comes to this market. In the meantime only a small volume of business can be reported. We quote as follows: Sulphate of ammonia, 3c. for spot and 3'05c. for shipments. Dried blood, \$1.95 per unit for high grade and \$1.85 for low grade. Acidulated fish scrap, \$13.50 f. o. h. factory. Dried scrap, \$23.50@24. Azotine, \$1.95. Tankage, \$19@21. Bone meal, \$22@23.

Double Manure Salts.—Quotations are about as follows for winter shipments, ex-vessel New York, in lots of 10 to 50 tons: 48%-53%, 1'18½@1'28½c.; 90-95%, 2'18@2'23½c.; 96-99%, 2'21@2'23½c.

Kainit.—There is no business doing in this article. Quotations remain \$8.75@9.50, according to quantity, time of delivery, etc.

Muriate of Potash.—There have been the usual arrivals of muriate during the week, all of which went into consumption. Nothing of special interest can be reported.

Phosphates.—The local market for phosphates shows no change, but from Charleston there are reports of a brighter outlook. The manufacturers there have commenced to receive orders and active operations will commence shortly, although it is well assured now that the Southern fertilizer trade this year will be much less than for some years past. According to Mr. Paul C. Trenholm, of Charleston, S. C., the well known fertilizer dealer and statistician, the domestic shipments of crude phosphate rock from Charleston, S. C., for January, 1892, were 19,311 tons, against 22,943 tons in January, 1891, and 18,762 tons in January, 1890. Prices continue at \$6 for dried and \$5 for undried with freights at \$1.75@2.

As stated in the ENGINEERING AND MINING JOURNAL of two weeks ago, the Florida pebble mines are bent upon combining. An other meeting was held in Jacksonville, Fla., on the 3d and 4th inst., which was attended by all the pebble men. The sessions were exceedingly harmonious and plans were discussed. A committee of five was appointed to perfect the details, etc., and the next meeting (which will be called whenever the chairman of the committee is ready to report) will be final. The plan is to have one selling agency, which will prevent ruinous competition, etc., etc. One of the members of the committee who was seen by a representative of the ENGINEERING AND MINING JOURNAL stated that the combination was by no means a "trust" or "combine" or anything that savors of monopoly. We understand, however, that fines will be imposed upon any member who violates the agreement; in fact, the combination will proceed in the same manner of all other such associations. The name has not been decided upon.

Nitrate of Soda.—This article continues dully quiet at \$1.85. Futures are rather weaker, being held at \$1.77½@1.80. The well-known nitrate brokers of this city, Messrs. Mortimer & Wisner, send us the following interesting statistics:

| | 1892. | 1891. | 1890. |
|---|---------|---------|---------|
| | Bags. | Bags. | Bags. |
| Imported into Atlantic ports from West Coast, S. A., Jan. 1, 1892, to date..... | 66,404 | 60,372 | 89,660 |
| Imported into Atlantic ports from Europe, Jan. 1, 1892, to date..... | ..... | ..... | ..... |
| Stock in store and afloat Feb. 1, 1892, in New York..... | 61,922 | 84,624 | 57,461 |
| in Boston..... | 1,000 | ..... | ..... |
| in Philadelphia..... | ..... | ..... | ..... |
| in Baltimore..... | 1,200 | 5,000 | 3,750 |
| To arrive, actually sailed..... | 172,000 | 188,000 | ..... |
| Visible supply to June 1, 1892..... | 236,122 | 277,674 | ..... |
| Additional charters..... | 206,000 | 320,500 | 488,600 |
| Total supply, when shipped..... | 442,122 | 598,124 | 549,811 |
| Stock on hand, Jan. 1, 1892..... | 53,585 | 36,454 | 22,009 |
| Deliveries past month..... | 55,867 | 12,202 | 50,458 |
| Total yearly deliveries..... | ..... | 634,207 | 673,679 |

Prices current Feb. 1, 1892, 1 85@1¼c. 1 80@1 82½c. 1 82½c. Liverpool Feb. 3.

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

The market for heavy chemicals is dull and inanimate this week, but as regards quotations there is no change.

Soda ash is quiet, but at the same time there is not much offering. For the commoner qualities minimum spot quotations are as follows:

Caustic ash, 48%, is quoted at £5 6s. 3d.; 57-58%, £6 7s. 6d. per ton; carbonated ash, 48%, £5 9s. 9d.; 58%, £6 12s. 9d. per ton; ammonia ash, 58%, £6 7s. 6d. per ton, all net cash. Special brands are scarce, and a considerable advance on above quotations has to be paid for prime makes.

Soda crystals are firm at £3 12s. 6d.@£3 15s. per ton less 5%.

Caustic Soda.—There are some inquiries from the continent, but the actual transactions are small, buyers having no faith in the market, and will only purchase from hand to mouth. Spot values are as follows: 60%, £9 2s. 6d.@70%, £10 5s. per ton; 74%, £11 5s.; 76%, \$2 7s. 6d., and upward, all net cash. For parcels under 10 tons, 5s. per ton extra is charged.

Bleaching powder is still very scarce for prompt delivery, and hardwood packages are firm at £7 15s.@£8 per ton net cash, but nothing to be had on this market for shipment to the States.

Chlorate of potash. Makers are fully sold for prompt delivery, and 5½d. per lb., less 5%, is asked for forward delivery. The advance has not yet been paid, although it is reported that some resales have been made at 5½d. per lb.

Bicarb soda is well maintained at £6 15s. to £7 per ton less 2½%, for one cwt. kegs, according to brand and quantity, with usual allowances for larger packages.

Sulphate of ammonia is rather lower, and holders seem more ready to meet buyers. For prompt delivery we quote £10 11s. 3d. to £10 13s. 9d. per ton for good gray 24% to £10 17s. 6d. per ton for 25%, both in double bags, less 2½% f. o. h. here.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Deadwood, Dak., Pittsburg, St. Louis, London and Paris, see pages 230 and 231.]

NEW YORK, Friday Evening, Feb. 12.

The mining market for the week under review has been quiet. The tremendous excitement in the railroad stock marked by the Philadelphia & Reading deal completely overshadowed the mining market. The usual rumors about an impending stock deal by the Comstock "ring" in San Francisco were duly circulated during the week. Of course, no precise or specific information is given by any one. The chief reason alleged is that "the time is ripe for it." But it is scarcely probable that any "deal" will be consummated until the Hale & Norcross suit is ended.

During the week there were sales of 600 shares

of Alta at \$1@1.50; 600 shares of Best & Belcher, \$2.95@3.30; 750 shares of Bullion at \$1.35@1.45; 700 shares of Exchequer at 65c.@77c.; 300 shares Julia at 20c.; 100 shares of Chollar at \$1.85; 200 shares of Justice at 20c.; 500 shares of Mexican at \$2@2.20; 800 shares of Potosi at \$1.90@2.10; 1,050 shares of Scorpion at 25c.@30c.; 500 shares of Union Consolidated at \$1.55@1.80; 500 shares of Utah at 53c.@60c.; 700 shares of Crown Point at \$1.40@1.50; 425 shares of Gould & Curry at \$1.75 @2; Hale & Norcross advanced from \$2.10 to \$2.90.

Of Ophir 400 shares were sold at \$3.10@3.50; and 100 shares of Overman at \$1.40; 400 shares of Savage at \$1.45@1.65; 400 shares of Sierra Nevada at \$1.85@1.90, and 700 shares of Yellow Jacket at \$1.10@1.25. Financial statements of the various Con. stock companies will be found elsewhere in this issue.

Of the Tuscarora stocks 300 shares of North Commonwealth changed hands at 45@47c. There was a sale of 200 shares of Navajo at 10@12c.

The annual report of the Horn Silver Mining Company has just been issued. The manager's report shows that during the year there were extracted 24,547 tons of ore at a cost of \$66,134. Each ton of ore carried a cost of \$5.29, and the average value per ton, including copper, was \$14.90. The ore reserve in the mine is considerably in excess of that shown 12 months since. The financial statement shows that the receipts for 1891, including the cash balance from the last annual report were \$650,893.88. The payments during the year, including four dividends of \$50,000 each, were \$381,589.60, leaving a balance cash on hand of \$275,304.28. The assets of the company in addition to the mine are estimated at \$1,190,970.18. There are no liabilities. Next week we shall publish extracts from the report, showing the amount of work done at the mine during the past year.

Among the Utah stocks dealt in Daly shows a sale for the first time in many months of 20 shares at \$31. Ontario appeared in considerable demand, 700 shares being sold at \$43.

Among the California stocks Brunswick was the feature of the week, having advanced from 8c. to 12c., with total sales of 28,600 shares. At the close 11c. was bid by Mr. H. R. Lounsbury, without takers. Transactions in Belmont aggregated 900 shares at 65c. There were sales of 800 shares of Standard at \$1.25@1.40.

Among the Colorado stocks Leadville continues to be the most popular, with sales of 2,800 shares at 20@22c. There was a sale of 500 shares of Little Chief at 30c., and another of 300 shares of Chrysolite at 27c. There is reported a sale of 200 shares of American Flag at 2c. We are at a loss to explain the reason for this transaction.

Of the Black Hills stocks Deadwood Terra shows sales of 200 shares at \$2.10. Caledonia was in some request, the reported sales aggregating 1,750 shares at 70@80c.

Phoenix of Arizona underwent a slight decline, but was still in request. The total sales amounted to 6,300 shares at 55@65c.

Alice this week was dealt in to the extent of 200 shares at \$1.20@1.30.

Boston. Feb. 11.

(From our Special Correspondent.)

Copper stocks continue to feel the depressing influence of the weakness in ingot copper and show more or less decline in prices throughout the list. The feature of the week was the activity in Centennial, which has been very steady at about \$8, notwithstanding the reports that the mine was to be closed, all the money having been spent without producing satisfactory results, and the disinclination of the directors to call upon the holders for an assessment under the present conditions. The strength of the stock was undoubtedly due to covering of shorts, and lower are likely to result when that interest is out of the market.

Calumet & Hecla, which has been exceptionally strong the past two months, finally yielded, and on very small sales declined to \$253 the present week, with a later rally to \$260, closing at \$259.

Boston & Montana continues to be pressed for sale, and early in the week declined to \$31, but in the later dealings recovered to \$32½, losing the fraction on sales to-day.

Butte & Boston has ruled quiet and steady at \$13½@14.

Franklin declined to \$11½, but recovered and sold up to \$12 in the later dealings. The stock is quite firmly held, as the condition of the company warrants the ruling price on the market.

Kearsarge sold as low as \$10, but later rallied to \$10½ on moderate transactions.

There has been considerable selling of Osceola this week, which at one time forced the price down to \$23, but later on it recovered and sold up to \$25½, but finally left off at \$24, a fraction lower than last week's closing.

Tamarack declined to \$150½, and recovered to \$152; later it sold at \$149, ex dividend \$4, and closed at \$148.

Allouez sold at \$1@1½, and Atlantic declined from \$9½ to \$9.

Bonanza appeared and sold at 42½c. for a small lot.

Sales of Quincy at auction yesterday were at \$103½@102½.

There was a little excitement in copper circles by the attempt on the part of some of the stockholders of the Huron Mining Company to procure

an injunction preventing the sale of delinquent stocks for the non-payment of the last assessment of \$3 per share. The effort was unsuccessful, and the stocks were sold on Thursday at the company's office at \$3, the amount of the assessment. Nearly the whole 40,000 shares were sold to parties in interest.

The silver stocks are quiet; no sales reported. 3 P. M.—Boston & Montana improved and sold at 32½, but Centennial declined to 7½, the short interest being largely eliminated.

FEB. 12.—By telegraph.—Centennial dropped to \$7, and one-quarter of 1% was bid, to drop it to \$10 for the balance of the year, with three-eighths of 1% bid to put it at 5 for the same period; Osceola, \$24½; Tamarack, \$148; Montana, \$32 hid, Atlantic, \$9.

Denver.

Prices and sales for the week ending February 6th, 1892:

| Company. | Open- ing. | H. | L. | Clos- ing. | Sales. |
|------------------------|------------|-------|-------|------------|---------|
| Mines. | | | | | |
| Alleghany..... | 10a | ..... | ..... | ..... | ..... |
| Amity..... | 02¼ | *03 | *02¼ | 02¼ | 14,300 |
| Bangkok C.-B..... | 05¼ | *06½ | 05¼ | 06 | 16,300 |
| Bates-Hunter..... | 60a | 40 | 40 | ..... | 100 |
| Brownlow..... | 05 | *06¼ | 06 | 04¼ | 16,000 |
| Calliope..... | 15 | ..... | ..... | 15 | ..... |
| Claudia J..... | 04¼ | 04¼ | 03½ | 03 | 53,300 |
| Cash..... | ..... | ..... | ..... | ..... | ..... |
| Clay County..... | ..... | ..... | ..... | ..... | ..... |
| Emmons..... | 149a | *49 | 45½ | 49 | 20,700 |
| Gettysburg..... | 30a | ..... | ..... | ..... | ..... |
| Gold Rock..... | 45¼ | 49 | 46 | 47½ | 1,900 |
| Leavenworth..... | ..... | ..... | ..... | ..... | ..... |
| Little Rule..... | 110a | ..... | ..... | ..... | ..... |
| Lexington..... | 38¼ | 40 | 38 | 40 | 1,600 |
| May-Mazzeppa..... | 110a | 81 | 81 | 80 | 100 |
| Matchless..... | ..... | ..... | ..... | ..... | ..... |
| Oro..... | 75 | ..... | ..... | 75 | ..... |
| Pay Rock..... | 01¼ | 01¼ | 01¼ | 01¼ | 1,200 |
| Puzzler..... | ..... | ..... | ..... | ..... | ..... |
| Paul Gold..... | 12 | ..... | ..... | 12 | ..... |
| Reed-National..... | ..... | ..... | ..... | ..... | ..... |
| Rialto..... | 113a | ..... | ..... | ..... | ..... |
| Running Lode..... | 131 | 130 | 28 | 130 | 200 |
| Whale..... | ..... | ..... | ..... | ..... | ..... |
| Bal. Smuggler..... | 17 | 120 | 15¼ | 16½ | 3,500 |
| Sutton..... | 19 | 21 | 21 | 21½ | 1,100 |
| Prospects. | | | | | |
| Argonaut..... | 15 | ..... | ..... | 15 | ..... |
| Big Indian..... | 15a | ..... | ..... | ..... | ..... |
| Big Six..... | 05¼ | 05¼ | 05 | 05 | 400 |
| Century..... | 09 | 08 | 07½ | 07 | 3,500 |
| Diamond B..... | 04¼ | 04¼ | 03½ | 03½ | 5,500 |
| Nat. G. & Oil Co..... | 07 | *03 | 06½ | 06 | 6,300 |
| Golden Treasure..... | 185a | 170 | 160 | ..... | 1,000 |
| Ironclad..... | 14 | *14 | 13½ | 12 | 1,500 |
| John Jay..... | ..... | 01 | 01 | ..... | 7,500 |
| Justice..... | 120 | 120 | 14 | 13¼ | 25,500 |
| Morning Glim..... | 47a | ..... | ..... | ..... | ..... |
| Park Consolidated..... | ..... | ..... | ..... | 13 | ..... |
| Potosi..... | 01¼ | 01¼ | 01¼ | 01¼ | 6,700 |
| Total..... | | | | | 185,200 |

* Buyer 30. † Buyer 60. ‡ Seller 60. § Seller 30. a Asked.

St. Louis. Feb. 10.

(From our Special Correspondent.)

There was a brisk market, but prices fell considerably this week, and to-day shows a marked decline in all quotations. Prices were held very well until Monday, when the market broke completely. Granite Mountain and Bi-metallic suffered the most and are now quoted over a dollar lower than the opening. News from the mines was not above the usual, while the only news here was of reorganization of the Aztec, St. Louis & Aspen and Yuma companies.

The Aztec property has been sold or rather reorganized and will in future be known as the Manhattan, the shares of which will be assessable.

The St. Louis & Aspen has decided to reorganize as an assessable company with 2,000,000 shares of stock.

The Yuma Mining Company is hard at work trying to arrange matters so as to resume operations at the mine. While much of the amount needed has been obtained, about \$30,000 is still needed. It is expected that this amount will be raised on a monthly payment basis.

Adams opened at \$1.42 on a sale of 100 shares, later it fell to \$1.25, at which figure 300 shares were sold on Saturday; afterward the market declined to \$1 hid, with the stock held firmly at \$1.25.

Central Silver opened at 13¼c., sold at 14c., and closes firm at 14½c.; sales, 2,400 shares.

Silver Bell opened at 17¼c., with 100 shares sold; 100 shares sold at 18¼c.; it closes strong at 21¼c.

Pat Murphy opened at 4¼c. and closes at 3½c.; sales, 100 shares at 4¼c.

Elizabeth had a declining market, and from a 45c. opening closes at 40c. Sales were 100 shares at 45c., 1,000 shares at 46¼@45c., 1,100 shares at 43¼c., and 1,200 shares at 42¼c.

American & Nette fluctuated but slightly and closes very strong. Opening at 97¼c., 500 shares sold at that figure, fell to 92c. with no sales, and closes at 98¼c.

Little Albert sold 1,000 shares at 6c., the opening price; 200 more went at 6¼c. and 600 at the closing figure, 7c.

Granite Mountain opened at \$16.50, sold 30 shares at that figure on Friday; 20 shares went on Monday at \$16, followed later by a decline of \$15.50, and to-day is hid at \$15.

Yuma opened at 11c., sold 200 shares at 12¼c., and then declined to the closing figure, 10c. There is still strength in the market.

Two thousand shares of Mickey Breen brought 2c. to-day, and 500 shares of Leo brought 10c. Bi-metallic is weak at \$16.75 hid, \$19.50 asked.

San Francisco. Feb. 6.

(From our Special Correspondent.)

Trading during the past week has been fairly active, particularly in the North End Comstocks. The increase of \$1 per ton in the assay value of Consolidated California & Virginia ore was the principal stimulating factor in the advance, but apart from that the manipulating hand of large operators has been apparent. To-day the leader was in heavy demand, over 7,000 shares having changed hands in two boards, at prices ranging from \$5.75, the opening figure, to \$6.30½. After the call there was a shading off, the stock selling strong, however, to the close. Mexican, and the other North Enders, have made the greatest advance during the week. Last Friday it sold for \$1.85; to-day it rose to \$2.15. Ophir at \$3.45; Sierra Nevada at \$1.80; and Union Consolidated at \$1.65, also sold steady, but followed the example of Consolidated California & Virginia and declined several points before the market closed.

Of the middle group of Comstocks Best & Belcher and Hale & Norcross have sold at much better prices than a week ago. The former sold freely to day at \$3.30 and the latter at \$2.10. Chollar at \$1.30 and Gould & Curry at \$1.8 showed slight gains, but Potosi at \$1.85 and Savage at \$1.40 have sold much the same as last week.

In the group of Gold Hill and South End Comstocks the greatest fluctuations, albeit of a narrow character, have been witnessed. To-day the report current on the street that an 8-ft. ore body exists in the Belcher had the effect of depressing rather than advancing the stock, which sold during the day at an average price of \$1.00. Alta has advanced during the week 50%, being quoted this morning at \$1. The offerings of the other stocks have been mostly in small lots, Alpha selling for 50c.; Bullion, \$1.20; Caledonia, 35c.; Challenge Consolidated, 95c.; Consolidated Imperial, 10c.; Crown Point, \$1.45; Exchequer, 35c.; Justice, 65c.; Cverman, \$1.10; Yellow Jacket, \$1.15; Occidental, 35c., and Kentuck, 25c.

The offerings of outside stocks have been merely nominal, as usual, and the demand has been practically nothing. Of the Bodies, Bodies Consolidated sold for 90c., Mono for 80c., Bulwer for 48c., and Summit for 8c., all of these being sold in very small lots.

In the Pacific Board, Crocker and Silver King, of the Quijotoa stocks, sold, the former for 11c. and the latter for 55c.

The Tuscaroras, for all the business that is being done in them, might as well be expunged from the list. As the controllers of this group seldom suffer in a stock-jobbing proposition, they are presumably, exercising their judgment in holding the stock close during the early period of the several mines prosperity. Any day there is likely to be a revival of interest in these stocks, when the public will be able to get all they want at advanced prices.

SAN FRANCISCO, Friday, Feb. 12.—[By Telegraph.]—The opening quotations to-day appear as follows: Best & Belcher, \$2.75; Bodie, 60c.; Belle Isle, 30c.; Bulwer, 45c.; Chollar, \$1.65; Consolidated California & Virginia, \$5½; Gould & Curry, \$1.70; Hale & Norcross, \$2.20; Mexican, \$1.50; Mono, \$1.10; North Belle Isle, 25c.; Navajo, 5c.; Ophir, \$2.90; Savage, \$1.30; Sierra Nevada, \$1.55; Union Consolidated, \$1.70; Yellow Jacket, \$1.05.

MEETINGS.

Bates-Hunter Mining Company, at the office of the company, Mining Exchange Building, Denver, Colo., March 5th, at 3 P. M.

Clay County Mining and Milling Company, at the office of the company, Mining Exchange Building, Denver, Colo., March 9th, at 10 A. M.

Consolidation Coal Company, at the office of the company, in Baltimore, Md., February 17th, at 12 o'clock noon.

Denver Natural Gas and Oil Company, at the office of the company, No. 1540 Lawrence Street, Denver, Colo., March 8th, at 2 P. M.

Emmons Mining Company, at the office of the company, room 44, Jacobson Building, Denver, Colo., March 7th, at 4 P. M.

Gold Rock Mining and Milling Company, at the office of the company, Mining Exchange Building, Denver, Colo., March 9th, at 3 P. M.

Kentucky Coal, Iron and Development Company, at the office of the company, in New York, March 2d, at 12 o'clock noon.

Lehigh & Wilkesharre Coal Company, at the office of the company, in Philadelphia, Pa., February 25th, at 12 o'clock noon.

May-Mazzeppa Consolidated Mining and Milling Company, at the office of the company, Mining Exchange Building, Denver, Colo., March 7th, at 3 P. M.

Rialto Mining and Milling Company, at the office of the company, No. 1637 Champa street, Denver, Colo., February 15th, at 3 P. M.

DIVIDENDS.

Deadwood Terra Mining Company, dividend No. 33, of five cents per share, \$10,000, payable February 20th at the office of Messrs. Lounsbury & Co., Mills Building, No. 15 Broad street, New York.

New Central Coal Company, dividend of \$1 per share, payable March 1st, at the office of the company, Room 54, No. 1 Broadway, New York. Transfer books close February 25 and reopen March 2d.

ASSESSMENTS.

| COMPANY. | No. | When levied. | D't'no't in office. | Day of sale. | Am't. per share. |
|------------------------------------|-------|--------------|---------------------|--------------|------------------|
| Alta, Nev. | 41 | Jan. 5 | Feb. 9 | Feb. 29 | .10 |
| Blue Jay, Utah. | 1 | Jan. 18 | Feb. 15 | Mar. 7 | .004 |
| Bullion, S. Dak. | 8 | Jan. 20 | Feb. 20 | Mar. 8 | .03 |
| Butte Queen, Cal. | 2 | Jan. 26 | Feb. 27 | Mar. 18 | .04 |
| Challenge, Con, Nev. | 10 | Jan. 14 | Feb. 17 | Mar. 9 | .25 |
| Chollar, Nev. | 32 | Jan. 8 | Feb. 11 | Mar. 3 | .50 |
| Con. Imperial, Nev. | 32 | Jan. 22 | Feb. 25 | Mar. 15 | .25 |
| Cons. St. Gothard G. Cal. | 4 | Dec. 29 | Feb. 6 | Feb. 23 | .05 |
| Con vention G., S. Dak. | 1 | Jan. 16 | Feb. 20 | ..... | .001 |
| Exchequer, Nev. | 32 | Jan. 22 | Feb. 25 | Mar. 17 | .25 |
| Found Treasure, Nev. | 7 | Jan. 19 | Feb. 24 | Mar. 17 | .50 |
| Gen. Merritt, S. Dak | 4 | Jan. 2 | Feb. 8 | Feb. 29 | .004 |
| Golden Fleeced Gravel, Cal. | 16 | Jan. 30 | Mar. 24 | May 7 | 5.00 |
| Gold Mountain, Cal. | 1 | Jan. 4 | Feb. 8 | Feb. 27 | 6.00 |
| Goodyear, Mont. | 1 | Dec. 8 | Jan. 14 | Feb. 20 | .01 |
| Gould & Curry, Nev | 68 | Jan. 5 | Feb. 8 | Mar. 1 | .30 |
| Hale & Norcross, Nev. | 100 | Jan. 5 | Feb. 8 | Feb. 18 | .50 |
| Hiawatha, Mont | 4 | Jan. 6 | Feb. 10 | Feb. 27 | .02 |
| Justice, Nev. | 49 | Dec. 23 | Jan. 28 | Feb. 17 | .25 |
| Keystone, S. Dak. | 1 | Jan. 16 | Feb. 16 | Mar. 2 | 10.00 |
| Mexican, Nev. | 44 | Jan. 14 | Feb. 17 | Mar. 10 | .25 |
| Middle Creek Gold, B. Col. | 2 | Jan. 16 | Feb. 20 | Mar. 22 | .05 |
| Northwestern G. & S. B. Col. | 4 | Jan. 15 | Feb. 24 | Mar. 16 | .25 |
| Norway, Utah. | ..... | Dec. 24 | Feb. 1 | July 21 | .02 |
| Occidental Con., Nev | 9 | Jan. 11 | Feb. 16 | Mar. 10 | .25 |
| Pasadena, Utah. | 1 | Jan. 12 | Feb. 15 | Mar. 10 | .004 |
| Savage, Nev. | 78 | Feb. 2 | Mar. 8 | Mar. 28 | .50 |
| Scorpion, Nev. | 3 | Dec. 15 | Jan. 22 | Feb. 15 | .05 |
| Sierra, Nev., S. Nev. | 101 | Feb. 1 | Mar. 4 | Mar. 24 | .30 |
| Siskiyou Consol. Quicksilver, Cal. | 2 | Dec. 22 | Jan. 28 | Feb. 19 | .02 |
| Umpire G. & S. Ore. | 4 | Dec. 16 | Jan. 25 | Feb. 15 | .014 |
| Union Con., Nev. | 45 | Jan. 6 | Feb. 11 | Mar. 2 | .25 |
| U. S. Grant, S. D. | 4 | Dec. 23 | Jan. 30 | Feb. 15 | .004 |

PIPE LINE CERTIFICATES.

| CONSOLIDATED STOCK AND PETROLEUM EXCHANGE. | | | | | |
|--|----------|----------|---------|----------|---------|
| Feb. 6..... | Opening. | Highest. | Lowest. | Closing. | Sales |
| 8..... | 60 1/4 | 60 1/4 | 58 3/4 | 60 | 13,000 |
| 9..... | 60 | 60 1/4 | 60 | 60 | 15,000 |
| 10..... | 59 1/4 | 59 1/4 | 59 1/4 | 59 1/4 | 45,006 |
| 11..... | 59 1/4 | 59 1/4 | 59 1/4 | 59 1/4 | 25,000 |
| 12..... | 59 1/4 | 59 1/4 | 59 1/4 | 59 1/4 | 12,000 |
| Total sales in barrels..... | | | | | 110,000 |
| NEW YORK STOCK EXCHANGE. | | | | | |
| Feb. 12..... | Opening. | Highest. | Lowest. | Closing. | Sales. |
| ..... | 58 3/4 | 58 3/4 | 58 3/4 | 58 3/4 | 10,000 |
| Total sales in barrels..... | | | | | 10,000 |

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feb. 12.
 PRODUCTION OF BITUMINOUS COAL for week ending February 6th, and year from January 1st.

| EASTERN AND NORTHERN SHIPMENTS. | | | |
|---------------------------------|---------|-----------|-----------|
| 1892. | | | |
| | Week. | Year. | 1891. |
| Phila. & Erie R. R. | 1,909 | 8,495 | 18,768 |
| Cumberland, Md. | 56,072 | 326,034 | 365,354 |
| Barclay, Pa. | 14,031 | 25,615 | 16,971 |
| Broad Top, Pa. | 11,995 | 64,172 | 69,478 |
| Clearfield, Pa. | 72,164 | 381,165 | 502,276 |
| Allegheny, Pa. | 23,642 | 114,014 | 141,128 |
| Beach Creek, Pa. | 44,173 | 233,581 | 266,370 |
| Pocahontas Flat Top | 50,408 | 250,963 | 220,255 |
| Kanawha, W. Va. | 76,471 | 216,631 | 177,360 |
| Total..... | 340,865 | 1,626,670 | 1,777,960 |
| WESTERN SHIPMENTS. | | | |
| 1892. | | | |
| | Week. | Year. | 1891. |
| Pittsburg, Pa. | 22,360 | 142,948 | 127,756 |
| Westmoreland, Pa. | 34,823 | 179,425 | 223,479 |
| Monongahela, Pa. | 6,977 | 44,342 | 66,723 |
| Total..... | 64,160 | 366,715 | 417,958 |
| Grand total..... | 405,025 | 1,993,385 | 2,195,918 |
| *Week ending January 31st. | | | |
| †Estimated. | | | |

PRODUCTION OF COKE on line of Pennsylvania R. R. for the year ending February 6th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 119,270 tons; year, 606,397 tons; to corresponding date in 1891, 518,965 tons.

Anthracite.

During the week there has been effected a railroad deal which in amount of capital involved and influence on the coal made is the most important transaction in the history of the trade. It consists of a lease of the Lehigh Valley and the Jersey Central railroads to the Philadelphia & Reading Railroad Company, and a practical control of the Delaware, Lackawanna & Western by the same interests.

For several weeks it has been patent to the "street" that there was a strong undercurrent in the anthracite coal world. This was manifest by the heavy buying of Reading, said to be by Vanderbilts; later, Jersey Central and Reading came in for attention. All this time Delaware, Lackawanna & Western was a great favorite. It was claimed that the buying was for investment. As the buying increased various rumors took shape; that the

allotment difficulty had been adjusted; that the Lehigh Valley had leased the Jersey Central; or that it had been decided to establish a central coal selling agency.

On Wednesday the news of the leases was announced, and they were ratified yesterday by the board of directors of the various companies. The terms are stated as follows: The Philadelphia & Reading guarantees on Lehigh Valley stock, dividends at the rate of 5% per annum until July 1st, 1892, 6% for one year afterward, or until July 1st, 1893, and 7% per annum after the latter date. The excess of earnings, if any, above 7% will be divided equally between the Lehigh Valley and the Reading companies until the Lehigh Valley receives 10% dividends. The surplus above such 10% will then go to the Reading. The Reading guarantees on the Jersey Central stock 7%, all excess over and above that figure to be divided equally between the Jersey Central and Reading companies. The term of lease is not announced.

The position of the Delaware, Lackawanna & Western is stated in an interview given to Dow, Jones & Co.'s News Agency by Mr. J. Rogers Maxwell, president of the Jersey Central, as follows: "Our people have been buyers of Lackawanna stock for some time past, and now have a large investment holding in the property which does not appear on the books. This has been known to Mr. Sloan for some time. The stock has been bought with the intention of working in harmony with Mr. Sloan for the general good of the coal trade."

The deal is far reaching in effect and will completely revolutionize the anthracite coal business. On a basis of the 1891 operations, the control of about 60% of the entire anthracite output has been obtained by the Reading, leaving the remaining 31% to be divided between the Delaware & Hudson, Pennsylvania Railroad, Pennsylvania Coal Company, New York, Ontario & Western, and the Erie. From all that can be learned no effort has been made to incorporate any of these interests. Delaware & Hudson with 10% of the output is the most important.

Beyond a ratification of the agreements no action has been taken. It is generally conceded that the Reading, through President McLeod, will take charge of the coal interests. This means an output restricted to the requirements of the trade, higher prices, immunity from rate cutting and a lessened cost in handling. He has now secured the extensive Jersey Central and Lehigh Valley terminals in New York, the Lehigh Valley's route to the lakes and that company's excellent Western market, the Poughkeepsie Bridge, and therewith a strong position in the New England all-rail coal trade. The Reading Coal and Iron Company alone owns nearly 50% of all the anthracite coal in Pennsylvania. With the facilities it now has it will absolutely control the market. It is the opinion of prominent coal men in this city that a central coal agency will be established in every trade center, and that with the exception of pensioning a few sales agents, no material changes will be made in the employes. The middlemen now do business on the margin of 15 cents per ton, standing losses in transportation and had debts, shortage, etc. On a basis of \$4 a ton this is equal to 3 1/4% of the gross revenue. It is extremely doubtful if the combination could operate for less. This would practically grant a continued existence with this element of the trade.

The first move looked for is an advance of 25c. per ton. The outside interests, while they act in harmony, will doubtless enjoy all the privileges of the combination and sell a little below it.

The consolidation is but a perfection of the late President F. B. Gowen's plan, worked out by President A. A. McLeod. The general belief is that the Vanderbilts, Maxwell and Beers are among the chief backers. President Depew says that the New York Central is not interested financially, while Vice-President Thompson says the same concerning the Pennsylvania.

A prominent coal man estimates that under the new arrangement the coal companies will do \$5,000,000 better than in 1891, and that of this amount \$3,000,000 will go to the Reading. This will place the last named company on a dividend-paying basis.

During the past week the coal trade has lived in Wall street, and as a consequence very little tonnage has been moved. There has been a light demand for future delivery at ruling quotations which has been invariably refused by the companies.

The past week has been a record breaker in the history of the New York Stock Exchange. Transactions have been confined chiefly to the anthracite coal railroad stocks. It was first thought that after the deal was announced a very ugly slump would take place. While this would have been expected under ordinary circumstances it did not apply to this situation, inasmuch as the buying is said to have been chiefly for investment. Reading, of course, was the favorite, and nearly three-fourths of its entire capital stock and about \$5,000,000 in its hands were traded in. In this one day alone the value of the different Reading securities were advanced \$8,000,000. To be added to this is an advance of \$5,000,000 made the day previous, to say nothing of the gradual advance which has been taking place for the last two months. This stock has made a steady advance from \$40@43 on last Saturday, it reached \$57 1/2@65 yesterday. During these five days 1,

797,667 shares sold in the New York market and 375,726 in the Philadelphia market, making a total of 2,173,393 shares. Delaware, Lackawanna & Western started at \$147 1/2@152 on Saturday and reached the quotations of \$156 1/4@163 1/4 yesterday. The stock closed quite weak on Wednesday night owing to the very puzzling information which the "street" had concerning the company's position in the coal deal. After the published interview of President Maxwell, of the Jersey Central, the stock made an upward stride, reaching the figure of \$163 1/4 at the closing. Jersey Central and Lehigh Valley, in marked advances, reflected the favor with which capitalists regarded the deal. The former gained seven points in five days, closing at \$160 1/4@162 1/2, on sales of 64,513 shares, the latter 12 points to \$138, on sales of 60,700 shares. Delaware & Hudson forged ahead under cover of the general bull movement, starting at \$127 1/4@129 1/4 and closing at \$130 1/4@136 1/4.

To day Reading suffered a slight reaction on early trading, dropping 1 1/2 points to \$63. The other coalers, with one exception, held their own. Lackawanna rose four points. Jersey Central closed at \$140, and Delaware & Hudson at \$138 1/4. At the close the market was weaker.

This morning the presidents controlling the 60% of the anthracite coal interests held a meeting at which it was voted not to advance prices beyond the ruling circular of \$3.50 for broken, \$3.65 for egg, \$3.75 for stove, and \$3.25 for chestnut. The sales agents held an adjourned meeting in the afternoon as a mere matter of form. The companies were all represented, the Reading by Mr. Frank Richard. No business was transacted.

Bituminous.

Although the bituminous trade is almost at a standstill, owing to the closing months of the coal year, the feeling is one of great hucyancy. The recent consolidation of anthracite interests, treated elsewhere in this issue, means higher prices for hard coal, which, in turn, will strengthen the soft coal situation. The trade is fully appreciative of this fact, and the primary movement coming just at this time, when new contracts are to be made, will doubtless be reflected in higher prices.

There is absolutely no new tonnage moving. As far as can be learned, no new contracts are being made; in fact none will be considered until freight rates have been fixed. It is customary each year for the railroads before putting the tariff into effect to test the feelings of the producers on the subject of rates. The sounding process has not yet been commenced.

The Seaboard Steam Coal Association, judging from present indications, will be continued another year.

It is said that the Baltimore & Ohio is considering its old plan of affording barges free towage in the Chesapeake, in order to place the port of Baltimore on a par with Philadelphia as regards rates.

Ocean freights are weak and unsatisfactory at \$5@90c. from lower ports to Boston.

NOTES OF THE WEEK.

It is reported that the Reading has given orders for the construction of 200 boats for use in the coal trade.

Boston.

Feb. 10.

(From our Special Correspondent.)

The important developments among the coal companies in New York this week has been the general topic of discussion in Boston, and as might be expected there is considerable diversity of opinion concerning its results. The trade has ample time to discuss the situation as it has little else to do. The weather has been mild during the week, and buying has been exceedingly limited. The market prices remain steady on most grades. Egg, however, can be had for \$3.55 and freebroken \$3.45, so I understand, which, of course, is 5 cents under the net New York circular price, showing a slight weakening in the market.

We quote f.o.b. prices net at New York: stove \$3.75; egg, \$3.55@3.60; free broken, \$3.45@3.50; chestnut, \$3.25; Lykens Valley, broken, \$4.90; egg, \$5.00; stove, \$5.40; chestnut, \$4.50.

Soft coal is easy but unchanged. It can be had on cars here, for \$3.75 per ton. The supply of cars here for shipment into the interior is greater than it was and affects the market very little at present.

Freights from Baltimore are a little softer, as low as 80c. being quoted. Other than that rates remain unchanged. We quote: From New York to Boston, 55@60c.; from Philadelphia to Boston, 75c.; from Philadelphia to Portland, 80c.; to Bath, 95c.; to Providence, 70c.; from Baltimore to Boston, 80@85c.; Newport News to Boston, 70c.; Sound points, 85c.

Retail traders are doing a very fair business; not from any favorable change in the weather, but there are quite a number of consumers who are replenishing their stocks. We quote: Stove, \$5.50; nut, \$5.50; egg, \$5.25; furnace, \$5.25; Franklin, \$6.75@7; all sizes; Lehigh egg, \$5.50; Lehigh furnace, \$5.50. Wharf prices are 50 cents less than the foregoing.

The receipts of coal at the port of Boston for the week ending February 6th were 23,621 tons of anthracite and 10,589 tons of bituminous against 27,489 tons of anthracite and 83,965 tons of bitumi-

nous for the corresponding week last year. The total receipts thus far for this year have been 139,225 tons of anthracite and 52,921 tons of bituminous against 116,264 tons of anthracite and 113,843 tons of bituminous for the same time last year.

Buffalo. Feb. 11.
(From our Special Correspondent.)

Anthracite coal is selling in a small way to supply local requirements and nearby customers. Large orders are few and far between. Prices are without change and stocks ample.

Bituminous coal is plenty and the demand good. Concessions are made in quotations at times to save demurrage or reduce stocks. Schedule rates, however, are unchanged.

Coke is quiet and steady at \$4.55 for foundry and \$4.90 for crushed on cars here.

The Delaware, Lackawanna & Western Railroad transported last year over 9,000,000 tons of coal.

Our superintendent of education will not advertise in future for coal for the public schools. He says it's no use as the bids are uniform.

The Lehigh Valley Railroad has ordered 2,000 box and 2,000 coal gondola cars, to be delivered with as little delay as possible.

The New York Central Railroad is reported to be asking bids for 1,000 box and 1,000 gondola cars. Large parcels of land have been lately purchased by this company near its present freight and passenger termini in this city. It is said that the intention is to build two large depots when the grade crossing matter is decided.

The annual trouble with regard to the cost of lighting our city lamps with coal gas (as well as by electricity) is on the carpet now. It is expected that a three years' contract will be made at reduced rates. In 1895 electricity, generated at Niagara Falls, will doubtless be the medium by which our streets, stores and houses will receive illumination.

Chicago. Feb. 11.
(From our Special Correspondent.)

Trade is very dull—entirely a weather market. Country orders are very light; a cold spell brings forward a few, but beyond regular contracts there is little new business. One prominent agent states that the scaling down of circular prices on yard coal is confined to two large dealers. One, whose lease expires soon, is desirous of clearing out his stock as early as possible, and the other wants to overhaul his dock before navigation opens. On the other hand it is well known that there is a large amount of coal on other docks which can be bought as low as the foregoing parties are naming. There is no great surplus of all-rail coal, which is sold on a basis of \$1.90 at the breaker.

There is still an over-supply of bituminous coal, trade is comparatively dull and prices easy. Eastern coal is not coming forward to any great extent, but prices of coal on track can be shaded very materially to avoid demurrage.

Coke is in fair demand only and any radical change to increased activity and consumption will depend very largely upon the augmented demand for finished iron from foundry machine shops, or wherever smelting of pig-iron is carried on. The prospects are that the coke business will greatly improve in the near future.

Circular prices are unchanged at the following rates: Lehigh lump, \$6.25; large egg, \$5; small egg, range and chestnut, \$5. Retail prices per ton are: Large egg, \$5.75; small egg, range and chestnut, \$5.75.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.15; Hocking Valley, \$3; Youghiogheny, \$3.25; Illinois block, \$1.90@2.2; Brazil block, \$2.50.

Pittsburg. Feb. 11.
(From our Special Correspondent.)

Coal.—The market is steady, the local demand being well maintained, as will no doubt be the case for some time. A rise in the Ohio River enabled the coal men to send out a small amount of coal to the lower markets, viz.: Cincinnati, 1,318,000 bushels; Louisville, 3,619,000; total, 4,937,000 bushels. The lower markets are well stocked with coal, particularly the Southern. The outlook for a coal strike on the River is a good one.

The upper Monongahela coal operators will undoubtedly reduce wages. The *National Labor Tribune* says a strike will be inaugurated there in the next 30 days. One of the operators said: "The miners in our district are now getting 3½ cents a bushel or one-half cent more than railroad rates. We, the river operators, cannot afford to pay it, and we will ask the miners to accept a half cent reduction; if they decline to accept we will shut down. While some of the operators do not care to push the matter before April 1st, I am in favor of taking action within 30 days. The railroads have so cut into our shipping points that we cannot stand the inroads any longer."

Coke.—The outlook for the coke interest is looking brighter. A large number of new ovens are being fired and new fields are being developed. Parties who ought to know say that the coal in this vicinity is nearly worked out and that a few years at farthest a number of concerns will have to remove their plants. Some of the large operators are purchasing coal lands at other points to be ready when the time comes.

The region has now 17,252 ovens; 13,922 are in operation and 3,330 idle. Of the 85 plants built and in

running order, 43 made six days and 28 five days. Cars are again reported short. The week's shipments were 126,324 tons, and were distributed as follows: To Pittsburg, 1,700 cars; points west of Pittsburg, 3,768; east of Pittsburg, 1,550; total, 7,018. Total number of cars shipped in January, 27,874. Prices are unchanged, the same as have ruled for the past thirteen months.

METAL MARKET.

NEW YORK, Friday Evening, Feb. 12, 1892.

Prices of Silver Per Ounce Troy.

| Feb. | Sterling Exchange. | London, Pence. | N. Y. Cents. | Value of sil. in \$1. | Feb. | Sterling Exchange. | London, Pence. | N. Y. Cents. | Value of sil. in \$1. |
|------|--------------------|----------------|--------------|-----------------------|------|--------------------|----------------|--------------|-----------------------|
| 6 | 4.86½ | 41½ | 90¾ | .702 | 10 | 4.86½ | 41¼ | 89¾ | .694 |
| 8 | 4.86½ | 41½ | 90¾ | .699 | 11 | 4.87¼ | 41¼ | 39¾ | .693 |
| 9 | 4.86½ | 41½ | 89¾ | .692 | 12 | 4.87¼ | 41¼ | 89¾ | .695 |

Owing to large shipments to London of about 1,400,000 ozs. this month, the market has been depressed, but, as the surplus has been disposed of, there is nothing in the condition of silver on this side to warrant any further decline immediately.

The United States Assay Office at New York reports the total receipts of silver for the week to be 94,000 ounces.

Government Silver Purchases.

Washington, D. C., February 12th, 1892 (By Telegraph).—The Treasury Department purchased today 159,000 ounces of pure silver at prices ranging from '905 to '906 per ounce.

Silver Bullion Certificates.

| Date | Price. | | Sales. |
|---------|--------|-------|--------|
| | H. | L. | |
| Feb. 6 | | | |
| Feb. 8 | | | |
| Feb. 9 | | | 35,000 |
| Feb. 10 | | | 70,000 |
| Feb. 11 | | | |
| Feb. 12 | | | 20,000 |

Total sales in barrels.....125,000

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

| | Bid. | Asked. |
|---------------------------------------|-------|--------|
| Trade dollars..... | \$.72 | \$.75 |
| Mexican dollars..... | .70¼ | .71½ |
| Peruvian soles and Chilean pesos..... | .68 | .70 |
| English silver..... | 4.68 | 4.71 |
| Five francs..... | 4.86 | 4.85 |
| Victoria sovereigns..... | 4.86 | 4.90 |
| Twenty francs..... | 3.88 | 3.93 |
| Twenty marks..... | 4.74 | 4.76 |
| Spanish doubloons..... | 15.55 | 15.70 |
| Spanish 25 pesetas..... | 4.78 | 4.83 |
| Mexican doubloons..... | 15.50 | 15.70 |
| Mexican 20 pesos..... | 19.50 | 19.60 |
| Ten guilders..... | 3.96 | 4.00 |
| Fine silver bars..... | .90¼ | .91¼ |

Copper.—There is little to be said about the market. Lake has again been somewhat easier, and was readily obtainable at about 10½@10'65c., but the large companies continue to remain out of the market, holding for higher prices. Casting copper is obtainable at somewhat easier rates, viz., 10½c. delivered, and even this price can be shaded somewhat. We do not hear of any sales of Arizona copper, for which prices rather above the market value are asked. Of furnace material little is offered in this market, and the Western producers evidently prefer not to follow present market values. The exports continue to be rather heavy.

In Europe the market continues rather depressed and complaints are loud that consumers' orders are rather scarce, and business has consequently been much restricted. In G. M. B.'s and Chili bars, little has been done, and prices came down in the middle of the week to £43 10s., but reacted somewhat and close at £44 to £44 2s. 6d. for spot and £44.10s. @ £44.12s. 6d. for three months prompt. For manufactured material we quote: English tough, £48 @ £48 10s.; best selected, £48.10s. @ £49; strong sheets, £57 @ £58; India sheets, £55 @ £56; yellow metal, 5½ @ 5¾d.

It is reported from England that Anaconda matte is now offered on the basis of G. M. B. copper for present shipment, so English smelters have a favorable opportunity for covering in furnace material at rather cheap prices.

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

| To | Copper Matte. | Lbs. | \$ |
|------------------------|---------------|---------|----------|
| S. S. Normandie..... | 2,850 bags. | 360,900 | \$25,000 |
| To Hamburg..... | Copper. | Lbs. | |
| S. S. Rugia..... | 399 pigs. | 112,020 | \$11,000 |
| To Havre..... | Copper. | Lbs. | |
| S. S. La Bourgogne.... | 162 casks. | 202,000 | \$21,180 |
| To Rotterdam..... | Copper. | Lbs. | |
| S. S. Werkendam..... | 9 bars. | 1,239 | \$136 |

Tin.—Continues rather dull; there is now and then a little more disposition to buy, but prices are rather depressed and do not leave any profit to the importers. Early in the week business took place at 19'525c. for lots of 50 tons, but since then

a firmer tendency has been established and 19'60c. has been paid for near delivery. For retail lots we quote 19'75c. cash and 19¾c. thirty days.

The English market, in consequence of the heavy drop in silver, has been rather flat and prices came down to £88 12s. 6d. @ \$88 15s. for spot, but since then a slight improvement has taken place, and the close is firm at \$89 5s. @ £89 7s. 6d. for spot and 5s. higher for three months. Shipments from the East this month are light.

Lead is dull and carload lots are obtainable at 4'10c., but in spite of these low prices there is hardly any disposition on the part of buyers to act, and transactions have been rather limited. It appears that the output in Colorado has considerably increased and thus offset the smaller production in the Idaho districts to a rather large degree. We have now to quote 4'10@4¾c.

The foreign market ruled steady, but yesterday prices were somewhat reduced, and Spanish lead is now quoted in London at £10 10s., and English lead at £10 12s. 6d. f. o. b.

Chicago Lead Market.—Mr. H. P. Post, telegraphs us as follows: "Market quite and dull and but little inquiry. Sales 300 tons of desilverized at 3'90c. Ten cars of Missouri at same figure. General opinion is that the bottom has been reached."

St. Louis Lead Market.—The John Wahl Commission Company, telegraph us as follows: "Lead continues in a state of inertia and appears to have few friends. Sales of a retail character have been made as low as 3'85c."

Spelter is in good consumptive demand, but the large production prevents any improvement in prices. We have to quote 4.625@4.65c. New York.

In London prices are lower, good ordinaries being quoted at £21 10s., and specials at £21 12s. 6d.

Antimony is flat and rather pressed for sale. Hallett's is now obtainable at 11@11½c., L. X. nominally at 12@12½c., and Cookson's 15½@15¾c.

Quicksilver.—This market continues quiet, with but little business doing. Quotations are: London, £7; New York, \$41.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Feb. 12.

With but few exceptions the general iron market does not differ much from what we have reported in this column for some time past. In pig iron the consumption keeps up, and the demand shows a falling off—a combination of circumstances which can result only in greater dullness and instability. Competent observers agree that the price of pig iron will undergo a decline before it will advance.

In rails there is nothing of interest. In the structural iron market beams continue to excite the most attention.

American Pig Iron.—The market for pig iron shows the same features which have characterized it for a month or two past. There is the same hand-to-mouth buying, and prices bid fair to decline still more, although, of course, the decline, if any occurs, will not be very great.

The demand for iron thus far this month has been small, and certainly does not warrant the continued large production, which shows no sign of falling off. With a few exceptions, notably the Thomas Iron Company, the Northern furnaces are not doing as well as they should. With the Southern producers the situation is still worse, and the chances of a speedy improvement in their condition are very slim. Already we are commencing to hear rumors of the probability of this or that Southern concern being forced to the wall. Southern iron is coming into this market freely, and is being offered at concessions more or less tempting. And yet no consumer shows much inclination to buy heavily. We continue to quote Northern, No. 1X, \$17@17.50; No. 2X, \$15.50@16; Southern, No. 1X, \$16@17; No. 2X, \$15@16.

Spiegeleisen and Ferro-Manganese.—Nothing of interest can be reported of this market. We hear of no sales during the week and quotations must be recorded as merely nominal, as follows: 20% spiegeleisen, \$27, and 80% ferro-manganese, \$62@63.

Steel Rails.—The main features which have characterized this market for many weeks past continue unchanged. The usual reports of sales during the week have been circulated among the trade, but in no case could specific information be given. We continue to quote steel rails at \$30 f. o. b. mill, and \$30.70 at tide water.

Rail Fastening.—Not a single transaction of interest is reported in this market. The lack of inquiry for fastenings is taken by many as indicative of the fact that, all rumor to the contrary notwithstanding, there have not been any large sales of rails made this week. We quote this week, fish and angle plates, 1'75@1'80c.; spikes, 2'10@2'15 c.; bolts and square nuts, 2'70@2'80c.; hexagonal nuts, 2'80@2'85c.

Merchant Steel.—Manufacturers of merchant steel report a very good business during the week just past. The demand has been good and the prices firm, especially in the higher grades of steel. Our quotations are as follows: Mueshet's special, 48c.; English tool, 15c. net; American tool steel, 7@8c.; special grades, 13@18c.; crucible machinery

steel, 4.75c.; crucible spring, 3.75c.; open hearth machinery, 2.25c.; open hearth spring, 2.50c.; tire steel, 2.25c.; toe calks, 2.25@2.50c.; first quality sheet, 10c.; second quality sheet, 8c.

Tubes and Pipe.—The usual business is doing in this market. Prices remain unchanged. We therefore quote ruling discounts as follows: Butt, black, 57%; butt, galvanized, 47%; lap, black, 67%; lap, galvanized, 55%; boiler tubes, under 3 in. and over 6 in., 55%; 3 in. to 6 in., 60%.

Structural Material.—The market for beams continues unsettled and the low prices tend to create an uncertainty in the minds of buyers as to what is really the lowest price at which beams may be bought. It is said that a large order was placed at 2c., although for small lots it is difficult for buyers to obtain a price less than 2.5c. Other quotations are: Angles, 1.90@2.10c.; sheared plates, 1.85c.@2.25c.; tees, 2.40@2.60c.; beams, 2.40@2.80 channels, 2.40@2.50c. Universal plates, 2.10c.; bridge plates, 2.10c., on dock.

Old Rails.—No sales are reported in this market, which continues as dull as ever. Nominal quotations are: Old tees, \$20@\$21; doubles, \$22@\$23. Wrought iron scrap is quoted at \$19@\$20.

Chicago. Feb. 10.

(From our Special Correspondent.)

During the past week or ten days there has been a noticeable decline in the demand for crude iron. Most of the larger consumers have filled their requirements from six to twelve months ahead, and a number of the smaller smelters have bought very liberally, the immediate result of which is that there is now less activity in coke foundry iron, which condition may continue for a short while. Finished iron is still comparatively inactive, but the new orders about to be placed for cars may put new life into the market; bars, sheets and plates are moving in a quiet way only. Actual orders for structurals have been somewhat retarded by irregularity in prices of beams and channels, each mill now making its own figures which vary more or less according to location of mill. Demand for small lots of steel rails continues good and the local mills look for some large orders during the next 30 days. Old material shows no sign of improvement and the outlook is poor.

Pi. Iron.—Business during the week has been fair only; orders are from small to moderate sized amounts of Northern coke iron, and at unchanged prices. Demand is almost entirely confined to lots of 100 to 300 tons, and most of them for prompt or early shipment. Furnaces here are in fair shape now, and can stand a short period of quietude without distress. Unable to stand the pressure of low prices, two more Southern furnaces were blown out last week, so that while production continues to increase and consumption in a slight degree only, prices cannot possibly harden, but rather the reverse. Foundry and soft grades are in limited demand, and furnaces are extending deliveries. Lake Superior charcoal iron is in some demand, but the tonnage is light.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$17@17.50; Lake Superior coke, No. 1, \$15.50@16; No. 2, \$15@15.50; No. 3, \$14@14.50; Lake Superior Bessemer, \$17; Lake Superior Scotch, \$17@17.50; American Scotch, \$17.75@18.25; Southern coke, foundry No. 1, \$15.50; No. 2, \$15; No. 3, \$14.50; Southern coke, soft, No. 1, \$15.50; No. 2, \$14.50; Ohio silveries, No. 1, \$18; No. 2, \$17; Ohio strong softeners, No. 1, \$18; No. 2, \$17; Tennessee charcoal, No. 1, \$18; No. 2, \$17.50; Southern standard car wheel, \$20@\$21.

Structural Iron and Steel.—There is much irregularity in quotations on beams and channels, and several contracts on which figures have been asked, have been withdrawn until prices become more settled. The outlook for a good run of business was never more promising. Quotations for car lots f. o. b. Chicago are as follows: Angles, \$2@2.15; tees, \$2.30@2.40; universal plates, \$2.12@2.15; sheared plates, \$2.10@2.20; beams and channels, \$2.50.

Plates.—Inquiry from the West and Northwest is improving, and business is somewhat brightening up. Warehouse trade is very fair. Tubes manifest no improvement and prices are nominal only. Steel sheets, 10 to 14, \$2.40@2.50; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$3@3.25; firebox sheet, \$4.25@5.50; flange steel, \$2.75@3.25; boiler rivets, \$4.25; boiler tubes, 2 1/2 in. and smaller, 55%; 7 in. and upward, 65%.

Merchant Steel.—Some mills which make a specialty of implement steels are several weeks behind with shipments on season's contracts. Demand is fair to good from wagon makers and other consumers. Mill agents report a good demand for tool steel. We quote \$6.75@7 and upward; tire steel, \$2.30@2.50; toe calk, \$2.50@2.65; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.75@1.90; open hearth machinery, \$2.60@2.75; open hearth carriage spring, \$2.30@2.40; crucible spring, \$3.75@4.

Steel Rails.—The large block of rails mentioned in last week's review went to Pittsburg makers. Inquiry is improving for small lots of 500 to 2,000 tons, and quotations on such are \$32. Rail fastenings and track supplies generally are in good demand. Regular quotations are: 1.80@1.85c. for steel or iron; spikes at \$2.15@2.35 per 100 lbs.; track bolts, hexagonal nuts, \$2.70.

Galvanized Sheet Iron.—The demand from mill and warehouse is first rate, and discounts are unchanged at 67% off on Juniata and 67 1/2% and 5% off on charcoal in large lots. Small quantities are quoted at 65% and 10% from list.

Black Sheet Iron.—Demand is light and there are few mills willing to shade 2.85c. Chicago for No. 27 common. Jobbers ask 3.10c. from stock same gauge.

Bar Iron.—But few mills are shading 1.67 1/2% base size, Chicago, while many are taking business at 1.70c. later. Demand is fair only, but the prospects are as favorable as they have been, and the railroad orders in sight will soon be given out. Warehouse demand is improving, and quotations steady at 1.80@1.90c. rates.

Nails.—Mill lots are quoted at \$1.80@1.85 Chicago, and manufacturers of wire nails claim that they must have more money for their product, as raw material is advancing. Jobbing price is \$1.90 @ \$1.95 in small lots. Steel cut nails are in fair demand at \$1.65 in car loads, and \$1.75 from stock in less quantities.

Scrap.—Cast and some of the cheaper grades are in fair demand; the better qualities of wrought are still neglected. No. 1 railroad, \$19; No. 1 forge, \$18; No. 1 mill, \$13; fish plates, \$20.50; axles, \$22; horseshoes, \$18.50; pipes and flues, \$11; cast borings, \$7.50; wrought turnings, \$9.50; axle turnings, \$12.50; machinery castings, \$12; stove plates, \$8.50; mixed steel, \$11.50; coil steel, \$14.50; leaf steel, \$15; tires, \$15.50.

Old Material.—About 3,000 tons of light section iron rails changed hands at \$21.50; old steel rails are quoted at \$13.50 for mixed lengths, and \$15 for long selected; old car wheels are selling in a small way at \$16.25@16.50.

Louisville. Feb. 6.

(Special Report by Hall Brothers & Co.)

Extreme quietness has prevailed in iron circles for the past week. Most all of the transactions reported have been for small quantities, from car loads up to 100 tons, and concessions have even been reported on these small transactions. It is said that one large Southern company at least was pressing sales at lower range of prices, which has at times necessitated some others to meet them to secure business, though generally quotations remain nominally unchanged. We quote:

Hot Blast Foundry Irons.—Southern coke No. 1, \$14@14.25; Southern coke No. 2, \$13.25@13.75; Southern coke No. 3, \$13@13.25; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.50@16; Missouri charcoal No. 1, \$17@17.50; Missouri charcoal No. 2, \$16.50@17.

Forge Iron.—Neutral coke, \$12.50@12.75; cold short, \$12.25@12.50; mottled, \$11.50@12.00.

Car Wheel & Malleable Irons.—Southern (Standard brands), \$18.00@18.50; Southern (other brands), \$17.00@17.50; Lake Superior, \$19.50@20.50.

Philadelphia. Feb. 11.

(From our Special Correspondent.)

The situation of the iron trade is surprising and disappointing to everyone connected with it. There have been very few large transactions, and those were in forge iron. A great deal of iron is wanted; at least brokers continue to assert the fact, which is probably true. Salesmen who have made a tour of some of the more important points of the territory, return with the statement that there is but little iron in the yard, and think that there is but little under contract for delivery after thirty days. It is hard to prognosticate anything at present. The bare facts simply are that buyers are purchasing very little more iron than they need, or for more than 30 days; that prices for a number of brands have receded about 25c., and that quotations for standard brands are held by several concerns fully up to early January quotations. Good Lehigh irons are being offered and taken at \$17.50 for No. 1, and No. 2, \$16; some brands, \$15.50. Virginia No. 1 has been offered at \$16, No. 2 at \$15.50. Moderate sales. Charcoal irons are being picked up in small lots, both cold and hot blast. A few sales of American Scotch have been made within a day or so, both Nos. 1 and 2.

Muck Bars.—The only thing to be said is that a few small lots have been taken at \$25.50@26.

Steel Slabs and Billets.—No earnest efforts have been made this week to sell, although mill men are badly off for business. Quotations \$26.50.

Merchant Iron.—Sharp competition continues throughout the State for merchant bars, and, as if things could be made worse, Western mill men are cutting under our very lowest quotations.

Skelp Iron.—Sales are insignificant.

Sheet Iron.—Only a small amount of business is being done at mills. The retail store demand is picking up for immediate deliveries. Card rates are firm for small lots. Prices on small orders, if they were to be had, would be lower.

Plate and Tank Iron.—Lowest quotation for steel to-day, 1.80c.; average quotation, 1.90c. Boiler makers are placing a good many orders, but they are for small lots. Refined, 2.25c.; shell, 2.30c. for iron; flange, 3.20c.

Structural Material.—Prices are unsettled. Buyers have not yet placed orders. Those who are in a position to know say a great deal of business is hanging fire. Quotations: 1.90c. for angles;

universal plates, 1.92c.; tees, 2.40c.; beams, 2.40@2.50c.

Steel Rails.—Small lots of steel rails are selling at \$30. Only a moderate amount of work is promised for the next thirty days.

Old Rails.—The best price paid to-day is \$20.50 for iron and \$16.50 for steel.

Scrap.—A good deal of scrap is being picked up for immediate delivery at \$19.50@20.

Pittsburg. Feb. 11.

(From our Special Correspondent.)

The iron and steel market has failed to show any improvement during the past week. Consumers seem to have a sufficient stock on hand, at least to meet present wants, and are disposed to ask concessions; while certain sellers are inclined to meet their views, there are others who hold an entirely different opinion, and prefer not to accept present rates, contending that the present depression is only temporary.

Under these circumstances the demand has been smaller than usual, with prices very unsettled; still, with all the dullness, and all the pressure to sell, prices do not yield to any serious extent. Of course, the past week has been the quietest of the year, and in some instances concessions of a few cents per ton were made, and sales of a few thousand tons were the result of the shading.

After all, the situation is by no means disquieting, particularly when the big sales made since the first of the year are taken into consideration. At the same time the point has certainly been reached when there must be more business, less iron or lower prices. The trade generally still holds to the idea that the alternative first noted will bring them out safe in the near future. A well informed iron man says: "The volume of business is not up to the capacity of the mills and furnaces, and as a result there is considerable weakness and irregularity in prices. As compared with former years, the amount of business now being done shows no falling off, but there is such a large and continuous growth in productive capacity that a very large increase in consumption is required each year to keep pace with the output in different lines. The present consumption of pig iron is certainly greater than ever before, but the increase in production is even more marked, so that the growth in demand hardly keeps the market steady. According to all accounts an enormous amount of work has been planned for this year by the railroads, builders and manufacturers, and indications point to a very large aggregate of business, although, apparently, it will not be very evenly distributed through the year.

Bessemer sales show a decline; gray forge is weaker; steel slabs and billets in some cases were shaded; ferro-manganese is being quoted at a decline; spiegel is lower; muck bar is weak but not quoted lower; steel beams and scrap material declined; old iron and steel rails are weak and prices uncertain; prices of skelp iron are maintained; new steel rails have sold at \$30 at works. The sales during the week were as follows:

| Coke Smelted Lake and Native Ores. | |
|---|----------------|
| 2,500 Tons Bessemer, February, March..... | \$15.25 cash. |
| 2,000 Tons Bessemer..... | 15.30 cash. |
| 2,000 Tons Bessemer, April, May, June..... | 15.25 cash. |
| 2,000 Tons Bessemer, March, April..... | 15.15 cash. |
| 1,000 Tons Bessemer, city furnace..... | 15.50 cash. |
| 1,000 Tons Grey Forge, March..... | 13.35 cash. |
| 1,000 Tons Southern White Iron..... | 13.00 cash. |
| 1,000 Tons Bessemer, February, March..... | 15.25 cash. |
| 1,000 Tons Bessemer..... | 15.25 cash. |
| 1,000 Tons Grey Forge..... | 13.40 cash. |
| 500 Tons Grey Forge..... | 13.35 cash. |
| 500 Tons Grey Forge..... | 13.30 cash. |
| 500 Tons Grey Forge..... | 13.25 cash. |
| 500 Tons Grey Forge..... | 13.20 cash. |
| 300 Tons No. 2 Foundry..... | 15.00 cash. |
| 250 Tons No. 1 Foundry..... | 15.50 cash. |
| 150 Tons Silvery..... | 16.00 cash. |
| Charcoal. | |
| 200 Tons White Southern Charcoal..... | 20.00 cash. |
| 140 Tons Old Blast..... | 26.75 cash. |
| 100 Tons Warm Blast..... | 18.50 cash. |
| 50 Tons No. 2 Foundry..... | 21.00 cash. |
| 50 Tons Cold Blast..... | 26.00 cash. |
| Steel Slabs and Billets. | |
| 1,200 Tons Steel Billets, April, May, June..... | 25.00 cash. |
| 1,000 Tons Steel Billets, March, April..... | 24.75 cash. |
| 500 Tons Steel Billets and Slabs..... | 24.50 cash. |
| Muck Bar. | |
| 700 Tons Neutral, April, May..... | 24.75 cash. |
| 500 Tons Neutral, April..... | 25.50 cash. |
| 300 Tons Neutral..... | 25.65 cash. |
| Ferro-Manganese. | |
| 125 Tons 80%, del..... | 63.00 cash. |
| 100 Tons 80%, del..... | 62.80 cash. |
| Skelp Iron. | |
| 400 Tons Sheared Iron..... | 1.80 4m. |
| 200 Tons Wide Grooved..... | 1.60 4m. |
| 150 Tons Narrow Grooved..... | 1.75 1/2 4m. |
| Steel Wire Rods. | |
| 350 Tons American Fives, at Mill..... | 33.25 cash. |
| 500 Tons American Fives, at Mill..... | 34.00 cash. |
| Steel Beams. | |
| 280 Tons Steel Beams, 10 x 12, per lb..... | 2 1/2 c. cash. |
| Steel Blooms and Rail Ends. | |
| 1,000 Tons Bloom and Rail Ends..... | 17.50 cash. |
| Old Iron and Steel Rails. | |
| 500 Tons Old Steel Rails, mixed lengths..... | 17.25 cash. |
| 500 Tons Old Iron Rails..... | 22.75 cash. |
| 500 Tons Old Steel Rails..... | 17.00 cash. |
| 250 Tons Old Steel Rails..... | 17.25 cash. |
| Scrap Material. | |
| 300 Tons Leaf Spring Steel, gross..... | 21.00 cash. |
| 300 Tons Coil Springs, gross..... | 19.00 cash. |
| 200 Tons No. 1 W. R. R. Scrap, net..... | 18.75 cash. |
| 200 Tons No. 1 W. R. R. Scrap, net..... | 19.25 cash. |
| 200 Tons Iron Axles Hammered, net..... | 26.00 cash. |
| 100 Tons Soft Steel, gross..... | 17.50 cash. |

NEW YORK MINING STOCKS QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Table with columns for Name and Location of Company, dates from Feb. 6 to Feb. 12, and Sales. Includes companies like Adams, Alice, Amador, Atlantic, Belcher, Belle Isle, Bodie Cons., Bos. & Mont., Brecco, Bulwer, Caledonia, Catalpa, Chrysolite, Colorado Central, Commonwealth, Comstock T. bonds, Cons. Cal. & Va., Crown Point, Daly, Deadwood, Fatier de Smet, Franklin, Freeland, Gould & Curry, Grand Prize, Hale & Norcross, Homestake, Horn Silver, Independence, Iron Hill, Iron Silver, Leadville Cons., Little Chief, Martin White, Mono, Mt. Diablo, Navajo, N. Belle Isle, Ontario, Ophir, Overman, Plymouth, Quicksilver, Quincy, Robinson Cons., Savage, Sierra Nevada, Silver Cord, Silver King, Small Hopes, Standard, Stormont, Yellow Jacket.

Ex-dividend. +Dealt at in the New York Stock Ex. Unlisted securities. #Assessment paid. \$Assessment unpaid. Dividend shares sold, 11,055. Non-dividend shares sold, 48,900. Total shares sold, 57,855.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, dates from Feb. 5 to Feb. 11, and Sales. Includes companies like Atlantic, Bodie, Bonanza Development, Brecco, Calumet & Hecla, Catalpa, Central, Cour d'Alene, Cons. Cal. & Va., Dunkin, Eureka, Franklin, Honorine, Horn Silver, Kearsarge, Lake Superior, Little Pittsburg, Minnesota Iron, Napa, Ontario, Osceola, Quincy, Ridge, Sierra Nevada, Silver King, Stormont, Tamarack, Tecumseh.

Dividend shares sold, 7,326. Non-dividend shares sold, 7,990. Total shares sold, 15,316.

COAL STOCKS.

Table with columns for Name of Company, dates from Feb. 6 to Feb. 12, and Sales. Includes companies like American Coal, Camhria Iron, Cameron Coal & I. Co., Ches. & O. R. R., Chic. & Ind. Coal, Col. C. & L., Col. C. & Hocking C. L., Consolidation Coal, Del. & H. C., D. L. & W. R. R., Hocking Valley, Hunt & Broad Top, Illinois C. & Coke Co., Lehigh C. & N., Lehigh Valley R. R., Lehigh & Wilk. Coal, Mahoning Coal, Maryland Coal, Morris & Essex, New Central Coal, N. J. C. R. R., N. Y. & S. Coal, N. Y. Susq. & West., N. Y. & Perry C. & L., Norfolk & West. R. R., Penn. Coal, Penn. R. R., Ph. & R. R., Sunday Creek Coal, Tennessee C. & I. Co., Westmoreland Coal.

Total shares sold, 2,737,412.

San Francisco Mining Stock Quotations.

Table with columns for Name of Stocks, dates from Feb. 5 to Feb. 11, and Sales. Includes companies like Alpha, Alta, Belcher, Belle Isle, Best & Belcher, Bodie, Bulwer, Chollar, Commonwealth, Cons. Cal. & Va., Crown Point, Del Monte, Eureka Consolidated, Gould & Curry, Hale & Norcross, M. White, Mexican, Mono, Mt. Diablo, N. Commonweath, Ophir, Potosi, Savage, Sierra Nevada, Union Con., Utah, Yellow Jacket.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS, DIVIDENDS, and similar. It lists numerous mining companies and their financial details.

G. Gold, S. Silver, L. Lead, C. Copper. * Non-assessable. + This company, as the Western, up to December 10th, 1881, paid \$1,400,000. † Non-assessable for three years. ‡ The Dea wood previously paid \$275,000 in eleven dividends and the Terra \$75,000. § Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Con. Virgin 40,000,000. ¶ Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$180,000 before reorganization in 1880. ‡‡ This company acquired the property of the Raymond & Ely Company which had paid \$2,075,000 in dividends.

STOCK MARKET QUOTATIONS.

Aspen. Feb. 6. The closing quotations were as follows: Agnes C. 1.10, Argentin Junata. 1.11, Aspen Deep Shaft. 5.00, Aspen Contact. .36, Best Friend. .36, Bitumetallic. .32, Bushwacker. .33, Carbonate Chief. .10, Della S. 7.00, Homer & Alta. .02, Justice. .10, Little Annie. .19, Mollie Gibson. 7.90, Nolan Creek. .12, Park, Mamie & Queen. .12, Pontiac. .25, Sheep Mountain S. & M. Co. .15.50, Struggler. .16, St. Joe & Mineral Farm. .20, Yellow Boy. .20

Baltimore, Md. Feb. 11. COMPANY. Bid. Asked. Atlantic Coal. \$.15, Balt. & N. C. .13, Big Vein Coal. .27, Conrad Hill. .30, Cons. Coal. 1.08, Diamond Tunnel. 1.09, George's Creek Coal. 1.08, Lake Chrome. .55, Maryland & Chariotte. .55, North State. .55, Silver Valley. .70

Pittsburg, Pa. Prices highest and lowest for the week ending Feb. 11: COMPANY. H. L. Allegheny Gas Co. \$.50, Bridgewater Gas Co. 5.50, Chariots Val. Gas. .30, Columbia Oil Co. .30, Consigne Mining Co. .30, Consolidated Gas Co. .30, East End Gas Co. .30, Fisher Oil Co. .30, Forest Oil. .30, Hazewood Oil Co. 5.00, Hidalgo Mining Co. .30, La Noria Mining Co. .30, Luster Mining Co. 9.63, Mansfield C. & C. Co. 25.00, Manufacturers Gas Co. 54.00, Nat. Gas Co. of W. Va. 50.00, N. Y. & Clev. Gas Coal Co. 14.00, People's Natural Gas Co. 7.88, Philadelphia Co. 15.33, Pine Run Gas Co. 3.00, Pittsburgh Gas Co. 2.13, Red Cloud Mining Co. 18.50, Silverton Mining Co. 12.63, South Side Gas Co. 103.00, Sterling Silver Mining Co. 75.00, Tuna Oil Co. 18.50, Union Gas Co. 12.63, Washington Oil Co. 100.50, W'moreland & Camb. 13.25, Wheeling Gas Co. 103.00, W house E. Light. 75.00, W house Air Brake Co., Ltd. 75.00

St. Louis. Feb. 10. CLOSING PRICES. Bid. Asked. Adams, Colo. \$1.00, American & Nettie. 1.05, Bi-Metallic, Mont. 16.50, Central Silver. .15, Elizabeth, Mont. .37, Granite Mountain, Mont. 15.00, Little Albert. .06, Montrose Placer, Colo. .07, Mickey Breen. .01, Pat Murphy, Colo. .05, Small Hopes, Colo. .05, Silver Ace. .25, Silver Bell. .25, Yuma, Ariz. .07

Helena, Mont. (Special report by SAMUEL K. DAVIS.) Prices highest and lowest for week ending Feb. 6, 1892: Bald Butte (Mont.) 2.25, California (Castle), Mont. .25, Champlon (Oro Fino), Mont. .20, Combination (Phillips'), Mont. 1.50, Copper Bell (Cataract), Mont. 1.25, Cumberland (Castle), Mont. 1.25, Elizabeth (Phillipsburg), Mont. .75, Florence (Nelhard), Mont. .20, Fourth of July Wash. .20, Glengary (Butte), Mont. 1.00, Helena & Victor. 2.25, Iron Mountain (Missoula), Mont. 7.75, Iron Mountain Ext. .15, Jersey Blue (Butte). .15, Jumbo (Castle), Mont. .35, Lone Pine Consolidated. 3.50, Mac (Unionville), Mont. .25, None Such (Unionville), Mont. .35, Poorman (Coeur d'Alene), Idaho. 1.00, Queen of the Hills (Neibart). .15, Southern Cross (Deer Lodge), Mont. 20, Yellowstone (Castle), Mont. .30

Deadwood. Feb. 6. Bid. Asked. Bullion. .65, Calcedonia. .70, Calumet. .08, Cambrian. .004, Carthage. .01, Deadwood Terra. 1.95, De Smet. .25, Double Standard. .104, Elk Mountain. .004, Emmett. .01, Equitable. .004, Florence. .024, Golden Reward. .08, General Merritt. .08, Harmony. .02, Hester A. .02, Homestake. 12.00, Hermit. .014, Iron Hill. .25, Isadorah. .20, Maggie. .07, Monitor. .08, Rainbow. .014, Retriever. .10, Ross-Hannibal. .07, Ruby Bell. .07, Ruby Wilkes. .01, Seabury Calkins. .03, Silver Queen. .04, Stewart. .06, Tornado. .12, Troy. .01, Uncle Sam. .05

Trust Receipts. Sales. H. L. American Cotton Oil. 1.515, National Lead. 20 1/2

Trust Stocks. Special report by C. I. Hudson & Co., members New York Stock Exchange. The following are the closing quotations Feb. 12: CERTIFICATES. Am. Cotton Oil, Com. \$35 @ \$35 1/2, Am. Sugar Refineries, Com. 82 1/2 @ 82 3/4, Distillers' & Cattle Feeders'. 50 1/4 @ 50 1/2, Linseed Oil. 30 @ 30 1/2, National Cordage, Com. 93 1/4 @ 93 1/2, National Lead Trust cfs. 20 1/4 @ 20 1/2, Standard Oil. 17 1/2 @ 17 3/4, W. U. Beef Co. 1 1/4 @ 1 1/2

Foreign Quotations. London. Jan. 29. Highest. Lowest. Amador, Cal. 5s. 4s. 6d., American Belle, Colo. 5s. 2s. 6d., Appalachian, N. C. 1d., Can. Phosphate, Can. 10s. 5s., Colorado, Colo. 2s. 6d., Cons. Esmeralda, Nev. 1s. 3d., De Lamar, Idaho. 1 1/4, Dickens Quater, Idaho. 1s. 6d., Elkhorn, Mont. 2 1/2, Elmore, Idaho. 9d., Emma, Utah. 1s. 3d., Flagstaff, Nev. 4s. 3s. 6d., Garfield, Nev. 1s. 6d., Golden Feather. 9s. 9d., Golden Gate, Cal. 4s. 9d., Golden Leaf, Mont. 5s. 6d., Golden River, Cal. 10s., Jay Hawk, Mont. 10s., Josephine, Cal. 1s. 3d., Kohinoor, Colo. 1s. 9d., La Luz, Mex. 1s. 9d., La Plata, Colo. 1s. 3d., La Valera, Mex. 2s. 9d., Mald of Erin, Colo. 4 1/2, Mammoth Gold, Ariz. 2s. 1s. 6d., Montana, Mont. 9s. 6d., New California, Colo. 2s. 1s. 6d., New Consolidated. 6d. 3d., New Eberhard, Nev. 2s. 6d., New Gold Hill, N. C. 1s. 6d., New Guston, Colo. 3s. 2 1/2s., New Hoover Hill, N.C. 2s. 6d., New Russell, N. C. 1s. 3d., Old Lou, Colo. 43 1/2, Parker Gold, N. C. 1s. 6d., Pittsburg Cons., Nev. 2s. 6d., Richmond Con., Nev. 15s. 10s., Ruby, Nev. 4 1/2s. 1 1/2s., Sam Christian, N. C. 1s. 3d. 9d., Sierra Buttes, Cal. 7s. 6d. 5s., Plumas Eur., Cal. 49 1/2, United Mexican, Mex. 43 1/2, U. S. Placer, Colo. 4 1/2, West Argentine, Colo. 4 1/2, Yankee Girl, Colo. 41 1/2

Paris. Jan. 28. France. East Oregon, Ore. 2.50, Forest Hill Divide, Cal. 60.00, Golden River, Cal. 130.00, Laurium. 770.00, Lexington, Mont. 125.00, Nickel. 945.00, Rio Tinto, Spain. 411.25, Tharsis, Spain. 520.00, Vieille-Montagne. 645.00

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid-Acetic, No. 8, pure, 1,040, 45, Commercial, in bbls. and cys. 0.19 @ 0.21, Carbonic, liquefied, 40, Chromic, cbem pure. 90, for batteries. 40, Hydrobromic, dilute, U. S. P. 25, Hydrocyanic, U. S. P. 45, Hydrofluoric. 20, Alcohol-65%, 4 gal. \$2.30 @ \$2.40, Absolute. \$3.50, Ammoniated. \$2.50, Alum-Lump, 45 @ 0.17, Powdered. 0.14 @ 0.15, Lump ton, Liverpool. 45, Aluminum-Lb. .50, Aluminum Chloride-Pure, 1.25, Amalgamating solution, 60, Sulphate. 0.17 @ 0.18, Ammonia-Sul. in bbl. lots, 0.13, Carbonate, 0.13, English and German. 0.13, Mariate, white, in bbls., 0.13, Aqua Ammonia-(in cys) 15° 0.09, 20° 0.12, 30° 0.15, 40° 0.18, 50° 0.21, 60° 0.24, 70° 0.27, 80° 0.30, 90° 0.33, 100° 0.36, 110° 0.39, 120° 0.42, 130° 0.45, 140° 0.48, 150° 0.51, 160° 0.54, 170° 0.57, 180° 0.60, 190° 0.63, 200° 0.66, 210° 0.69, 220° 0.72, 230° 0.75, 240° 0.78, 250° 0.81, 260° 0.84, 270° 0.87, 280° 0.90, 290° 0.93, 300° 0.96, 310° 0.99, 320° 1.02, 330° 1.05, 340° 1.08, 350° 1.11, 360° 1.14, 370° 1.17, 380° 1.20, 390° 1.23, 400° 1.26, 410° 1.29, 420° 1.32, 430° 1.35, 440° 1.38, 450° 1.41, 460° 1.44, 470° 1.47, 480° 1.50, 490° 1.53, 500° 1.56, 510° 1.59, 520° 1.62, 530° 1.65, 540° 1.68, 550° 1.71, 560° 1.74, 570° 1.77, 580° 1.80, 590° 1.83, 600° 1.86, 610° 1.89, 620° 1.92, 630° 1.95, 640° 1.98, 650° 2.01, 660° 2.04, 670° 2.07, 680° 2.10, 690° 2.13, 700° 2.16, 710° 2.19, 720° 2.22, 730° 2.25, 740° 2.28, 750° 2.31, 760° 2.34, 770° 2.37, 780° 2.40, 790° 2.43, 800° 2.46, 810° 2.49, 820° 2.52, 830° 2.55, 840° 2.58, 850° 2.61, 860° 2.64, 870° 2.67, 880° 2.70, 890° 2.73, 900° 2.76, 910° 2.79, 920° 2.82, 930° 2.85, 940° 2.88, 950° 2.91, 960° 2.94, 970° 2.97, 980° 3.00, 990° 3.03, 1000° 3.06

Powdered, 4 gal. .94, Marble Dust-4 bbl. \$4.25, Metallic Paint-Brown 4 ton. \$20.00, Red. \$20.00, Mineral Wool-Ordinary slag. .014, Ordinary rock. .014, Ground, 4 ton. \$20.00, In sheets according to size. 1st quality, 4 lb. \$2.00 @ \$3.00, Naphtha-Black. \$10.00, Nitre Cake-4 ton. \$10.00, Ochre-Rochelle, 4 lb. \$1.50 @ \$1.55, Washed Nat Ox'rd, Lump, 4 lb. \$0.44 @ \$0.47, Washed Nat Ox'rd, Powder, 4 lb. \$0.47 @ \$0.50, Golden, 4 lb. .004 @ \$0.04, Domestic, 4 lb. .04 @ \$0.04, Oils, Mineral-Cylinder, light filtered, 4 gal. .15 @ \$0.20, Dark filtered, 4 gal. .13 @ \$0.15, Extra cold test, 4 gal. .18 @ \$0.20, Dark steam refined, 4 gal. .10 @ \$0.18, Phosphorus-4 lb. .55 @ \$0.60, Precip. red, 4 lb. .88, white, 4 lb. .93, Plumbago-Ceylon, 4 lb. .04 @ \$0.05, American, 4 lb. .05 @ \$0.07, Potassium-Cyanide, 4 lb. C. P. .70, Bromide, domestic, 4 lb. .30 @ \$0.25, Chlorate, English, 4 lb. .104 @ \$0.11, Chlorate, powdered, English, 4 lb. .104 @ \$0.11, Carbonate, 4 lb. by casks, 2 1/2 @ \$0.40 @ \$0.42, Caustic, 4 lb. pure slick. .084 @ \$0.074, Iodide, 4 lb. \$2.58 @ \$2.63, Nitrate, refined, 4 lb. .06 @ \$0.08, Bichromate, 4 lb. .68 @ \$0.10, Yellow Prussiate, 4 lb. .23 1/2 @ \$0.24, Red Prussiate, 4 lb. .40 @ \$0.45, Pumice Stone-Select lumps, 4 lb. 0.12, Original cks., 4 lb. .014 @ \$0.02, Powdered, pure, 4 lb. .014 @ \$0.02, Pyrites-Non-cupreous, p. units. 1 1/2 @ \$1.15, Quartz-Ground, 4 ton. \$12.50 @ \$17.50, Kotten Stone-Powdered, 4 lb. .034, Lump, 4 lb. .06 @ \$0.10, Original cks., 4 lb. .014 @ \$0.054, Rubbing stone, 4 lb. .07, Sal Ammoniac-lump, in bbls., 4 lb. \$0.74, Salt-Liverpool, ground, 4 sack. .70, Domestic, fine, 4 ton. \$7 @ \$7.50, Common, fine, 4 ton. \$4.50 @ \$5, Turk's Island, 4 bush. .26 @ \$0.28, Salt Cake-4 ton. \$10.00, Salt Peter-Crude, 4 lb. .034 @ \$0.04, Soapstone-Prussiate, 4 lb. .174 @ \$0.18, Phosphate, 4 lb. .07 @ \$0.18, Stannate, 4 lb. .08 @ \$0.15, Tungstate, 4 lb. .08 @ \$0.15, Hyposulphite, 4 lb. in casks. 0.235 @ \$0.245, Strontium-Nitrate, 4 lb. .094 @ \$0.10, Sulphur-Roll, 4 lb. .024, Flour, 4 lb. .024, Sylvinit, 23 @ 27 1/2, S. O. P., per unit. 40 @ \$24, Talc-Ground French, 4 lb. .014 @ \$0.14, Terra Alba-French, 4 lb. .90 @ \$1.00, English, 4 lb. .50 @ \$0.60, American No. 1, 4 lb. .10, American No. 2, 4 lb. .40 @ \$0.50, Tin-Crystals, in kegs or bbls. 11 @ \$51, reathered or flossed. .25, Muriate, single. .07, Double or strong, 54° B. .09, Oxy. or nitro. .10, Tin Plates, 4 box, Swansea, best, 18 @ \$19, best coke. 15 @ \$16, Vermillion-Imp. English, 4 lb. .90 @ \$0.95, Am. quicksilver, bulk. .45, Am. quicksilver, bags. .95 @ \$1.00, Chinese. .95 @ \$1.00, Trieste. .90 @ \$0.95, American. 1.14 @ \$1.13, Zinc White-Am. Dry, 4 lb. .044 @ \$0.05, Antwerp, Red Seal, 4 lb. .074 @ \$0.074, Muriate solution. .06, Sulphate crystals, in bbls., 4 lb. .034