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CONTENTS.

The Tariff Bill... 635
The Quincy Mining Company... 635
Gold in New Zealand... 635
The Nicaragua Canal... 635
Mining in Hungary... 635
The Sault Ste. Marie Canal... 635
An Australian Coal Discovery... 636
The Personal Hazard in Mining and Railroad... 636
New Publications... 636
Books Received... 637
Use of Plain English in Geological Discussions... J. A. Church 637
Granulating Matte Process... A. Raht and W. E. C. Eustis 637
Peculiar Case of Stratification... J. F. Blandy 638
Theories of Coal Formation... A. de Gaul 638
Montana Mining Prospects... H. M. Beadle 638
Variations in the Milling of Gold Ores... T. A. Rickard 639
Economic Position of the Open Hearth Furnace... H. H. Campbell 641
Canadian Mining Exhibit at Chicago... 642
The Late John Tyndall... 643
Abstracts of Official Reports... 643
New Cage for an Inclined Shaft... R. G. Brown 644
Crucible Furnace for Burning Petroleum... W. E. Crane 644
Recent Decisions Affecting the Mining Industry... 644
Patents Granted... 645
Personals, Obituaries, Societies, Technical Schools, Industrial... 646
Notes: The Trans-Pacific Cable, 642—Large Guns, 642—Work of Gunpowder, 643—Iron in Italy, 645—The Sault Ste. Marie Canal, 645—Native Antimony, 645—Proposed Exhibition at Berlin, 645—Reclaiming New Jersey Meadows, 645—A New South Wales Antimony Mine, 645

\* Illustrated.

MINING NEWS. Ohio... 649
Alabama... 647
Alaska... 647
California... 647
Colorado... 647
Florida... 648
Idaho... 648
Illinois... 648
Indiana... 648
Kansas... 648
Kentucky... 648
Massachusetts... 648
Michigan... 648
Minnesota... 648
Missouri... 648
Montana... 649
Nevada... 649
New Mexico... 649
North Carolina... 649
Oregon... 649
Pennsylvania... 649
South Carolina... 649
South Dakota... 650
Tennessee... 650
Utah... 650
Wyoming... 650
FOREIGN. Queensland... 650
Rep. Columbia... 650
COAL: New York... 650
Boston... 651
Buffalo... 651
Chicago... 651
Pittsburg... 651
IRON: New York... 651
Buffalo... 652
Chicago... 652
Philadelphia... 652
Pittsburg... 652
MARKETS: METALS... 653
CHEMICALS AND MINERALS... 654
MINING STOCK MARKETS: New York... 654
Colo. Springs... 655
Boston... 655
San Francisco... 655
London... 655
DIVIDENDS... 655
ASSESSMENTS... 655
MINING STOCK TABLES: New York... 656
Boston... 656
San Francisco... 658
Coal Stocks... 653
Colo. Springs... 658
Baltimore... 658
London... 658
Paris... 658
Aspen... 658
St. Louis... 652
Duluth... 658
Denver... 658
Helena... 658
Philadelphia... 658
Pittsburg... 658
CURRENT PRICES: Chemicals... 656
Minerals... 656
Rarer Metals... 656
ADVT. INDEX... 15
ADVT. RATES... 14

It is now announced that debate on the tariff bill will be begun immediately after the holiday recess, that is, on January 3d, and that the bill will have precedence of all other measures.

THE cross-fire of petitions, charges and allegation between Mr. RICE and the Reading receivers continues, and the literature of the case is likely to develop to an alarming extent.

THE recent purchase by the Quincy Mining Company of 640 acres of land adjoining its present workings, which is referred to in our mining news columns, will in all probability enable that company to extend its operations considerably, as there is good reason to believe that the bed from which it has been drawing ore is also copper bearing under the newly acquired property.

THE gold mining industry in New Zealand has shown this year a considerable improvement, and for the quarter ending September 30th the gold exports amounted to £245,692, an increase of £31,149 over the corresponding quarter of 1892.

THE shareholder in a mining company does not usually expect an assessment to follow close upon the heels of a dividend, although the former may come much more frequently and the latter not as often as he could desire.

THE advocates of the Nicaragua Canal in Congress are, it is said, preparing to urge very strongly government aid to the enterprise, either in the form of a direct loan to the company or a guarantee of its securities.

THE latest report on the mining industries of Hungary, which is for the year 1892, shows that the total area of land classed as mineral was 64,907 hectares, of which 8,278 were owned and worked by the State, while 56,629 were either owned or leased by private parties.

THE general accounts of falling off in the iron ore traffic and in business of all kinds would lead us to expect a material decrease this season in the traffic of the Sault Ste. Marie Canal, through which pass all the vessels plying between the Lake Superior ports and those of the lower lakes.

THE notice of Prof. JOHN TYNDALL, which we give on another page, and which was written by an earnest friend of the great scientist, calls attention to the fact that he was really one of the last of the "all-round" scientists who belonged to the earlier generation of investigators.

own time the development of all departments of physical science has been carried so far that both scientific investigation and engineering practice is being specialized to a degree which was not dreamed of 25 or 30 years ago. Very few men, indeed, have now the ability or the opportunity to master more than one branch, and the separation is every year carried further and further. A man can no longer study or investigate in physical science generally, but must confine himself to some particular branch. In the same way the title of engineer no longer specifies fully a man's profession, but must be prefixed by that of his special department. How much further this process of differentiation and specializing will continue it is hard to say.

OUR Australian contemporary, the *Mining Standard*, quotes from a daily paper an advertisement from a prospector offering not only a half-share in a rich gold claim, but also matrimony, to any young woman who is willing to invest the very moderate amount of £20 to be used in developing the claim. Unless the prospector himself is unusually unattractive, this seems to be a decided bargain, for the average husband certainly ought to be worth £20, even if the claim should turn out to be good for nothing. This kind of offer opens an entirely new field, and we should not be willing to let our friends on the other side of the globe get ahead of us in developing it. Imagine the possibilities opened up in such advertising for enterprising prospectors on the one hand and for ladies who are tired of a lonely life on the other. What attraction there would be in a special column—"Rich placer claim in exchange for a reasonable amount of working capital and a lady matrimonially disposed." "A lady under 25 will furnish capital to develop a good lode and a wife to manage the owner; must carry free gold and be reasonably good looking, respectively. No silver claims or persons over 40 considered." The field, however, is an unlimited one, and we merely suggest a few of the possibilities, leaving others to work them out.

#### AN AUSTRALIAN COAL DISCOVERY.

An important discovery of coal, which is at the same time an instance of results confirming scientific observations, is noted in New South Wales, where coal of excellent quality has been struck under Port Jackson, which is the harbor of Sydney, at a depth of 2,929 ft. This is the second bore that has been put down in the same locality. The first reached a total depth of 3,095 ft., and at 2,901 ft. a "burnt" seam of coal about 8 ft. in thickness was pierced; but as it was known that some of the coal seams had been disturbed, and as the bore had proved the existence of a thick seam of coal, it was determined to sink a second in further search of the valuable deposit in the same locality, and the result has been, as stated, the discovery of a seam of good bituminous coal 10 ft. in thickness. The bore was made by an American diamond drill. The core of coal is 8 ft. long and 4 in. in diameter; the remainder of the coal was in dust driven up by the action of the water and will be analyzed. The seam is known as the Bulli seam. The depth as determined in advance by Professor DAVID was within 30 ft. of the actual depth, though the professor had nothing to guide him within 20 miles of the present bore which is situated at Cremore Point on the north shore opposite, and about three miles from the principal wharfs. This coincidence must be considered largely as "luck," but at the same time it is a proof of the great regularity of the measures. Probably the condition of the coal as reported in the first bore-hole was due to careless boring grinding up the cores. The nearest worked coal mine is some 40 miles south of Sydney by rail, and Newcastle, which is the principal coal port, is 70 miles north of Sydney. The bore was put down by the Sydney & Port Packing Coal Company, through the agency of the government diamond drill, the engineer in charge being Mr. HOOPER. The company received assistance from the prospecting fund voted by Parliament.

#### THE PERSONAL HAZARD IN MINING AND RAILROADING.

There is undoubtedly a very general popular impression that to the men engaged in it, mining is the most dangerous of all trades or businesses. The circumstances surrounding the miner, his daily labor in darkness and in narrow, confined quarters, and the apparent impossibility of escape in case of accident have strongly impressed the public mind, and this impression has been increased by the publication from time to time of accounts of disastrous accidents in which many lives were lost. For some unknown reason also a mining calamity seems to take a stronger hold on the public mind and to be remembered longer than the more frequent railroad accident; perhaps the very fact of the frequency of the latter confuses the recollection and helps to bring oblivion to the past. Only one or two mining accidents in this country have equaled in extent or in the number of victims the great catastrophes at Norwalk, at Ashtabula, at Little Silver or at Revere, or the more recent disasters at Hastings or at Battle Creek. Nevertheless, the great majority of persons, if asked whether the personal hazard were greater in mining or railroad work, would without hesitation give the bad pre-eminence to the former.

This belief, however, is not borne out by the facts of the case, as shown

by official statistics. Until recently it was not an easy matter to ascertain with any degree of correctness the number of railroad men who suffered from accident in the course of their daily work, but for several years past the Interstate Commerce Commission has collected and published statistics of accidents which now give the number with as fair a degree of accuracy, probably, as can be expected. In quoting these figures we have used those relating to railroad employees only, making no mention of the large number of injuries to passengers and others who form a class in no way represented in mining operations.

The last report of the Interstate Commission—for the year 1891-92—gives the total number of persons employed on the railroads of the United States at 821,415, and of this number 2,554 were reported killed and 28,267 injured by accident during the year. That is, one railroad employee in 322 was killed and one in 29 suffered personal injury sufficient to disable him for the time.

Now we have no authority similar to the Interstate Commission to collect such figures from the mines, but several of the States have mine inspectors, and to some of their reports we may turn for comparison. If coal-mining States are selected for this purpose there can be no question of unfairness, since it is well known that the risks in coal working are greater than in any form of metal mining, not only on account of the presence of gas, the danger of fire and explosion, but because coal mines are generally more extensive and less secured by timbering from falls of rock and similar casualties. In the State of Pennsylvania we find from the inspectors' reports that in a total of 120,972 persons employed in and about the anthracite coal mines, the proportion of casualties was in 1892 one killed in 327 and one injured in 127, while of 78,235 employees in the bituminous mines one out of 592 was killed and one out of 200 injured. Nor was last year an exceptional one, for the number killed in the anthracite region for a series of years has been: 1 to 288 in 1891; 1 to 311 in 1890; 1 to 312 in 1889, and 1 to 319 in 1888, while in the bituminous mines the proportion for those years respectively was: 1 in 312; 1 in 458; 1 in 581, and 1 in 604. Again the number injured in the anthracite mines for the same years was 1 in 122; 1 in 116; 1 in 120, and 1 in 111, and in the bituminous districts 1 in 235; 1 in 177; 1 in 203, and 1 in 231. Here we find that the proportion of men killed was rather less and that of injured very much smaller than on the railroad.

Illinois again is a coal-mining State, and one in which we might expect to find a full proportion of accidents. The mines are not usually so deep or extensive as those of Pennsylvania, but on the other hand there are more small workings where expensive safety appliances are not used. From the Illinois report for the year ending June 30th, 1892, which coincides with the year covered by the Interstate Commission's report, we find that of 33,632 workers at the mines, 57 were killed and 370 hurt, the proportion being 1 in 590 killed and 1 in 91 injured. Both proportions are very much smaller than those reported for the railroads.

After all, in both occupations, while the great disasters attract attention it is the small ones which count up in the aggregate, just as the small losses from chance shots and disease wear down the effective strength of an army more than the great battles, and it is these losses which are hardest to prevent. In many of the States the attempt has been made by laws regulating the ventilation of mines, protection of shafts and other points; but any similar regulations for the protection of railroad employees are of very recent origin.

Mineowners are not exempt from that selfishness which prompts almost all humanity to grasp at profit to the neglect of its duty to others; but to their credit it may be said that there is no such disgraceful record against them as is found in the persistent refusal of the railroads to adopt automatic couplers and train-brakes in freight service until forced to do so by law, while their contemptuous disregard of public opinion in the matter of car heating is equally a matter of record. Nothing quite so bad can be charged against the mining industry.

#### NEW PUBLICATIONS.

GEOLOGICAL SURVEY OF NEW JERSEY; ANNUAL REPORT FOR 1892. Prof. John C. Smock, State Geologist, Trenton, N. J.; State Printers. Pages 368; illustrated.

This is the most recent of the valuable series of reports published by the Geological Survey of New Jersey; it forms a book of 368 pages, with numerous colored plates, prepared in an artistic manner, and various figures illustrating the text. There are besides a map of the State of New Jersey, and a geological map of parts of Monmouth and Middlesex counties in pocket envelopes. The first 31 pages of the book are devoted to administrative reports; the remainder is divided into five parts, each of which is filled by a monograph on some feature in the geology or geography of the State. The most important of these are the first on "Surface Geology," which occupies 116 pages, by Rollin D. Salisbury, and the second, on "The Cretaceous and Tertiary Formations," 71 pages, by William Bullock Clark. The latter, it should be said, is only a preliminary report on these formations in the State of New Jersey, and has especial reference to Monmouth and Middlesex counties. It goes at length into a description of the marl beds, and the origin, occurrence, and character of the deposits of green sand, for

which it will be a valuable reference. The other monographs in the report are "Water Supply and Water Power," by C. C. Vermeule, "Artesian Wells in Southern New Jersey," by Lewis Woolman, and "Notes on the Sea Dykes of the Netherlands." The work of the Geological Survey of New Jersey has been very commendable, and the last report, the 29th in the series, is fully up to the high standard which has been maintained throughout.

**EXPLOSIFS DE SURÉTE GRISOUTITE—WETTERDYNAMITES—EXPLOSIFS A BASE D'AZOTATE D'AMMONIAQUE.** Par A. Macquet. Ingenieur au Corps des Mines. Paris, France; Baudry & Cie. Pages 594. Price (in New York) \$4.20.

This volume consists of two memoirs written by M. Macquet, and a supplement containing a variety of documents and other information. The first section, covering 250 pages, refers to the use of explosives in mines where the conditions are dangerous owing to the presence of gas, coal dust or other explosive material, and to the requirements of material which can be safely used under such conditions. The choice of a safe explosive is fully and carefully discussed, and the author explains the claims of grisoutite and the Wetterdynamites to especial consideration. He also treats of the best and safest methods of using explosives in mining.

The second part, covering 170 pages, is devoted to the use of explosives prepared in accordance with the recommendations of the French commission on the subject, and here also the merits and advantages of grisoutite are discussed. Accounts are given of a number of experiments and their results are compared. This section concludes with a chapter on explosives having nitrate of ammonia as a base, and the dangers attending their use.

The appendix, which occupies nearly 170 pages, gives accounts of several mine explosions and other accidents with discussions of their causes; an account of the work of the Austrian commission on explosives, with some discussion on its conclusions; and several other documents bearing on the question. The author has collected a large amount of material, most of which he presents in a condensed form.

**CONTINUOUS CURRENT DYNAMOS AND MOTORS: THEIR THEORY, DESIGN AND TESTING.** By Frank P. Cox. New York: The W. J. Johnston Company, Limited. Pages 271; illustrated. Price \$2.

This work, intended for students, gives the theory and design of continuous current dynamos and motors as understood and practiced in the designing room, while the methods of testing described are those of the factory. The practical side of the questions treated is always kept in view. The first four chapters consist of a brief review of the electrical units and the general principles of the machines, and may be considered as an introduction to the subsequent portions; the higher branches of mathematics have been avoided. Chapter V. is on calculations pertaining to the magnetic circuit. Chapter VI. treats of the theory of windings, losses, etc., and Chapter VII. of the special points to be observed in motor designing. In Chapters VIII., IX. and X., the application to the design of armatures, field magnets and motors of the principles developed in the preceding chapters is explained by reference to numerical problems selected so as to cover as broad a field as possible and show in what manner to make the various compromises always necessary in practical designing. In Chapters XI. and XII. the methods of testing a completed machine and investigating its characteristics and the effect of various changes in design and operation are discussed and illustrated by curves. As the subject of steam engine is allied to the testing and operation of dynamos and motors, the last two chapters are devoted to indicator diagrams and steam power calculations. There are four appendices, on tests of irons, ampere turntables, determinations of sizes of wire for armatures and field coils, and on the calculation of belting. Most of the engravings were specially prepared for this work, and almost all of the curves given are reproductions of those obtained in actual commercial tests.

**THE WORLD OF MATTER: A GUIDE TO THE STUDY OF CHEMISTRY AND MINERALOGY.** By Harlan Hogue Ballard, A. M., President of the Agassiz Association. Chicago; Howard & Wilson Publishing Company. Pages 264; illustrated. Price \$1.

This book is the first of a series which the author intends to publish to help the young student approach the study of natural science in a logical order, and aid him to grasp the essential unity of its several branches. The author commences with the examination of a piece of ice, and notices one by one each of its physical properties. He then in the same way takes up in succession water, fire, air and earth. These compound substances of course lead him to the study of chemical combinations, and in Chapter IX. he mentions and explains briefly some of the chemical laws. He then studies pieces of charcoal, carbon, marble, clay, potassium, mica, salt, hydrochloric acid, chlorine and iron; after which he gives us a retrospective chapter and a brief discussion on the true order of scientific studies. Then follows a short description of some of the other elements, and some of the common minerals, and lastly four chapters are devoted to the determination of minerals, with the aid of the blowpipe and simple wet analysis. He gives at the end of the book a key for determining 24 of the more common minerals.

The author has, we think, devoted too much space to the study of the commoner physical, and too little to the more uncommon, properties. For example, he devotes no less than 20 pages to telling us that ice is cold, smooth, slippery, hard, heavy, etc., but passes very summarily over the determination of specific gravity. After stating the principle on which it is based he gives the rule for its determination of any mineral. "Divide its weight in air by its loss of weight in water." He does not describe a hydrometer nor mentions a word about the determination of specific gravities of liquids or substances which cannot be weighed in water.

The book is written in plain and simple language and will no doubt help to make clear some things which usually puzzle beginners. A collection of 36 minerals, arranged in case, have been prepared to accompany this book. They have been selected under the supervision of Prof. W. O. Crosby, of the Boston Society of Natural History.

## BOOKS RECEIVED.

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

*Legends of Gems.* By Frank Shelley. New York; R. H. Russell & Son. Pages 124. Price, \$1.

*Book-Keeping at a Glance.* By John T. Brierley. New York; The Excelsior Publishing House. Pages 142. Price, 50c.

*An Economical System of Sanitary Drainage for City and Country.* By Captain M. Nadien. Chicago; printed for the Columbian Exposition. Pamphlet, pages 16. Price, 25c.

*How Shall We Make Our Homes Healthy?* By Benjamin J. Portugaloff, M. D. Chicago; printed for the Columbian Exposition. Pamphlet, pages 12; illustrated. Price, 25c.

*The Need of Standard Methods for the Analysis of Iron and Steel with Some Proposed Standard Methods.* By Dr. C. B. Dudley and Dr. F. N. Pease, Easton, Pa.; The Chemical Publishing Co. Pamphlet, 42 pages.

## CORRESPONDENCE.

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

## The Use of Plain English in Geological Discussions.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Your printer's devil must have danced on my manuscript awhile before he gave it to the compositor. I did not write that "Professor Posepny took a position which is 'unreasonable,'" as you print it, but a position that is "reasonable." It would be nonsense to accuse the professor for defending a course which is followed by most geological writers, as I point out in the sentence following the misprinted one.

NEW YORK, DEC. 18, 1893.

JOHN A. CHURCH.

## Case-Hardening.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Will you kindly explain through the columns of your paper the action of cyanide of potassium upon low grade steel during the operation known as "case-hardening"? I do not remember having seen a scientific explanation of what takes place while the cyanide is being applied to the red hot steel; also of what takes place during the sudden quenching of the steel while under the influence of the cyanide.

BENEDICK.

(Case-hardening is the superficial carburizing of the soft steel, changing its surface from low-carbon soft steel to high-carbon hard steel. The same effect may be brought about by using charcoal or other carbonaceous substances in place of cyanide of potassium. It is thought that the latter substance is particularly energetic in case-hardening, and if this be so it is probably because the cyanogen which it contains—a nitride of carbon—is a compound which readily gives up its carbon. If there be any difference between the action of cyanide of potassium and that of charcoal it is that the former carburizes more rapidly than the latter. The sudden cooling of the case-hardened steel, for instance, by quenching it in water, acts in precisely the same way as the quenching in the usual hardening of steel.

That is to say, the thin film of high carbon steel which has been created on the surface of the metal is by the sudden cooling hardened in the same way that any other high-carbon steel is hardened by like quenching. The rationale of the operation of hardening is in dispute, but the opinion, we believe, of the majority of competent judges is that the sudden cooling preserves the special combination of carbon and iron which exists at a high temperature and which is intensely hard, whereas, in slow cooling this combination is broken up and gradually changed to another which is much less hard. In the sudden cooling there is not enough time afforded for the carbon to change from the condition known as "hardening carbon" in which it is found in hardened steel, to the condition known as "non-hardening" or "cement" carbon, in which it is found in annealed steel.—Editor "Engineering and Mining Journal.")

## The Granulating Matte Process.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: With much interest and some amusement I have followed in the "Journal" the controversy about granulating slag and matte, and with your kind permission would like to contribute my little share. In the year 1867 I had 12 small copper blast furnaces running at Ducktown, Tenn., which discharged their slag direct into a swift running stream of water, thus carrying the granulated slag into the creek. I cannot claim that the idea was original with me, for I had seen the same used at an iron blast furnace at Loher Huetten, near Siegen, Germany, about the year 1860, and even then, it was not considered new at that place. So I have no doubt that another contributor might present himself, if he cares to, who used the device long before I did.

PUEBLO, Colo., Dec. 12, 1893.

A. RAHT.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I have read with much interest your various correspondents' contributions to the "shotting" process as applied to slags, matte, and metallic copper, as I have had personally a good deal to do with the introduction of this process in this country. I was, therefore, much gratified to see in your issue of December 2d, that Mr. John L. Thomson stated the facts of my work in that line as far back as 1881, at Capleton. I further notice in your issue of December 9th that Mr. R. H. Terhune, of Salt Lake City, thinks that the process is a very old

one, but that he was the first to apply the elevator to handling shotted lead slags, stating that this work was done at the Hanauer works in June, 1892. Very likely this may be true as to lead slags, but most certainly it is not the case with regard to copper slags, as a bucket elevator was put in operation by me at the Orford works, Constable Hook, N. J., in the year 1886, which handled thousands of tons of shotted slag.

This process of shotted and handling the slags worked so well, that I thought it would be a good plan to take out a patent on this work myself, and was informed, as Mr. Terhune was, that the process was very old. I think the gentlemen to whom I applied, informed me that the process was as old as the hills. Personally, I should not be at all surprised to have some of your correspondents inform you that the process was in use by the Romans in the old Spanish mines.

Boston, Dec. 12, 1893.

W. E. C. EUSTIS.

#### A Peculiar Case of Stratification.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: The accompanying sketch shows a very peculiar case of stratification which I saw lately in the region of the Grand Canyon. It is situated at the mouth of a small canyon where it enters into Prospect Valley about 10 miles north of Pine Spring. This Spring is at the head of Aubrey Valley, on the western edge of Coconino County, Arizona. All the belts A and B are belts of sandstone of varying thickness, grade and color, the whole section being about 40 ft. from the bottom of the canyon to the top of the cliff, and a sandstone stratum can be seen underlying the bed A.

This bed is a medium grained gray sandstone, and is distinctly divided into slabs as I have marked in the sketch. Having some 10



miles to make before dark over a poor trail, and it being late in the afternoon, I was not able to stop and make measurements except by the eye. I judge the belt to be between 5 and 6 ft. in thickness, the dip of inclined pieces to be about 45°, and the thickness of the separate plates to be 6 to 8 in. A short distance up the gulch this belt was quite uncovered, and I could see that each plate piece had a width about equal to its length. The horizontal pieces or plates are about the same length as the inclined ones. I do not know how far the strata can be traced. Each plate has the two ends bevelled, and the side edges square, and come out in solid paving slabs. Can this be called a case of crystallized sandstone, or what is it? and how shall we name it under the head of stratification?

PRESCOTT, ARIZ., Dec. 2, 1893.

JOHN F. BLANDY.

#### Theories of Coal Formation.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I am glad to see attacks made on the theories which are set forth in the old textbooks. A very short employment in the coal mines satisfied me that they were entirely inadequate to explain the formation of the coal beds, and I am convinced that the time will come when the whole theory will be abandoned. I remember well when I first read the chapters of the "Great Authorities" on the subject, what an enormous stretch of the imagination it required to picture the immense forests and collections of drift-wood necessary to build up a coal seam, and the thousands of years required to build up a 50-ft. bed; and then to think that this vegetable matter should be distributed so evenly as to form a seam of nearly uniform thickness; take the upper Freeport bed for example, extending over hundreds of square miles.

Upon what is the theory, that coal is of vegetable origin, based? Upon the finding of a lot of roots of little plants, and here and there trees in the underlying clays, with quantities of leaves, sticks charcoal, etc., next to the overlying slates, and because the microscope shows a lot of such woody substance in the body of the seam.

Is such proof sufficient to establish such a stupendous theory of the formation of a heavy bed of 6 to 50 ft. thickness? If I plunge a bunch of wool into a lot of hot pitch, and the microscope finds it afterward in the hardened mass, is the inference to be that it was formed from the destruction of sheep? In the sandstones of the coal formation are quantities of fossil trees. Were these trees of silex growing at that period?

My belief is that we must start upon an entirely different basis. From whence came the enormous quantities of silicic acid which made the hundreds of feet of sandstone of the Lower Silurian? or the quantities of lime and carbonic acid to build the thousands of feet of limestone, and alumina to make the slates and shales? That carbon was present in immense quantities at that time the limestones show, and there was plenty left to make the coal beds in connection with hydrogen. That it could exist in a fluid form is evidenced by the oil fields and the asphaltum lake in Trinidad. I have seen in California a bed of slate from 1 to 2 ft. thick which in places was filled with what might be described as a coal gravel, from the size of peas to small cobble stones. It had no appearance of having been rolled and rounded, as they were smooth, always oval in form and flat, and looked as if they had been plastic. The fracture was the same as bituminous coal. In "The Topography of Coal," by Lesley, he gives an illustration to show that the pebbles of the great conglomerate of the coal regions were once plastic.

This bed, which is a very coarse conglomerate in Eastern Pennsylvania, we know changes gradually westward to a fine grained sandstone. The coal beds also change from the heavy beds of anthracite

to semi-anthracite, semi-bituminous and bituminous. Many distinguished geologists have described the anthracite as a natural coke, and give the tilting and fracturing of the formation, with possible extra heat and pressure as the explanation of the natural coking process.

We know that when we coke bituminous coal we increase the percentage of ash. How is it that a natural process decreased the percentage at least one-half?

Now every one is entitled to theorize as much as he pleases, and entitled to reject the theories of others, particularly if he does not think them well founded. As I cannot receive those laid down in the authorities, I have tried to form one for myself, though still in a very crude state. My examinations of coal beds lead me to believe that the substances forming our coal beds were once in a fluid state, and did not have to pass through the process of vegetation before being deposited. That the beds of clay instead of being a soil formed a cemented floor, which retained the coal-building fluid until it hardened. I will not go into the details which have led me to these ideas.

I fancy that several knights have begun to put on their armor before they have read thus far, so I will take mine off and set it up to be pitched into while I hide around the corner to see if it is attacked, and will shelter myself under a distinguished name.

A. DE GAUL.

#### Montana Mining Prospects.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: The condition of mining in Montana is more depressed than at any time in 10 years, and, it might be truthfully said, since the country was settled. Outside of gold and copper properties but little is being done. It is stated that during last month more copper was produced from the mines of Butte than for any month in its history. If it is true, the ores were taken from those parts of the mines already developed, for less men were employed in them than at any time when they were all at work. At this time it looks as if the number of men at work in the copper mines at Butte had been increased. The new railroad to Anaconda is about completed, but it is probable that it will not be open to heavy traffic at least until January. When that time arrives it is said that the output of the Anaconda mines will be increased. The Alice and Lexington (silver) mills are running on ores furnished by leasers.

The pinch of the hard times has just begun to be felt. Nearly all the county governments of the State have been conducted extravagantly, and when the worst pinch comes it is necessary to be close in order to have the funds last through the winter. It is estimated that there are 5,000 people out of work in Butte, 1,000 of whom are women.

The search for gold properties during the year has been actively prosecuted, and a number of good claims have been discovered. Next year these will be worked to a greater or less extent, and the search for others be vigorously prosecuted. Probably twice as many gold properties are being worked now as there were last year. Most of these are properties that have been worked to some extent before and abandoned. The success attending the attempt of the Longmaid Brothers in opening up the Penobscot has given encouragement to others to do likewise. The Piegan, near Gloster, is taking out some good ore, and those working it are highly pleased with the result, and next year expect to have a mill of their own. A. M. Essler, who had charge of the Helena & Frisco mine at the time of the strike in the Coeur d'Alenes last year, is operating his mine and mill about 10 miles east of Helena, on McClellan Creek, and the owners of the Holbrook, adjoining Essler's property, are working it also, Essler doing the milling for both. Two Huntington mills have been set up in New York gulch, some 15 miles northeast of Helena, across the Missouri River, in Great Belt Mountains, and parties owning claims near by have leased the Little Dandy mill, and are reducing ore from some claims on Trout Creek. J. P. Schmit, who was a long time with the Longmaid Brothers, with other parties has leased the Black Swan, in Oro Fino gulch, five miles south of Helena, and will begin milling ore soon, running 10 stamps. R. G. Davies, an attorney, of Helena, has bought the Orear properties, in Tucker basin, three miles south of town, east of Dry Gulch, and has started up the 5-stamp mill on the premises, and is himself working a shift at the mill.

The Penobscot is doing better than was thought when the mill was started about a year ago. Some shoots or pipes of ore have been found that promise well, and the amount of ore in sight gives the Longmaid Brothers great hopes of its future. The Bald Butte has completed the addition to its mill, and at last accounts was running 30 stamps, and it is probable that by this time its full complement of 40 stamps are dropping. This is one of the great mines of the State. The shoots are long and their value evenly distributed throughout their strike and depth. At the east end of the 200 level some galena ore was found that contained free gold; how much there is of it has not been ascertained by outsiders. A crusher has been put up at the mine, which is operated by a dynamo at the mill, a mile away.

The Royal Gold will contest with the Bald Butte the claim of being the largest gold mine in the State. It lies in Granite County, on the Boulder, a creek that empties into Flint Creek, near Stone station, on the Phillipsburg branch of the Northern Pacific road. The ore shoot is of great length, and is remarkably even in value. It is owned by the Bennet Brothers and Mr. Conrad Kohrs, of Deer Lodge. In the immediate vicinity of the Royal Gold are other gold properties which look well for development and promise to be good producers. Madison County is coming forward as the great gold-producing county. Prospectors are busy, and at Sand Creek and near Sheridan it is said that some good properties are being developed. Mr. Leiter's group of mines, not far from Sheridan, are especially promising well.

This year the yield of gold in Montana will equal, if it does not exceed, that of last year. Lewis and Clarke County's production will exceed that of any year since 1888. The production of silver in the State will not be over two-thirds of the output last year, and the copper production will probably fall a little short of that of last year.

HELENA, MONT., Nov. 20, 1893.

H. M. READLE

VARIATIONS IN THE MILLING OF GOLD ORES. NO. VIII. AMADOR, CALIFORNIA

Written for the Engineering and Mining Journal by T. A. Rickard.

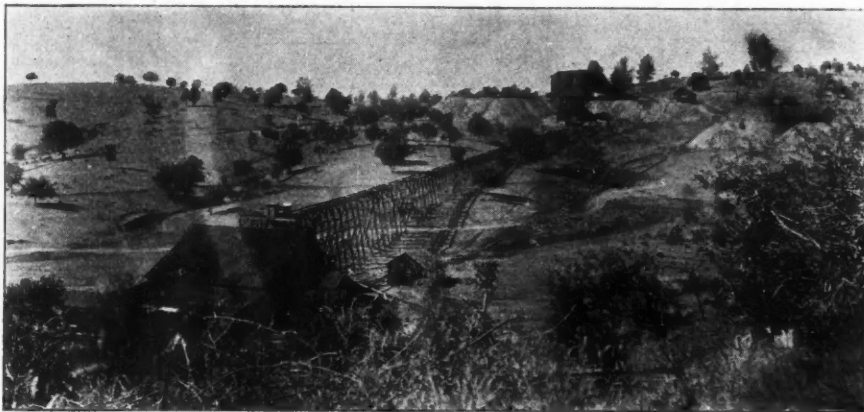
(Copyright, 1893, by the Scientific Publishing Company.)

Amador County lies extended among the rolling foothills of the Sierra Nevada, sloping from the pineclad mountains down into the dusty valley of the San Joachin. The county has its greatest extent east and west, but from the Cosumnes River on the north to the historic Mokelumne on the south it covers 17 miles of the main gold belt of California. It is a mining district whose record fills some of the first and most interesting pages of the history of Californian gold discovery. As early as 1848 mining was begun in Hicks Gulch, a tributary of Sutter Creek. The story of that early mining is all of gulches and of creeks, for the diggers followed the running stream and had not yet realized the importance of the quartz lodes. In 1851 a stamp mill was erected on Amador Creek. This date also marks the commencement of exploration on that great auriferous belt which extends through several counties and has become known as the "mother lode." In 1856 there were 20 stamps working ore from the Keystone mine, 38 on the Spring Hill and 20 at the Amador Mine. Motive power was obtained from the creek by using large overshot wheels. The gravel deposits of the mountain streams became exhausted about the year 1860, and quartz mining received a fresh impetus. In 1866 there were 296 stamps crushing the produce of 15 mines. In 1874 the number had increased to 335 stamps, supplied by 13 mines. It is evident from these figures that while the milling capacity had grown the number of mines which afforded the ore supply had not increased. The explanation is to be found in the construction of the Amador canal, which by conveying water power to the district enabled a very considerable enlargement of the mills to be carried out and made this district one of the most busy and prosperous of the gold mining regions of California. In 1879 the Amador Canal Company owned 45 miles of main ditch. The total length of canals and ditches was no less than 94 miles. The water is delivered to the mines under a head varying from 130 ft. to 470 ft.

comparatively small plant and consists of only 20 stamps. The weight of each stamp is now about 800 lbs., though when new the figure was 850. The speed is regulated at 96 drops per minute. The height of the drop is changed with the hardness of the ore to be crushed, the minimum being 6 in. and the maximum 7½ in. The capacity of the mill shows a wide variation, according as the ore is hard or soft, free from sulphide minerals or rich in them, carrying the gold in a coarsely divided condition or containing it intimately mixed with pyrite. The minimum capacity is 40 tons and the maximum 85 tons per day. The average is about 55 tons or 2¾ tons per stamp per 24 hours. At the present time the ore is of high grade and an endeavor is made to retain the gold inside the battery; the crushing capacity is therefore somewhat sacrificed and averages 45 tons per day. On the other hand last year when the ore was low grade and valuable more for the gold bearing pyrites than for its free, readily amalgamable gold, the mill was used more as a crushing machine, preparing the millstuff for concentration, and at that time 2,600 tons per month were ordinarily treated, being at the rate of over 80 tons per day or about 4 tons per stamp.

Several kinds of screens are used, in accordance with the character of the ore being crushed. Brass wire cloth, 30 mesh, is employed for ore of medium hardness, carrying gold of medium fineness. Such a screen lasts for from 35 to 55 days. For ores rich in pyrites, steel wire screens, 20 mesh, are generally used. They give a rapid discharge and wear from 20 to 30 days. When the ore contains the gold in a fine state of subdivision, and as usually happens, is also very hard, then punched Russia iron, size No. 7, is employed. This tends to keep the pulp inside the mortar and to give fine crushing. Such screens last from 40 to 60 days.

In every instance the wear of the screen is most irregular. This is due in large part to the chips of wood (from underground timbers) which get stuck in the screen openings and make frequent scraping necessary. Incidentally I may mention that by actual count I found that the No. 7 Russia iron screen contained 10, the 30 mesh brass wire 23, and the 20 mesh steel wire 18, holes per linear inch. The brass wire gave much the most free discharge and the most even crushing, the steel the coarsest crushing and the most rapid



GOVER MINE AND MILL, AMADOR COUNTY, CALIFORNIA.

In 1878 there were 510 stamps at work in Amador County crushing the ore of 22 mines. In 1890 the number of stamps was almost exactly the same, 511, distributed in 18 mills, treating the ore of 18 mines.

During 1892 the State of California produced gold having a value of \$12,571,900. Of this total Amador County yielded very nearly \$1,500,000. At the present time the district is fairly prosperous; some of the old mines have recently been reopened and there is reason to expect that there will be a renewal of that activity which characterized the county a few years ago. The accompanying table gives the chief figures indicative of the methods of milling at five of the best known mills. They are scattered among the series of picturesque little mining towns, which reach from Drytown to Mokelumne Hill. Most of the plants are old but have been variously modified so as to meet the changing requirements of the ores:

discharge, and the punched iron the most uneven crushing and the most irregular discharge.

to be shortly described, and then to the concentrators. These last are four Woodbury machines, constructed on the principle of an endless

From the battery the pulp passes over a series of amalgamating tables, rubber belt having 13 subdivisions. The partition into narrow strips is supposed to give a greater capacity than the plain belt. It does less clean work, however. Ordinarily at this mill the yield of concentrates is equivalent to 1% of the ore crushed. In 1891, 650 tons of sulphurets were obtained during the crushing of 22,400 tons, being in the proportion of about 2¾%. At that time the assay value of the concentrates was about \$100 per ton; now it ranges between \$100 and \$125 per ton. They are sold to the chlorination works at Amador City and at Drytown.

The water used for milling purposes, inclusive of the concentrators,

COMPARATIVE TABLE.

Name of Mill.	No. of stamps.	Weight of each	Drops per min.	Height of drop.	Depth of discharge.	Cap. per stamp.	Cap. of mill.	Kind of screen.	Wear of screen.	Percentage of concentrates.	Value of concentrates.	Retort percentage.	Fineness of bullion.	Loss of mercury per ton of ore.	Water per stamp per min.
		Lbs.		In.	In.	Tons.	Tons.		Days.	%	\$	%	Per 1,000.	Dwts.	Gals.
Gover	23	800	96	6¾	8	2.2	45	Several varieties.....	45	1	110	37	825	2.6	3¼
South Spring Hill.....	40	750	93	7¼	7¼	2.3	92	No. 8 angle slot.....	34	1¼	40	45	830	"	3½
Wildman.....	30	750	92	7	7¼	2.3	65	o 6 angle slot.....	36	1¼	60	42	809	4.5	3
Keystone.....	40	750	90	6	7	2.5	100	No. 8 straight slot.....	32	1¼	110	45	830	6.5	3¼
Kennedy.....	40	850	83	6¼	7	2.5	100	30 mesh brass wire.....	30	2	125	42	828	"	3
Clinton.....	20	1,000	85	6	7¼	3	60	20 mesh brass wire.	25	2	100	30	820	"	5

\* Figures not obtainable.

Of the five mills whose names appear on this list I shall endeavor to give a detailed description of one and that one will be the Gover mill, which in many ways fairly typifies the best practice of Amador County. This plant is located about two miles north of the town of Amador. The mill, the mine, the tramway which connects them and the surrounding hillslopes with their clumps of white oaks compose a picture thoroughly characteristic of the mining regions of the Californian foothills. The accompanying photograph will therefore prove of interest.\* The Gover mill is 19 years old; it is a

amounts to 10 miner's inches, or 108 gallons per minute, when treating ore heavy in pyrites, and diminishes to 6 miner's inches, equivalent to 65 gallons per minute, when ordinary quartz is being crushed. Immediately outside the mortar there is a pipe for distributing clear water. As a rule more water is wanted on the plates outside than is required inside the battery. When the reverse is the case the clear water is diverted inside so as to make up the requisite quantity.

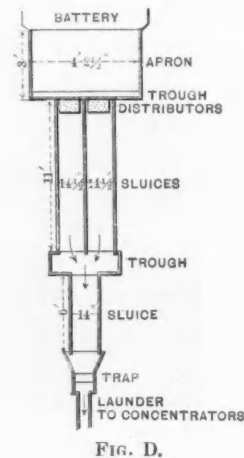
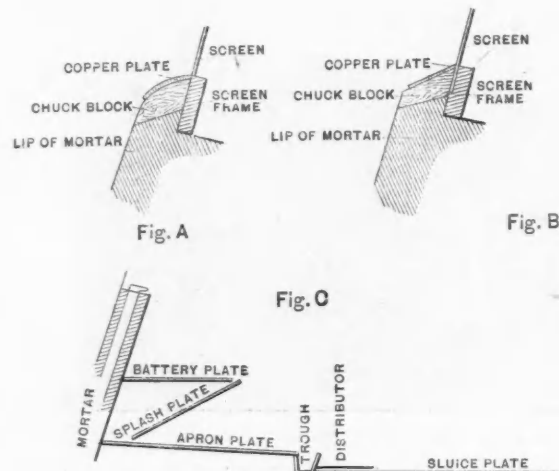
The consumption of mercury depends upon the richness of the ore. While the gold of rich ore is also usually coarse and requires proportionately less mercury than the gold that is in a fine state

\* For the two very excellent photographs illustrating this contribution I am indebted to Prof. S. B. Christy.

of subdivision and which therefore becomes more thoroughly amalgamation, yet in practice it is found that the consumption of mercury per ton of ore is greatest with the richest ores because they require the more free addition of mercury, and therefore the greatest opportunity of loss by subdivision of the mercury when in the battery. The presence of pyrite is also an important factor. The friable finely divided particles of pyrite coat the globules of mercury and prevent them from coalescing. In the treatment of 22,400 tons of ore, in one year, 200 lbs. of mercury were consumed, being at the rate of 2.6 dwts. Troy per ton. During the week of my last visit the ore being crushed was of high grade and 60 oz. of mercury were being used per 24 hours. It is added to the ore in the battery by the amalgamator at regular intervals in a small wooden spoon and most of it is, of course, recovered when retorting the amalgam. Thus, in retorting 350 oz. of amalgam there were recovered 191 oz. of quicksilver. The amalgam is now worth \$7.50 per oz., but usually averages \$6.50 per oz., equivalent to a retort yield of 37%.

The gold saving is done, directly, in the mortar itself, and on the amalgamating tables outside, also, indirectly, by the concentrators and a system of blankets which follows. As already stated, free mercury is added to the ore as it is fed into the battery. This serves to collect some of the gold which then settles as amalgam to the bottom of the mortar, hiding in the corners and between the dies. The work of gold saving is, however, supplemented by the use of an inside copper plate. This is placed at the front of the mortar, immediately under the screen frame. It is fixed to a wooden block, called the "chuck block," whose inside surface is curved and carries the copper plate while the front fits tightly against the lip of the mortar. The plate is 6 in. wide and the full length of the interior. The depth of the chuck block is 8 in. and it serves to heighten the issue by raising the front of the mortar. It has been found that a curved chuck block (see Fig. A) gives a more rapid discharge than a straight one (see Fig. B) such as was in use formerly at the Plymouth Mill.

Of a total clean up of 350 oz. of amalgam, 277 oz. or 79% were obtained from inside the battery, and 73 oz. or 21% were got from off the outside amalgamating tables. Of the total obtained inside



the battery, 221 oz., or 63% of the whole 350 oz., came off the plate, and the balance of 56 oz. was obtained from the treatment of the sands remaining inside.

The pulp from the mortar is discharged upon a series of amalgamating tables, having various dimensions. The screen surface is small, it is only a strip 4 in. wide by 4 ft. long. This is one reason for the comparatively long service given by the screen, and as the discharge of a mortar is nearly always confined to the bottom part of the screen surface it is an arrangement which does not, I think, seriously interfere with the rapidity of the issue.

The accompanying sketches illustrate the arrangement of the amalgamating tables. The photograph of the interior of the mill will also help to make the description clear. On issuing from the mortar the pulp falls upon an amalgamated plate, called the battery or splash plate. This is 4 ft. 2½ in. wide and 19 in. deep. It discharges in turn upon another plate arranged at an angle of about 45°, and which is 8 in. deep and 46 in. wide. Then the pulp runs over the "apron," a plate 3 ft. deep and 50 in. wide. The arrangement just described (and illustrated in Fig. C) serves to give an extra amount of amalgamating surface without taking up much space. From the apron the pulp passes into a small transverse trough, and then goes through two openings, which deliver it to the "distributors," which in turn allow it to pass through on to the sluice plates. (See Fig. D.) The "distributor" consists of a copper plate punched with holes 1 in. apart and serves to break up the pulp and to scatter it evenly over the plates which follow. The sluices have a slope of 1½ in. per foot and the apron ¼ in. per foot. The former are 14½ in. wide and 11 ft. long. They deliver their burden to another, a single sluice, 14 in. wide and 6 ft. long. From the last the pulp goes through a well or mercury trap before passing over a launder for delivery to the concentrators.

The whole arrangement of the plates is lacking in common sense and is most unpractical. That it is scarcely defensible is fully recognized by the manager who had to take the mill as it was, but who intends to have a very different arrangement in the new plant which it is proposed to erect. The bad arrangement of the amalgamating tables is a universal defect of the mills of this region, and will be again discussed later on.

The general clean up takes place once a month. The inside plates are then taken out of the mortar and scraped. The battery sands are treated in a barrel where the grinding is assisted by the addition of scrap iron. After 8 or 9 hours quicksilver is introduced, and the charge is retained for 4 hours more. The aprons and splash plates are dressed whenever their surface becomes hard. Occasionally very finely divided sulphurets collect and have to be brushed off. When crushing such ore as is comparatively free from valuable pyrites and containing gold that is easily caught the mortar will arrest over 90% of the total obtained by the entire mill. The aprons and splash plates are then only cleaned up once a month, and the sluices once a week. When treating sulphureted ore, that is millstuff containing 1½ to 3% pyrites, about 70% of the total saving is accomplished inside the mortar, and of the remaining 30%, half is caught by apron and splash plate, half by the sluices. When crushing such ore the aprons are cleaned off partially every other day and the sluices daily.

From the concentrators the tailings go outside the mill proper to another building, where they pass through a blanket plant. The tables are in 8 sections, having a total width of 115 ft. and a depth of 18 ft. They are covered with thin canvas, that variety known as 10-oz. Arctic duck. Before flowing over the tables the pulp is roughly sized by means of settling boxes; the heaviest material then goes to the four central divisions. Below the tables there is a series of setting pits which is cleared up at intervals of from 2 weeks, the uppermost, to 6 months, the lowermost. The "heads" are shoveled into a box and washed by a running stream on to a Woodbury concentrator, having 11 partitions. The concentrates thus obtained are found to be in an extremely fine state of subdivision. To prevent loss by their suspension on the water running away care is taken to keep the concentrates under water as much as possible. They can be seen to float in the receiving box under the concentrator belt, but from here they are run through a pipe which issues under water in a tank lower down, where they settle. A saving of \$15 per month has been made by the prevention of loss by suspended slimes. The tailings plant gives one-quarter of the total yield of concentrates, thus, of the last 15 tons obtained, 3½ tons came from here, and 11½ tons from the upper mill. The

value per ton varies, usually those from the blanket plant are the richest, but occasionally they are poorer than the average of the upper mill. This plant requires one man's labor; he is paid \$75 per month. The canvas costs at the rate of \$15 per month.

Iron shoes and dies are used at this mill. Good and cheap castings are obtained from the neighboring foundry (Knight's) at Sutter Creek. One reason given for the preference for iron over steel is that the latter wear longer, and therefore, too much amalgam is locked up among the dies during the period which elapses before they are changed. In the crushing of the last 3,560 tons of ore there were used 5,080 lbs. of shoes and dies. There remained, as scrap, 1,640 lbs., which were sold to the foundry for 2c. per lb. The first cost of the shoes and dies was at the rate of 3½c. per lb. The cost per ton crushed was therefore 49c., or deducting rebate for scrap, just 4c. per ton. This is a very average cost. Chrome steel costs 8½c. delivered and there is no market for the scrap. Notwithstanding the greater cost of the steel I believe that if used for the shoes, and cast iron retained for the dies, better work could be done than at present. Complaint is made that the chrome steel is not of uniform quality, some lots giving most excellent service while others "cup" and wear away rapidly and irregularly, and the last is as bad as the first, since an irregular surface seriously diminishes the crushing capacity.

The character of the ore influences the wear of shoes and dies, especially the shoes. The millstuff is usually fairly clean quartz, and when crushing such material the wear is less than when treating slate or soft ore. This is due to the fact that in the latter instance it is more difficult to regulate the feeding and to prevent iron from working upon iron.

The ore of the Gover mine is essentially quartz, mixed with slate in a proportion less than is usual in the district. The rockbreaker is at the mine and the millstuff is delivered to the tramway ready for the stamps. The gold contents of the ore vary from \$5 to \$25 per ton. It is said that the final loss in the tailings averages 26c. with a maximum of 45c. per ton.\*

\* For much of this information and for courtesies received, I am indebted to the manager, Mr. Arthur B. Call.

The total expense of milling a ton of ore has averaged, from Jan. 1 to Sept. 1, 1893, as follows: Amalgamation 12c., one amalgamator by day and one by night; concentration, 4c., one mechanic, part time; water, 20c., supplied at rate of 20c. per miner's inch; shoes and dies, 4c., cast iron  $3\frac{1}{2}$ c. per lb. delivered; quicksilver and screens, 1c., loss of mercury at the rate of  $2\frac{1}{2}$  dwts. per ton of ore; incidentals, 7c., including repairs, canvas, lubricants, etc.; total, 48c. In most cases the rockbreaker is placed inside the mill and the breaking of the ore preparatory to pulverizing is included among the items of milling cost. In this case it would be necessary to add 5c. per ton, bringing the total expenditure to 53c. per ton of ore.

(To be Continued.)

#### THE ECONOMIC POSITION OF THE OPEN-HEARTH STEEL FURNACE.\*

By H. H. Campbell.

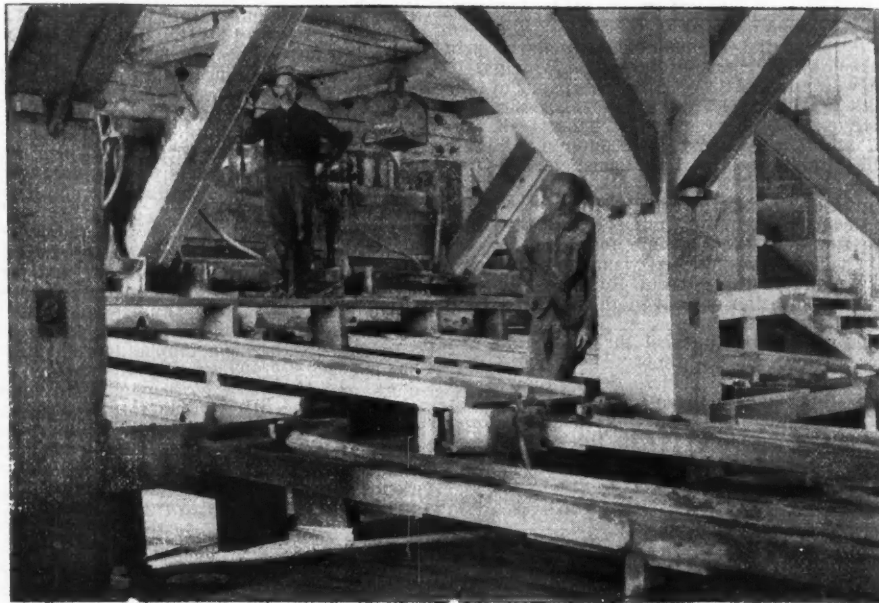
The open-hearth furnace is a regenerative gas furnace in which pig iron, wrought iron, steel, or similar iron products are exposed to the direct action of the flame and converted into steel. As an outlet for the crop ends and miscellaneous scrap from the steel mills of the country, the open-hearth furnace fills a position of general economic importance. More than this, it has been found peculiarly fitted for producing certain grades of structural and other steels, and furnaces have been operated where scrap was scarce and where it was necessary to use pig iron alone as the regular charge. Thus the process has been raised from a subsidiary to an independent position. In the field of structural work, as in other branches, the Bessemer converter is always a colossal rival. In the United States, Bessemer linings are almost universally acid, and therefore in the following detailed comparison of the two processes it will be unnecessary to consider the metallurgical position

objectionable impurities renders the question of stock a matter of secondary importance.

4. The conditions of Bessemer practice preclude a system of testing during the operation. The vessel may be turned down for a time, but a skull is likely to form on the lining where the metal lies, and this skull, if dissolved, by a subsequent hotter charge, may appreciably affect the composition after a test has been taken. Moreover, the chilling of the charge during the testing is a matter of vital importance in the practical working of the mill. The fact must also be noted that the economy of the Bessemer process depends upon continuous and rapid running; any system of interrupted work is bound to raise the cost of the product.

5. The open hearth admits a system of testing without any correlated disadvantages. Such testing is necessarily crude, since the bath is continually changing under the action of the flame, and the results must be obtained quickly. The tests must also be taken before the addition of the recarburizer, and hence will be only relative. After the addition of the recarburizer, the rapid oxidation of the manganese renders delays out of the question, but in spite of the limited opportunities, the tests that can be made are of great value in controlling and regulating the composition of the charge.

6. Uniformity and homogeneity, therefore, are two of the most important factors in the comparison of the merits of the Bessemer and the open-hearth product; but unfortunately no conclusive testimony can be given to the skeptical or even the careful mind. No one conversant with the facts doubts that Bessemer heats can be made which are as homogeneous throughout as any open-hearth charge that was ever melted. No one doubts that in good practice the proportion of Bessemer heats which are not homogeneous is a small percentage of the whole number. But the question is not as to the homogeneity of ninety-nine heats; it is about the quality of the hundredth. And it is not one single test of this hundredth charge that is required, but a large number of tests, taken from all parts of the cast. One piece of



INTERIOR OF GOVERNMENT MILLS, AMADOR COUNTY, CALIFORNIA.

of the basic converter or the applicability of its products to the stringent demands of modern engineering.

1. In making steel with the phosphorus from 0.06 to 0.10%, the converter can turn out a product at less cost than the open hearth. For many purposes it answers well enough. In comparing it with open-hearth metal of exactly the same contents of carbon, silicon, manganese, phosphorus, sulphur and copper, no marked difference can be detected by the ordinary methods of testing; but many engineers, after long experience with both metals under various trials and stresses, think that the Bessemer metal suffers a larger number of inexplicable breakages. Experiments on punched test-pieces indicate that this arises from its greater liability to crystallize under shearing stresses.

2. To make Bessemer steel with low phosphorus requires very careful selection of the raw material. If cupolas are used, the pig iron will absorb both sulphur and phosphorus from the coke, and the percentage of these elements will be increased by the waste in the converter. The pig iron must therefore contain much less than the maximum of impurity allowed in the steel. It must also contain the requisite amount of silicon for successful blowing, and the scrap used in the vessel should be as pure as the iron. These conditions are not impossible or impracticable, but they enhance the cost of the product considerably and prevent the employment of pure Bessemer steel in competition with common open-hearth metal.

3. No solid fuel is used in the open-hearth furnace, and therefore phosphorus cannot be absorbed from it by the metal, while sulphur will not be unless the coal be unusually sulphurous. There is also more leeway in the selection of stock. In the acid-lined furnace, low or high-silicon iron can be used, as well as washed pig, charcoal blooms, or basic scrap, while the smaller amount of oxidizable elements reduces the increase in the percentage of phosphorus and sulphur due to waste. In the basic furnaces the ability to remove both these

steel differing radically from the rest wipes away all favorable arguments drawn from any number of other tests indicating homogeneity. The terms homogeneity and uniformity are often confounded. The first should mean the likeness of all parts of the same heat, and the second the likeness of one heat to another. It may be said that the second term includes the first, but this would imply a stretch of meaning, as by common acceptance it may be said that certain products are uniformly irregular. What is required in steel products is a combination of uniformity and homogeneity; and obviously, no series of records, however long, can demonstrate the existence of this necessary combination, unless all heats have been thoroughly tested and have been found homogeneous.

In the case of low-carbon steels, the open-hearth possesses slightly better facilities for securing homogeneity and uniformity than the Bessemer. For high-carbon steels the conditions of manufacture make the hearth far superior. The metal in the converter is always blown until nearly all the carbon is eliminated, since the stopping of the blow at any definite intermediate point has proved impracticable. All the carbon content of the steel, therefore, must be added in the recarburizer, and absolutely perfect homogeneity can only be secured by absolutely perfect mixing. In the open hearth, on the other hand, the high-carbon steels are made by interrupting the process at the desired stage. It is plain that no mixing is required, so far as carbon is concerned, since about the same quantity of recarburizer will be used for a given manganese, whether high or low steel is being made.

The manganese in the recarburizer distributes itself very evenly under proper conditions. Some variations in physical properties will be caused by differences in finishing temperatures, and some by the fact that the test bars, not being machined, are not exactly round, and hence their area may not be accurately calculated; but the data will sufficiently indicate that the variations are not of practical importance.

The foregoing comparison of the open hearth and the converter may

\* Abstract from paper read before the Engineering Congress in Chicago.

not be a convincing argument against Bessemer metal. It may justify engineers in using the cheap article in many structures, but it will also sustain the more cautious members of the profession who refuse to incur a known or probable risk. In adhering to the safest course, engineers are continually calling for a metal with lower phosphorus. The limit has been 0.10%; it is now 0.08; soon it will be 0.06; it should be 0.04. Every step in this direction means more work for the open hearth, and it means also the development of the basic furnace.

The stock required in acid work for a pure product is, and always must be, more expensive than for the common grades. The basic-lined furnace renders possible the elimination of the impurities. Like every new device, it has its censors. One of the commonest arguments against it is that good steel cannot be made from bad stock. This statement must be carefully qualified in speaking of the acid process, since the finest open-hearth and crucible-steels may be, and usually are, made from washed pig iron, puddled iron or charcoal blooms, all produced by the application of a basic process to a more or less phosphoric iron. So far as the assertion is applied to the basic open-hearth process, it is unquestionably wrong; the first piece of good steel made from phosphoric iron relegated this doctrine to the realm of ignorant prejudice. Some engineers prefer not to employ basic metal rather than incur the least risk of unsatisfactory material from a new process. Against such reasoning little can be said, since it has already been admitted that Bessemer and open-hearth metals of the same composition may be unlike; but it is well to consider that a bad heat of steel made by the basic process may be due to ignorance and inexperience in new methods, while such an excuse is out of place when applied to the Bessemer practice, which has been developed for a generation.

#### THE CANADIAN MINERAL EXHIBIT AT CHICAGO.

Specially Reported for the Engineer and Mining Journal.

(Concluded from page 17)

#### NEW BRUNSWICK AND THE NORTHWEST TERRITORY.

Both of these displays were small. Gypsum constituted the principal exhibit in the New Brunswick court, deriving its principal interest from the fact that it was mined at the Cathrae gypsum quarry, one of the largest deposits in the world. A statuette of Sir John Macdonald had been carved out of this material. Nickel ores were shown from St. Stephen, while a quantity of economic minerals, salt, silica, red granite and plumbago showed the characteristic minerals found in this Province.

The great Alberta coal field of the Northwest Territory was represented by large specimens of lignites from the mines of the Dominion Coal Company. These are found in the Laramie formation, and it is said that the seam, from which one specimen was taken, shows a face of 320,000 sq. ft. The plant of the Alberta Railway and Coal Company, for mining and transportation of coal in the territory, was illustrated by a series of photographs.

In several glass vials were exhibited natural tar-sands and tars from the Athabasca River region. In the report of the Canadian Geological Survey upon these sands, a very lucid description of the region along the Athabasca River, where these sands are met with, mentions the fact that at one point this formation, which belongs to the lowest division of the Cretaceous, is 150 ft. thick, and is so



Section Six Miles Below Forks

Scale 300ft = 1 inch

FIG. 1.

saturated that the pure tar oozes out of the bank in several places and flows down the slope, forming pools at the bases of the escarpments. The accompanying sketch, Fig. 1, furnished some idea of the associated stratification. But the Northwest Territory is still in the hands of the scientists, and although their investigations warrant confidence in the great mineral possibilities of the region, that cannot be practically demonstrated for some time to come, or at least until the region is more accessible. The exhibit, however, is significant as showing what the line of development probably will be.

Both of these displays were made through the efforts of Dr. Selwyn, Director of the Canadian Geological Survey, by whom they were also arranged.

#### THE DOMINION GEOLOGICAL SURVEY.

A display of minerals covering the resources, geology and physical aspect of the entire Dominion of Canada was made by the Canadian Geological Survey, under the immediate charge of the veteran director, Dr. Selwyn. As may be imagined the exhibit was made with great scientific exactness, and a careful study by the visitor will enable him to gain a good idea of the geology as well as of the minerals of scientific and economic value throughout the length and breadth of the Dominion. We have already passed in review the displays made by the several provinces, but these, as they should, made prominent the metal and mineral upon which each province may depend for commercial advantage. The general exhibit therefore very happily filled out any missing numbers in the series and presented a continuous mineral story from one ocean to the other.

In a number of flat cases, the style adopted in the Museum at Ottawa, appeared suites of specimens neatly trimmed and labeled. The specimens were arranged first geologically and then subdivided with reference to geology; thus under Laurentian were in one row all the gneisses of Nova Scotia; on another those of Ontario, and another

those of the Northwest Territory. The collection in all comprised 1,500 specimens, and was especially prepared for the Exposition by Mr. Walter F. Ferrier, of the Geological Survey. The whole collection will form a part of the cabinet collections in the museum of the Survey at Ottawa. In connection with this a paleontological collection containing many fossils of extreme beauty and rare interest was exhibited. The Eozoon Canadense, which has caused so much contention among geologists, was illustrated with great completeness. This fossil was shown not only in connection with the minerals associated with it, but by means of drawings of microscopic observations and by photographs.

As a rule maps are prepared with so little regard for popular taste that they are passed unheeded. Two charts of the Dominion, however, prepared by the Survey and showing the occurrence of economic and precious minerals, caught the eye of nearly every sight-seer. Most prominent on these maps was the great Alberta coal-field, in the Northwest Territory, which in extent seems to outdo the bituminous fields of Illinois. The gold district of the Fraser in British Columbia, and the valley formed by the St. Lawrence River and lakes Ontario and Erie, seemed to have varied and extensive mineral deposits. In both sides of this valley are to be found coal, petroleum, iron, etc., and the belt projects beyond the mouth of the St. Lawrence River over into the districts of New Brunswick and Nova Scotia, where the occurrence of gold and coal has established important mining industries. There was also shown a map geologically colored, from which was apparent the extent of the great areas of the earlier rocks in Canada, especially the Laurentian and Devonian. Sectional maps showed the work of survey expeditions to the Yukon region, the Lake of the Woods and other points. The Survey in all has some 30 men out this year on eight expeditions of this kind. Among the most important may be mentioned the party which takes in the Athabasca region of the Northwest Territory, and another the British Columbia gold country up to the Alaskan boundary. Special surveys are also being carried on in Manitoba, in Quebec, in Nova Scotia and in New Brunswick. The Ontario Survey covers the Algoma, the Sudbury, the Kingston and the Lake Simcoe districts. Some excursions, like that through the Northwest Territory to Lake Athabasca, remind one of a Polar Expedition, so far as duration and expense are concerned. The geologists started on this 4,000-mile journey from Ottawa in June of this year, and will be absent for a year, with a chance of not returning at all, the country being very wild. The maps exhibited are the result of these surveys. As soon as a party returns to Ottawa its members immediately devote themselves to the presentation of the data secured in the form of charts and maps, and the organization of the specimen into museum collections.

A special exhibit of the gems and precious stones of Canada was made by a private firm in Montreal. In this the agates were particularly beautiful, and when cut and polished in jewelry form exhibited beautiful surface appearances and markings. Jade, tourmalines, albites, sodalite, and quartz-asteria were among the other choice and rare gems native to this rich mineral country.

In the line of economic minerals, phosphates and building stones headed the list. The specimens showed the many varieties of phosphate mined and a corresponding diversity in colors. The apatites ranged from a deep green to a light pink-in color. A series of pictures above the cases of exhibits illustrated the outcrops of phosphate veins and the methods of mining as practiced in Canada. A small trophy of building stones in cubes showed the characteristic limestones and marbles. The most beautiful specimen was one of mottled serpentine and dolomite ranging from pale green to pure white. A cross section of the so-called fossil trees found in Potsdam sandstone, near Kingston, was on exhibition. These trees were discovered to be simply concretions in sandstone, although they are perfectly cylindrical in shape, are many feet in diameter, and look like great petrified tree trunks when brought to daylight in the quarry. Canadian plumbago and its uses were illustrated by the commercial exhibit of the Walker Mining Company, which showed both the crude and manufactured articles. Several specimens taken from the quarry show 36% of pure carbon in the shape of disseminated graphite. A number of pictures and photographs arranged along the top of the cabinets gave an idea of the Geological Museum as it appears in the Government Building at Ottawa. There were also a number of views of phenomenal geology, such as exposed beds of polished and crumpled gneiss, and pictures of the inspiring mountain and mining scenery of the Dominion.

This excellent showing of the geology, lithology and mineralogy of the Dominion was undertaken by the Dominion Survey at the request of the Minister of the Interior, Mr. F. Mayne Daly, and in the hands of the veteran geologist Dr. Selwyn, director of the Survey, possessed, of course, great scientific interest, and presented many new features of Canadian geology. The collections were made up principally of new materials brought in recently from the fields and from duplicates in the Ottawa Museum, and were arranged by Mr. C. W. Willmot, assistant curator, Mr. W. F. Ferrier, lithologist, and Mr. P. H. Selwyn. The fossils were prepared and arranged by Dr. H. M. Ami, paleontologist. The maintenance of the exhibit in Chicago was in charge of Dr. Selwyn and his able assistants, Mr. P. H. Selwyn and Mr. C. W. Willmot.

**The Trans-Pacific Cable.**—Mr. Sandford Fleming has submitted plans to the Canadian Government for four alternative routes for a submarine cable from Vancouver to Australia. The longest line is 8,264 miles, and will cost \$9,125,000; the shortest is 6,224 miles, and its estimated cost, \$6,900,000.

**Large Guns.**—The army gun factory, at Watervliet, N. Y., is now nearly completed, and the largest class of forgings can be handled. It is proposed to build a gun of 16-in. bore, which will be the largest gun of modern type yet undertaken in this country, the 13-in. being the heaviest now under construction.



## THE LATE JOHN TYNDALL.\*

It would be impossible in a brief notice even to touch upon all the work that he accomplished. Regard his career from what point of view we please, it is seen to be so full of events, so abounding in materials, so replete with interest, that the biography of the man cannot fail to be written. Seldom, indeed, has there been a more tempting subject presented to the biographer. Tyndall did, perhaps, more to popularize natural philosophy than any other man born in the nineteenth century. He was not a specialist, in the modern fashion, at all events. The growth of science has been so rapid that the all-round man has become an impossible anachronism. It was not so 20 or 30 years ago. To a very considerable extent Tyndall dealt with all those branches of science which concern inanimate nature. He was a very fair chemist. He probably knew in 1880 as much about electricity and magnetism as any one else. He was the most eminent living authority on glaciers and their action—a subject intimately connected with profound geological speculation. Of light he had made a special study. His attainments were, however, second to his individuality. He was an enthusiast; and this enthusiasm left its mark on all his work. He possessed in an eminent degree scientific imagination; and his command of language endowed him with the power of projecting his mental conceptions on the brains of his hearers and readers. His ingenuity prevented him from ever being at a loss to devise an experiment to confirm a discovery or emphasize a proposition. His fertility of resource in the laboratory continually stood him in good stead. It must not for a moment be forgotten by the younger men of science that before the time of Faraday very little was heard of public demonstrations of scientific truths. Priestley, Dalton, Davy, possessed neither the apparatus nor the information needed. Tyndall in a most masterly manner succeeded in making his hearers see for themselves the phenomena which he described. He managed to keep scientific instruction at a very high level, and yet to make it thoroughly intelligible. Nor was it in the lecture-room alone that he was successful. A better book of its kind than the volume of revised lectures, "Heat as a Mode of Motion," has yet to be written. These lectures came to all but the select few as a revelation. Their admirable lucidity will probably never be surpassed. It is the custom now among a certain school to assert that Tyndall propagated errors; that, for example, there is no such thing as radiant heat. But when "Heat as a Mode of Motion" was written, no one dreamed of regarding the phrase as inaccurate or misleading, and until the end of the present year no man of science has considered it necessary to abolish the word "heat" altogether, and suggest in its stead the indefiniteness "Radiancy." During the best days of his career, Tyndall was, however, more than competent to take care of himself; and the adversaries who escaped from a controversy with him unmauled were at once few and lucky. Indeed, there is reason to believe that he possessed something of the innate love of combat which seems to be the inheritance of all Irishmen; and he was never happier than when advancing some proposition certain to startle his hearers and set controversy on foot. The celebrated address which he delivered in Belfast, as president of the British Association, in 1874, is a marvel of polished diction. Who that heard that address can forget the beautiful and prophetic passage with which it closed. "Here, however, I must quit a theme too great for me to handle, but which will be handled by the loftiest minds ages after you and I, like streaks of morning cloud, shall have melted into the infinite azure of the past." But there is not the least difficulty in selecting a multitude of passages from his writings scarcely less happy. Thus we have the delightful story of the society lady, who, sitting beside him at dinner, said, "Professor Tyndall, what is your theory of the universe?" "My dear madam," he replied, "I have not even a theory of magnetism, much less of the universe."

The most prominent part played by Tyndall of late years was that which he took in the celebrated discussion concerning the relative merits of gas and electricity for lighthouse illumination. For some years he had been consulting engineer, if we may use the words, in the matter of light to the Board of Trade and the Trinity House. But the sequel of the famous Wigham controversy was that he resigned his post because he believed that the inquiry was not being carried out on a true scientific basis, and on that alone.

In many respects Tyndall was entirely different from the modern men of science. His methods were not theirs. His turn of thought was different—more diffuse, more general, more cosmopolitan. He was original and audacious. Nothing in the past was sacred to him. He was steeped to the very lips in Faraday's opinions, and Faraday was nothing if not soundly original. To him Faraday was an immortal genius. And yet two men could not well be more diverse in their ostensible methods of handling scientific problems. The fact that Faraday had a warm friendship for, and sincerely admired, Tyndall ought to go far to silence detractors of the latter. That he made enemies is certain; when did an earnest man escape that fate? But their number was as nothing compared to the multitude of his friends.

Work of Gunpowder.—In a paper read before the Society of Engineers, Mr. Perry F. Nursey mentioned that, according to Abel, gunpowder yields upon explosion 43% by weight of permanent gases, and 57% of matter which is solid at ordinary temperatures, but part of which may exist as vapor when the powder is exploded under pressure. At 0° C., and ordinary barometric pressure, the permanent gases generated by gunpowder occupy about 280 times the volume of the original powder. As, however, the temperature of the explosion of gunpowder is about 2,200° C., or nearly 4,000° F., these gases exert a tension, when developed in a confined space, which amounts to about 6,400 atmospheres, or about 42 tons on the square inch if the powder entirely fills the space in which it is exploded. The total theoretic work which gunpowder is capable of performing in expanding indefinitely is about 486 foot-tons per pound of powder.

\* Abstracted from paper in the London "Enquirer."

## ABSTRACTS OF OFFICIAL REPORTS.

## ANCHOR MINING COMPANY, UTAH.

The report of this company for the year ending September 30th, gives the receipts as follows: Ore sales, \$123,040; assessments, \$119,872; other sources, \$3,947; total, \$246,859. The payments on all accounts were \$237,513, leaving a balance of \$9,346. Superintendent Keith's annual report says that "sinking of the shaft during the past year has been pursued during eight months, ending June 10th, when work was stopped owing to the large amount of surface water coming in, the care of which would have entailed too large an expense. The work done amounts to 365 ft. below tunnel level, two compartments and manway 5 x 10'3 ft. clear inside of timbering. The first 200 ft. of the shaft below tunnel level was in wet ground, obliging us to use sinking pump while at work, and a pump station was cut at the 1,400-ft. level. Below this station the ground has been dry, and sinking was continued. A pump station was also made at the 1,300 level, and a 4½ Blake blower placed there, which furnishes all the air needed in the stopes. When work stopped in the shaft it was in quartzite with streaks of lime running through it, which we think is but a short distance above true quartzite."

A pipe line has been laid from Deep Lake, consisting of 300 ft. of 6-in., 500 ft. 5-in. and 7,198 ft. of 4-in. pipe to the White Pine ore house, which has been converted into a tank house. From this tank to the Anchor hoisting works a line of 1,400 ft. of 3-in. pipe conducts the water, affording a plentiful supply for all purposes. The large Rand compressor has been placed at the main shaft and work at intermediate shaft discontinued. There has been no work done in the mine since July 6th, owing to the low prices of ore.

There has been stoped out during the year 3,157 cu. yds., producing ore as per statement herewith: 11,503 tons second class, in 2,747 tons of concentrates, which sold for \$59,569, and 1,962 tons first class, \$63,470, a total of \$123,039. The expenses were: Cost of extracting ore, \$41,748; cost of supplies, \$19,343; concentrating, \$11,278; hauling, \$10,437; sampling com. assays, \$7,857; total, \$90,664, leaving a balance of \$42,357. Including the pro-rata share of dead work, taxes, insurance and other expenses, the cost of the first class ore at market is \$15.70 per ton, and of concentrates, \$20.82 per ton, leaving the ore account as follows: 2,747 tons concentrates, \$67,199; 1,962 tons of first class, \$30,806; total, \$98,006; deducting net cost of ore, \$90,664, leaves the pro-rata of dead work, taxes, insurance, etc., \$7,342.

The mill has done good work during the five months it has been employed, concentrating 11,503 tons of crude ore into 2,743 tons of concentrates, an average each month of 2,300 tons of crude ore into 550 tons of concentrates. Other work during the year is as follows: Shaft incline, 510 ft.; prospect, running west from incline, 341 ft.; prospect, drift at 500 level, 205 ft.; cross-cut from prospect drift, 500 level, 80 ft.; stope drift from incline, 86 ft.; drift from stope, 42 ft.; winze from shaft incline, 4 x 7 ft., 35 ft. There has been received during the year: On account of ore sales, \$123,039.94; on account of assessments, \$119,871.80; on account of sundry other sources, \$3,947.68; total, \$246,859.42. And disbursed during the same time, \$237,513.20; leaving a balance of \$9,346.22.

## MONTANA MINING COMPANY, LIMITED.

The report of the directors for the half year ending June 30th shows that the reconstruction of the company was successfully carried out, virtually with the unanimous co-operation of the stockholders of the old company. Of the total nominal capital, 657,158 shares have been issued, leaving 2,812 shares still at the disposal of the company. The revenue account shows a gross loss of \$19,253, in which, however, certain items, over and beyond the ordinary working expenses and chargeable to special accounts, are included, namely: Cost of lawsuit, £7,249; permanent improvements, £861; reconstruction expenses, £2,033; proportion of income tax, charged to the present company, £128. The ore treated for the six months in the mills produced \$245,047; in addition the dam tailings yielded \$42,860. The actual realized and realizable value of the yield amounted to only \$228,385, the difference amounting to \$59,522, or 20'67%. The heavy difference in realization was chiefly due to the low price of silver as compared with its coinage or assay value. The actual yield in bullion was 8,381 oz. gold and 88,891 oz. silver.

Referring to the suit of the St. Louis company, the report says: "In the circular of May 26th last, the directors announced the successful termination of the lawsuit against the Montana company, instituted by the St. Louis Mining and Milling Company, to recover alleged damages amounting to £400,000. They have pleasure in informing the shareholders that the plaintiffs in that action having failed to appeal within the period prescribed by law, the decision then rendered, which was in the company's favor on all points, cannot now be disturbed. The directors regret to state, however, that the St. Louis company is still harrasing the Montana Mining Company with further litigation, but in view of the defeat the St. Louis company sustained in the suit recently decided, the directors are sanguine of gaining another decisive verdict should the action lately instituted be brought to trial."

In his report Manager Bayliss says: "In common with every enterprise in this country, we have suffered from the widespread financial disturbance of the past two months and the heavy depreciation in the value of silver. Since the collapse of this market in June we have been unable to realize our concentrates, as the smelters refuse, in the present unsettled condition of affairs, to make an offer for the purchase of this product; and in consequence of the scarcity of currency our gold and silver bullion, which has heretofore been disposed of for cash, is purchased subject to payment in New York exchange. Our position during the past two months has, therefore, been one of considerable embarrassment, for while our financial position is thoroughly secure, the temporary curtailment of income and the delay in the realization of our product have caused us much inconvenience, only

allayed by your prompt remittances from London and the accommodation extended to us by the Merchants' National Bank, of Helena. Under the conditions now prevailing I hesitate to make any forecast of the future, but I venture to hope that you will feel assured by the improvements shown in the past four months' operations, and with the probability of some legislation favorable to silver I see no reason why this improvement should not be maintained, and the future prospects of the company advanced in a material degree by the results of development work now in progress."

#### A NEW CAGE FOR AN INCLINED SHAFT.

Written for the Engineering and Mining Journal by E. G. Brown.

The engraving herewith shows the cage which sometime ago replaced the skip, at the Original Mine, in Butte, Montana. The shaft is on an incline varying in general between 14° and 17° from the perpendicular, and is 4 ft. wide in the clear. For years it had been worked with a skip, the cross-head being identical with the one shown on the cage. Two of the skip bodies were used, one always being in reserve, the repairs being considerable. The minor disadvantages of a skip are many, but chief among them in this particular instance was the difficulty of keeping properly spaced the four points, represented at each horizontal section by the two rails and guides. A considerable



CAGE FOR INCLINED SHAFT AT ORIGINAL MINE, MONTANA.

portion of the shaft was through stope ground, and the continual settling produced frequent eccentricities of alignment, while this in turn made slow running imperative.

To obviate such troubles the cage was adopted. Larger guides (4 in. x 6 in.), shod with strap iron, were substituted for the 4 in. x 4 in. previously in use, and the safety jaws on the cage were cut out, as shown, so as to close clear of the strap. Experience, however, has shown that the strap iron could be dispensed with and no serious lessening of the life of the guides result. Before this fact was appreciated, attempts were made to use a rubber tire on the wheels, but these were not at first successful, and no further experiments have been entered on, a plain, flat-faced wheel acting admirably.

Owing to the limited width of the shaft the fronts of the cars had to be altered a little to avoid grazing the timbers. This can be seen on the car in the background of the engraving. It had been apprehended that the variations in dip of the shaft would cause a shifting of the cars and become serious in the case of a heavily loaded car and at considerable speeds, but by using guards that fit snugly and even wedge on the sloping end, no trouble has been experienced, the maximum variations being 4° or 5° above or below the normal slope, to conform with which the cage was built.

The floor of the cage swings up, being hinged at the center, and furnishes thus a trap door for lowering long timbers from the cage into the shaft, when shaft work of any kind, such as sinking or repairing, is in progress. Apart from this the engraving probably calls for no explanation, unless it should be added that there are no wheels on the foot-wall side of the guides, plain iron shoes being sufficient; even these show but the slightest wear.

#### A CRUCIBLE FURNACE FOR BURNING PETROLEUM.\*

By W. E. Crane.

The furnace is built round as high as the top of the crucible, and 4 or 5 in. larger in diameter. From there up it is built square, and the corners used as described further on. The pot stands on a support about 6 in. high. If it is a furnace running continually, it is immaterial of what substance it is made, or how solid, provided it will withstand the high temperature. If a furnace runs 10 to 12 hours only per day it should be made with as little substance as will withstand the temperature and weight. If made solid, the first heat will take longer, as this support must be thoroughly heated through before the bottom of the pot will heat. After the first heat any support will be all right. Fig 1 shows an elevation of the furnace, which has been rebuilt from one using grates for coal. A brick bottom is put over the grates to preserve them, but one grate should be taken out and a hole left through the bottom, so that the metal can run through if a pot breaks. Fig. 2 shows a part plan of furnace at the top of the pot. Four pieces should be provided of the shape shown at A in one of these corners, which will rest on top of the pot and in the corner of the furnace, shutting in the products of combustion around the pot below the top. By this means fully 15% of the fuel will be saved, a much hotter fire secured, and faster work done. A small flue should lead off from the top of this chamber, not over 2½ in. square, either to the chimney or to a heater for heating the air, or to other system of economizing the heat from waste gases. When the waste heat is utilized, this construction is essential in melting alloys, especially where spelter or zinc is used, as the fumes would coat over or fill up any economizer. By closing the space at the top of the pot the fumes from the alloys could be carried off through a separate flue. This flue should have from 30 in. to 40 in. area. The burner would probably be an air burner, with as low a pressure as possible. Some burners work nicely with as low as 6-oz. pressure. All of the air for combustion should be supplied by the blower. With an air burner at high temperatures there is usually a deposit of carbon. This can be prevented by introducing a small jet of steam, preferably superheated. As a general thing this will be found to cause more annoyance than

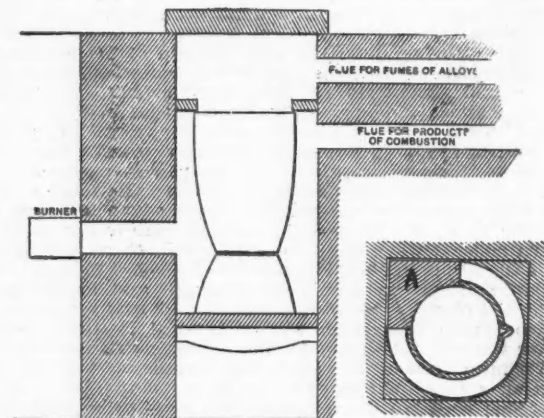


FIG. 1. CRUCIBLE FURNACE FOR BURNING PETROLEUM.

FIG. 2.

that of removing the deposited carbon. The steam will have a tendency to lengthen the flame, and as a consequence the heat will be less intense, more of the heat passing off into the flume.

There should be a good draft to take off fumes when melting alloys, which smoke a good deal; but the draft for the products of combustion should be light. For the support for the crucible in furnaces running 10 hours per day, I have found an old pot cut off at the right length and turned bottom up to be as good as anything tried. The pieces to shut off at the top of the pot should be made of crucible stock and well seasoned.

#### RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Supreme Court of Michigan.

##### Contributory Negligence of Servant in Violating Orders.

A verdict was properly directed for a mining company in an action for negligently causing the death of an employee who, while oiling the pump in a mine shaft, was killed by the breaking of a rope and the falling of a bucket which was being raised, and where it appeared from the testimony that the company's officers directed him not to work at the pump while men at the windlass were raising and lowering the buckets, and that he knew, at the time of the accident, that the buckets were being used.—Lendberg vs. Brotherton Iron Company. 56 N. W. Rep., 846.

Supreme Court of Pennsylvania.

##### Accounting for Sale Under Order of Court.

Where a lease of coal land belonging to an estate required the mining of a certain amount each year, and the payment of a royalty thereon, but did not require the payment of royalties on such amount, whether mined or not, and the leased land and all unmined coal therein was subsequently sold by order of court, the administrator of the estate could not be surcharged on accounting with uncollected royalties on coal which ought to have been, but was not, mined, as all such

\* Paper read before the American Society of Mechanical Engineers at the New York meeting, December, 1893.

unmined coal was covered by the sale, and the estate thereby received its value.—In re Hodgson's Estate. 27 At. Rep., 878.

Supreme Court of California.

Lien on Structures for Mining Claims.

Under the statute providing that mechanics, materialmen, etc., performing labor of furnishing material for the construction of any building or other structure, shall have a lien upon the property upon which they have bestowed labor or furnished materials, and that any person who performs labor on any mining claim shall have a lien on the same, a lien for material furnished for structures upon a mining claim, to be used in operating the same, filed against the structures, is invalid, as it must be filed against the whole claim.—Williams vs. Mountaineer Gold Mining Company. 34 Pac. Rep., 702.

Iron in Italy.—The imports of iron into Italy in the first nine months of this year amounted to 175,229 tons, as compared with 114,424 tons in the corresponding period of 1892. In the total of 175,229 tons, representing the imports of iron into Italy to September 30th, this year, Germany figured for 57,328 tons, and Great Britain for 117,899 tons.

Sault Ste. Marie Canal.—This canal closed for the season on December 6th. During the month of November 1,089 vessels passed through the canal, carrying 1,080,368 tons of freight; an increase of 70 vessels and 151,396 tons over November, 1892. Of the vessels, 817 were steamers, 193 sailing vessels, and 79 rafts and barges. The full accounts for the season are not yet made up, but the total freight tonnage passing the canal up to November 30th was: 10,838,131 tons, against 11,188,676 tons to the corresponding date in 1892; a decrease of 350,545 tons, or 3 1/2% only. The few days in December before closing will not make any material change in the totals.

Native Antimony.—According to W. L. Watts, in the Eleventh Report of the State Mineralogist of California, which has just been published, a ledge of quartzite and porphyritic rock containing native antimony has been discovered on Erskine Creek, four miles south of Hot Springs, in Kern County. Two tons of metal were taken from a shaft 30 ft. deep and 1.5 tons from a cut 8 ft. deep. The native antimony was found in nodular masses, coated with oxide of antimony and clay, which varied in weight from 1 oz. to 300 lbs. The two openings from which ore was obtained were about 1,000 ft. apart, on the same ledge. There are many veins carrying sulphide of antimony in the neighborhood of this ledge, particularly in a southerly direction therefrom, and numerous claims have been located, but are at present awaiting capital for development.

A Projected Exhibition at Berlin.—In the year 1879 there was held at Berlin a local industrial exhibition, which was fairly representative, and gave satisfactory economical results. The committee of that exhibition, which is still in existence, proposed to again hold a local exhibition—on a much larger scale, of course—and offered the surplus from the previous exhibition toward a new one. There seemed, however, to be a feeling for a large national German exhibition in preference to a merely local one. The German societies for the promotion of art industry are very much in favor of the latter plan, and have formed a union for the purpose of bringing about a large collective exhibition, and it has even been suggested that a large special building should be erected. That part of the plan which comprises the special Berlin exhibition also meets with considerable support, and over 2,500 entries have already been received. The financial aspect of the affair is also promising, for the guarantee fund has now reached a sum of 3,000,000 marks, or \$720,000, and it is thought that the exhibition can now be realized without any State aid.

Reclaiming New Jersey Meadow Lands.—Upon his return from Holland recently, the State Geologist of New Jersey presented the report of his investigations in that country to the officials of the New Jersey State Geological Survey. His visit abroad was made solely for the purpose of determining the possibility of reclaiming much of the 300,000 acres of New Jersey meadow land. This entire area of land is practically lying idle. The little of it that is in use lies in the upper end of the State, far from the coast. Of the total acreage nearly nine-tenths of it lies along the coast and Delaware Bay, and 100,000 acres occupies the territory from Barnegat to Cape May. Efforts have been made with indifferent results to reclaim part of the Hackensack meadows, but the practical failure of the work has led State Geologist Smock to compare the neglected meadow lands with the farms he found in the Netherlands. He is confident that New Jersey may attain much fine farming land by adopting a system of embankments and dykes like that now in use in Holland. The State Geologist has presented detailed descriptions of the important dykes of the Netherlands and the most modern means employed for the drainage of the lands inclosed by them.

A New South Wales Antimony Mine.—The Eleanora Mine was discovered 13 years ago, and has been worked with varying fortunes until recently, when it has been placed on a substantial footing under charge of Mr. George Smith. At present, says the "Australian Mining Standard," the chief workings are near the main shaft, above the 400-ft. level north and south. Here the vein is on an average 7 ft. wide carrying 11 dwt. to 15 dwt. of free gold per ton, and about 15% of antimony. After being hauled up the shaft the ore is screened; the coarse is hand-sorted and the fines are treated by a May's jigger. The antimony portion of the ore goes direct to the furnace, the remainder to the battery. At the south end of the mine a new main hauling shaft 12 x 4 ft. is being sunk to meet the 400-ft. level south from the No. 1 shaft. Good progress is being made with the work, and an adit is also being driven to drain the mine.

The crushing plant consists of a 25-head battery, which is hand-fed.

When the ore has been crushed it passes over large baize tables on to three concentrators. The baize is washed every hour into bins. The material thus saved goes into two large amalgamating barrels, and after most of the gold has been caught, it again passes on to two small separators. It is only six months since the concentrating plant was erected, yet \$12,000 worth of concentrates have been saved and sold to the Wallaroo Company. The tailings carry about 4 dwt. of gold, but these are all being saved for future treatment. As showing the tough nature of the ore, it may be mentioned that the 25-head of stamps only get through 140 tons per week, working full time.

The smelting plant consists of five reverberatory furnaces, four for treating the ore crude and one for reducing the oxide of antimony to white metal. The average production of antimony is over 10 tons per week. This is bagged and sold in London, fetching on an average £21 per ton for crude, and £36 for white metal. The average yield of gold is about 78 oz. per week, not including 3 1/2 tons of concentrates of 9 oz. per ton. Mr. Smith estimates that there are 40,000 tons of tailings on the ground, containing 14,000 oz. of gold, and he is now working out a scheme for their treatment. When the electric power company commences operations it is the intention of the management of the Eleanora Company to erect a new 60-head battery with the best concentrating plant obtainable.

PATENTS PUBLISHED IN GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

WEEK ENDING DECEMBER 9TH, 1893.

- 718 of 1893. Rock Drill. O. Terp, C. R. Brown & C. A. Godfrey, London.  
939 of 1893. Air Compressors for Mining Work. E. Evans & W. Veitch, Trefriew, & G. Veitch, Crieff.  
1,214 of 1893. Bleaching Powder. E. K. Muspratt & A. Carey, Liverpool, & V. C. Driffeld, Widnes.  
1,385 of 1893. Electrolytic Process for Coating Metals. A. E. & A. G. Haswell, Vienna.  
1,437 of 1893. Elimination of Sulphur from Iron and Steel. H. J. Phillips, Ebbw Vale.  
1,470 of 1893. Armor Plates. T. J. Tressider, Sheffield.  
7,286 of 1893. Miners' Safety Lamps. J. Graham & H. Chapman, Morley.

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, DECEMBER 12TH, 1893.

- 510,375. Apparatus for Generating Steam by the Aid of Molten Slag. Edgar A. Ashcroft, Broken Hill, New South Wales.  
510,448. Oven for the Manufacture of Coke. Martin V. Smith, Pittsburg, Pa.  
510,454. Machine for Rounding and Straightening Bars. Peter A. Wagner and Napoleon Beauregard, San Francisco, Cal.  
510,455. Coal-Cutting Machine. Isaac Wantling and James T. Johnson, Peoria, Ill.  
410,558. Apparatus for Burning Tiles and Brick. William Whitesell, Fort Recovery, O.  
610,462. Gas Generator. Walter B. Wright, Chicago, Ill.  
510,481. Coupling for Metallic Flexible Tubing. Henri A. Linzeler and Pierre R. P. Dubault, Paris, France.  
510,493. Brick Machine. John J. Whittaker, Acrrington, England.  
510,512. Metal-Working Machine. Joseph E. Lee, Wyalusing, Pa.  
510,517. Rock-Drilling Machine. James A. Pearsall and Cassius M. Walker, Denver; Assignors to the Rocky Mountain Drill Company, Pueblo, Colo.  
510,547. Grate. Francis H. Richards, Hartford, Conn.; Assignor to Eckley B. Coxe, Drifton, Pa.  
510,548, 510,549, 510,550, 510,551, 510,552, 510,553, 510,554, 510,555, 510,556. Furnace. Francis H. Richards, Hartford, Conn.; Assignor to Eckley B. Coxe, Drifton, Pa.  
510,565, 510,566, 510,568, 510,569. Traveling-Grate Furnace. Eckley B. Coxe, Drifton, Pa.  
510,567. Process of Burning Fuel. Eckley B. Coxe, Drifton, Pa.  
510,570. Heating Plant. Eckley B. Coxe, Drifton, Pa.  
510,571. Furnace Floor. Eckley B. Coxe, Drifton, Pa.  
510,572, 510,574, 510,577, 510,584. Furnace. Eckley B. Coxe, Drifton, Pa.  
510,573. Traveling Grate. Eckley B. Coxe, Drifton, Pa., and Francis H. Richards, Hartford, Conn.; Said Richards Assignor to said Coxe.  
510,575. Traveling Grate Furnace. Eckley B. Coxe, Drifton, Pa.  
510,576. Floor-Plate for Furnaces. Eckley B. Coxe, Drifton, Pa.  
510,578. Process of Burning Fuel. Eckley B. Coxe, Drifton, Pa.  
510,579. Grate-Bar. Eckley B. Coxe, Drifton, Pa.  
510,580. Floor-Plate for Furnaces. Eckley B. Coxe, Drifton, Pa.  
510,581, 510,582, 510,587, 510,588. Furnace. Eckley B. Coxe, Drifton, Pa.  
510,582, 510,583, 510,585. Steam Plant. Eckley B. Coxe, Drifton, Pa.  
510,586. Process of Utilizing Carbonaceous Minerals. Eckley B. Coxe, Drifton, Pa.  
510,588. Furnace. Eckley B. Coxe, Drifton, Pa.  
510,589. Furnace Plant. Eckley B. Coxe, Drifton, Pa.  
510,591. Suction-Pipe for Dredges. William J. Dyer, Honolulu, Hawaii, Assignor to the Elsdon Iron and Locomotive Works, San Francisco, Cal.  
510,617. Manufacture of Compounds of Pyroxyline. John H. Stevens, Newark, N. J., and Frank C. Axtell, Brooklyn, N. Y.; Assignors to the Celluloid Manufacturing Company, New York.  
510,623. Grate. Charles Whitfield, Kettering, England.  
510,631. Smoke-Consuming Furnace. William L. Deulo, Rochester, N. Y.  
510,658. Steam-Superheater with Independent Furnace. Louis Uhler, Geneva, Switzerland; Assignor to Louis Uhler Cadisch, same place.  
510,670. Coal-Dumping Wagon. Lorenz R. Behlert, Baltimore, Md.  
510,672. Process of Obtaining Sweet Residual Petroleum Products. Edward G. Brown, Brooklyn; Oswald N. Cammann, New Brighton, and Oliver Wilcox, Brooklyn, N. Y.  
510,673. Apparatus for Combustion. Andrew Bryce, Allegheny, Assignor of nine-tenths to Charles A. O'Brien, Pittsburg, Pa.  
510,674. System for Dumping Cars. David P. Cameron, San Francisco, Cal.  
510,736. Dredger. William T. Urie, Kansas City, Mo., Assignor to the Urie Dredge Manufacturing Company, same place.  
510,737. Apparatus for Feeding Fuel to Steam Generator Furnaces. John Vicars, Thomas Vicars and John Vicars the Younger, Liverpool, England.  
510,748. Means for Manufacturing Chains. Charles White, Barrow-in-Furness, England.  
510,763. Box Pile for Making Bar Iron. John R. Baugh, Detroit, Mich.  
510,764. Metal-Bending Machine. Charles A. Bertsch, Cambridge City, Ind.  
510,777. Apparatus for Heating Metals Electrically. Charles L. Coffin, Detroit, Mich.  
510,788. Pulverized Fuel Burner. Frederick H. Hawkins, New York, N. Y.  
510,796. Machine for Forming Metal Tubes. William Kegler, Bellevue, Ia.  
510,800. Rock-Breaking Machine. Cornelius Kimplen, Chicago, Ill.; Assignor to Mary Kimplen, same place.  
510,819. Downdraft Brick Kiln. Louis H. Reppell, Kansas City; Assignor to William R. Reppell, St. Louis, Mo.  
510,834. Process of and Apparatus for Dissociating Soluble Salts by Electrolysis. Henry S. Blackmore, Mount Vernon, N. Y.  
10,865. Mold and Process of Making Same. Benjamin Jones, Cleveland, O.

## PERSONALS.

Mr. W. V. S. Thorne has been appointed superintendent of the Eastern Railroad of Minnesota.

Mr. Thomas L. Green is now assistant secretary of the new Individual Coal Operators' Association.

Mr. Chauncey H. Andrews, a prominent iron manufacturer of Youngstown, O., is reported seriously ill.

Mr. Warren Delano, Jr., has been chosen vice-president of the Lackawanna Steel and Iron Company and will have charge of the New York office.

Mr. Simon Muhr, of Philadelphia, Pa., has been elected a director of the Finance Company of Pennsylvania, vice George de B. Keim, deceased.

Mr. Henry Parrock has been made general manager of the Pomeroy mill of the Union Iron and Steel Company, at Youngstown, O. Mr. John Bennington succeeds Mr. Parrock as superintendent of the company's upper mill.

Mr. L. B. Whitney, recently connected with the firm of A. Whitney & Sons, of Philadelphia, has resigned his connection and formed a partnership with Mr. DeWitt W. Smith. The new firm will represent several manufacturers of machinery.

Mr. A. E. Hogue has been appointed manager of the Broken Hill Proprietary Block 14 mine, in New South Wales, in place of Mr. Z. Lane. Mr. Hogue is a native of Victoria. He studied geology, mineralogy, chemistry, assaying and metallurgy at the Ballarat School of Mines; while he has gained practical experience as a mine manager in Victoria, New South Wales, Queensland, Northern Territory, New Zealand, and also in the United States.

## OBITUARY.

James F. Boyd, a retired iron manufacturer, died in Yonkers, N. Y., on December 18th, aged 80 years.

Gilbert Knapp, a pioneer foundryman and ironworker, of northeastern Pennsylvania, died in Honesdale, Pa., on December 20th, aged 80 years.

Henry Janes died suddenly in Baltimore, Md., on December 20th, aged 67 years. He was a member of the well known firm of E. Pratt & Brothers, and was for many years the shipper of the Maryland Coal Company, George's Creek Coal and Iron Company, and the Borden Mining Company. He was well known to the coal trade of Baltimore and New York.

Bryan Donkin, who died in London, England, December 4th, aged 84 years, was for many years in business as a manufacturer of machinery, but retired in 1881. He was the senior member of the Institution of Civil Engineers and wrote frequently papers for that and other scientific societies. He took out several patents for inventions and improvements in steam engines and paper machinery.

Gustav Adolph Liebig died at Catonsville, Md., on December 17th. Dr. Liebig was born in 1824, in Hayda, Austria. He devoted his attention to the study of chemistry several years while assistant to Prof. Joseph Redtenbacher. He followed the latter to Vienna, where Dr. Liebig engaged in scientific researches until 1854. He came to the United States in 1856, and went to Baltimore in 1858. After going to Baltimore, Dr. Liebig attained a reputation as an authority on the manufacture of fertilizers and their modes of application to the soil. Impressed with the importance of the phosphates found upon the Island of Navassa, he suggested their value and was the means of bringing them into use. Through his efforts the Navassa Phosphate Company was organized and obtained possession of the island. Subsequently the Navassa Guano Company, of which he was president, was formed for the purpose of manufacturing the product of the island into merchantable fertilizers. About 10 years ago he sold his interest in the company and organized the Flamingo Guano Company.

George de B. Keim, ex-president and ex-receiver of the Philadelphia & Reading Railroad and Canal and Iron companies, died at Philadelphia, Pa., on December 18th. Mr. Keim was born in Reading, Pa., 62 years ago. He was elected president of the Reading Railroad to succeed Franklin B. Gowen in 1884. The road went into the hands of receivers the same year, and Mr. Keim retained the presidency until January, 1886, when Mr. Gowen was again elected to the office. In 1888, when the receivership was dissolved, Mr. Keim was chosen a director of the road and elected to the presidency of the Coal and Iron Company. Mr. Keim served as a receiver of both corporations from 1884 to 1886. He was made general solicitor of the Reading in 1871 and subsequently was chosen vice-president. He materially aided Mr. Gowen in acquiring control of coal lands for the Reading, and was intrusted with millions of dollars in making the purchases. Mr. Keim was admitted to the Berks County bar in 1852, and soon afterward began practicing in Philadelphia. In 1855 he removed to Pottsville and became counsel for leading coal operators. He returned to Philadelphia in 1871.

George H. Babcock, the inventor, well known in New York, as the head of the Babcock & Wilcox Boiler Company, died at Plainfield, N. J., on December 16th. He had been seriously ill since he returned from a Western trip last summer. Mr. Babcock was born in Otsego, N. Y., in 1832. His parents were poor, but their son had an inherited skill in mechanical invention that resulted in making him a successful business man. When comparatively a youth he started in Westery, R. I., the first printing office in that part of the East, and founded "The Literary Echo," which is still a successful publication under the name of "The Narragansett." Later Mr. Babcock met Charles Potter, now president of the Potter Printing-Press Works, of New York and Plainfield, who was then treasurer of a Westery iron company. A partnership was formed for the manufacture of printing presses. Later this connection was dissolved, Mr. Potter taking the plant and continuing the business. Mr. Babcock came to New York and entered the employ of J. D. Stetson, a patent lawyer. During the three years that he was there he taught mechanical drawing in Cooper Union. During the following years he was connected with the Mystic Iron Works, at Mystic, Conn., and the Hope Iron Works, at Providence, R. I. He then met Stephen Wilcox, of Westery, and with him invented the stationary engine that utilized the tubular boiler invention of Mr. Babcock. This invention was successfully applied to manufacturing purposes. The partnership formed by the two men continued uninterruptedly until Mr. Wilcox died, about two weeks ago.

## SOCIETIES AND TECHNICAL SCHOOLS.

Civil Engineers' Club of Cleveland.—At the regular meeting, December 12th, Mr. L. E. Chapin, of Canton, O., read the paper of the evening, entitled "Sewage Disposal at Canton, O.," which was discussed by Messrs. E. P. Roberts, Hosea Paul, C. M. Barber, W. H. Searies and A. H. Porter.

University of Illinois.—The corner stone of the new building for the engineering department was laid at Champaign, December 13th, with appropriate ceremonies. The building will be a three-story structure 200 x 76 ft., with an extension 72 x 66 ft., and will cost \$160,000.

New York Railroad Club.—At the annual meeting, recently, the following officers were elected: President, R. C. Blackall; vice-presidents, George W. West, A. E. Mitchell and W. H. Lewis; secretary, John A. Hill; treasurer, C. A. Smith; executive committee, Thomas Millen, W. C. Ennis, H. H. Vreeland, W. W. Snow and W. G. Wattson; finance committee, F. M. Patrick, F. W. Coolbaugh and R. A. Parke.

American Institute of Mining Engineers.—The 66th meeting of the Institute (being the 24th annual meeting) will be held at the Princess Anne Hotel, Virginia Beach, near Norfolk, Va., beginning Tuesday, February 20th, 1894. Mr. John Graham, Jr. (P. O. Box 213, Norfolk, Va.), is the chairman of the local committee of arrangements. The following special hotel rates are offered to members and guests attending the meeting: Board and lodging per day, \$2.50; room, with bath, for one person, \$4.50 per day; for two persons, \$8.50. Applications for rooms should be addressed to the clerk of the hotel on and after January 20th.

In connection with this meeting, excursions to Norfolk, Portsmouth Navy Yard, Newport News and Hampton, and a trip into the Dismal Swamp, are contemplated. Further particulars will be given in a later circular.

Special railroad rates will not be arranged; but rates over any of the trunk lines to Baltimore can be obtained from local agents at 2 cents per mile for any party of 10 traveling together. It is proposed, as a convenient route for many of the members, to take the steamer of the Bay Line, leaving Baltimore on Monday, February 19th, at 7 p. m., and arriving at Norfolk at 7 a. m. on Tuesday. Assurance of free transportation between Norfolk and Virginia Beach has been received. A special rate for members has been offered by the Bay Line of \$3.75 for the trip from Baltimore to Norfolk, including supper and stateroom, or \$7 for the round trip, including stateroom returning.

Continued discussion of the papers presented at the Chicago meeting of August last will be a special order at this meeting. While contributions concerning any of these papers will be welcome, the following topics are particularly suggested, as possessing much interest for mining engineers and metallurgists: A.—"The Physics of Steel." (See papers of Messrs. Martens, Osmond, Pourcel, Sauveur, Hadfield, Howe and Webster.) B.—"The Genesis of Ore Deposits." (See papers of Messrs. Posepny, Emmons, Jenney, Blake, Rickard and Case.) Members intending to offer contributions to the discussion of these or any other topics treated in the papers read at Chicago, or original papers on other subjects, are requested to give early notice to the secretary, and, in the case of new papers, to forward manuscript or full account of the same at once.

Geological Society of America.—This society holds its sixth annual meeting in Boston, Mass., beginning Wednesday, December 27th. The meeting will be called to order at 10 a. m., in the Hall of the Boston Society of Natural History, corner of Boyl-

ston and Berkeley streets. Prof. William H. Niles, the president of the Natural History Society, will welcome the Geological Society. It is proposed to hold the sessions of Thursday at Harvard University, in Cambridge. Titles and abstracts of papers should be sent to the secretary immediately. Matter for the programme distributed at the first session must be in the secretary's hands by noon of Tuesday, December 26th. Until December 22d the address of the secretary, Mr. H. L. Fairchild, will be Rochester; after that date at the Thorndike, on Boylston street, Boston. Excellent facilities will be given for use of lantern illustrations. In place of the formal lecture upon Wednesday evening, it is proposed to hold a regular session for reading of papers. Following an early adjournment there will be an opportunity for social introductions. On Thursday evening the annual dinner of the Society will be held, probably at the Thorndike.

The secretary has issued the following preliminary list of papers to be read at this meeting: "Some Recent Discussions in Geology," Sir J. William Dawson, Montreal, Can.; "New Discoveries of Carboniferous Batrachians," Sir J. William Dawson, Montreal, Can.; "A Geological Study of Lake Mohonk and Lake Minnewaska, N. Y.," William H. Niles, Boston, Mass.; "Expédition to the Bahamas," Alexander Agassiz, Cambridge, Mass.; "A Prismatic Stadia Telescope," Robert H. Richards, Boston, Mass.; "The Eastern Boundary of the Connecticut Triassic," W. M. Davis and L. S. Griswold, Cambridge, Mass.; "Geographical Work for State Geological Surveys," W. M. Davis, Cambridge, Mass.; "Faceted Pebbles on Cape Cod," W. M. Davis, Cambridge, Mass.; "The Origin of the Coarsely Crystalline Vein Granites of Pegmatites," William O. Crosby, Boston, Mass.; "A Classification of Economic Geological Deposits, Based Upon Origin and Original Structure," William O. Crosby, Boston, Mass.; "Ancient Volcanic Rocks Along the Eastern Border of North America," George Huntington Williams, Baltimore, Md.; "The Geological Structure of the Housatonic Valley East of Mt. Washington," William H. Hobbs, Madison, Wis.; "Volcanit, an Anorthoclase Augite Rock," William H. Hobbs, Madison, Wis.; "Lacustrine Tertiary Formations of the West," William B. Scott, Princeton, N. J.; "Fossil Flora of Alaska," Frank H. Knowlton, Washington, D. C.; "Shastachico Series of the Pacific Coast," J. S. Diller, Washington, D. C.; "The Hibernia (New Jersey) Fold," J. E. Wolff, Cambridge, Mass.; "Geological Notes on Some of the Coasts and Islands of Behring Sea and Its Vicinity," George M. Dawson, Ottawa, Can.; "Crustal Adjustment in the Upper Mississippi Basin," Charles R. Keyes, Des Moines, Ia.; "Geology of Southern Indian Territory and Northern Texas," Robert T. Hill, Washington, D. C.; "Geological Activity of the Earth's Originally Absorbed Gases," Alfred C. Lane, Washington, D. C.; "The Gabbros on the Western Shore of Lake Champlain," James F. Kemp, of New York, N. Y.; "Geology of the Coosa Valley in Georgia and Alabama," C. Wilard Hayes, Washington, D. C.; "Origin and Classification of the Greensands of New Jersey," William B. Clark, Baltimore, Md.; "Certain Climate Features of Maryland," William B. Clark, Baltimore, Md.; "Pleistocene Problems in Missouri," James E. Todd, Vermillion, S. Dak.; "Johann David Schoepff, and His Contributions to North American Geology," George Huntington Williams, Baltimore, Md.; "Notes on the Occurrence of Mica in the Laurentian of the Ottawa District," Robert W. Ellis, Ottawa, Can.; "Relations of Synclines of Deposition to Ancient Shore Lines," Bailey Willis, Washington, D. C.; "Paleozoic Overlaps in Montgomery and Pulaski Counties, Virginia," M. R. Campbell, Washington, D. C.; "Lake Cayuga, a Rock Basin," R. S. Tarr, Ithaca, N. Y.; "Glacial History of Western Pennsylvania," C. Frederick Wright, Oberlin, O.; "Remarks Upon a Supposed Glaciated Stone Axe from Indiana," C. Frederick Wright, Oberlin, O.; "Extra-Moraine Drift Between the Delaware and the Schuylkill," Edward H. Williams, Jr., Bethlehem, Pa.; "The Madison Type of Drumlins," Warren Upham, Somerville, Mass.; "Diversity of the Glacial Drift Along Its Boundary," Warren Upham, Somerville, Mass.

## INDUSTRIAL NOTES.

The Chattanooga Stove Company has resumed operations after a shutdown of three months.

Bay State Furnace, at Ft. Payne, Ala., was recently sold under an order of the Federal Court.

Citico Furnace, just outside the corporation line of Chattanooga, was put in blast December 12th.

The Allentown, Pa., Rolling Mills have reduced the wages of 50 men in the foundry and machine shop about 15%.

At Rockwood, Tenn., work has been resumed in the coal mines and the new furnace is completed and will be put in blast January 1st.

Jenkins Brothers, manufacturers of valves, packing, etc., will remove from their present address in Philadelphia to 117 North Fourth street.

On and after January 1st, 1894, the address of the California Wire Works and A. S. Hallidie will be Nos. 509-511 Market street, San Francisco.

The American Mining and Milling Machinery Company, Cleveland, O., issues a handsome catalogue describing and illustrating the American rock crusher, the American ball pulverizer and other devices for the treatment of ores of various descriptions.

The Jeffrey Manufacturing Company, Columbus, O., has ready for distribution a complete catalogue showing full-size illustrations of all the chain links made by it. The catalogue also includes a full price-list of the company's specialties, and will be of value to all who use material in this line. Copies will be sent on request.

The Carnegie Steel Company's Homestead mill will close on December 23d. Secretary Lovejoy says that the shutdown is due to lack of orders. The concern's policy is to run when it has orders, and stop when the orders do not come in. Consequently, the length of the shutdown will be indefinite. About 3,000 men will be affected.

The J. H. & D. Lake Company, Massillon, O., reports business gradually on the increase again and every indication for fair business after January 1st. The company shipped recently friction clutch pulleys to Tacoma, Wash.; four friction clutch pulleys to Santiago de Cuba; 20 to Cleveland, O., and numerous other points throughout the United States.

The National Electric Company, Eau Claire, Wis., having purchased the entire plant and stock formerly operated and owned by the National Electric Manufacturing Company, is prepared to furnish alternating and direct current apparatus, multipolar power generators and motors, transformers of any capacity and voltage, as well as other electrical apparatus and appliances.

#### MACHINERY AND SUPPLIES WANTED

If any one wanting machinery or supplies of any kind will notify the "Engineering and Mining Journal" of what he needs he will be put in communication with the best manufacturers of the same.

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.

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.

#### GENERAL MINING NEWS.

##### ALABAMA.

Tennessee Coal, Iron and Railroad Company.—Orders have been given to start up one of the blast furnaces at Ensley on January 7th, and at intervals of 10 days thereafter, two of the furnaces at Bessemer will be blown in. The company is now making considerable shipments of coal to Mobile for export to South and Central America.

##### ALASKA.

Bonanza Lode.—The Juneau "Mining Record" says that A. Goldstein, owner of this claim in Juneau has struck a vein carrying free gold, and intends to continue development.

##### CALIFORNIA.

###### Calaveras County.

Green Mountain.—This mine, owned by the Messrs. McSorley, and located in Chili Gulch, about 1½ miles from Mokelumne Hill, has been sold for \$17,500.

Murray Creek Mining Company.—The Murray Creek mine, says the Calaveras "Prospect," will soon commence crushing ore. A five-stamp mill is all ready for work, and a Tulloch concentrator will be added in a few days. There are over 100 tons of rock on the dump which will pay well in free gold, and the sulphurets of which assay very high.

###### Eldorado County.

Melton Gold Mining Company.—This company has been organized to work gold mines in this county. The main office will be in New York. The directors are Loring L. Lombard, John H. Maugham, Kimble W. Robbins, Wm. J. Hammond, Jr., and Joseph Kunzmann, of New York City.

###### Mono County.

Bulwer Consolidated Mining Company.—The latest weekly official letter says: We have ceased crushing ore and have cleaned up at the mill. We crushed during the week 48 tons of ore, the average battery sample assay of which was \$24.15 per ton; tailings, \$8.47 per ton. Crushed during the whole run 320 tons of ore. The repairs to drifts and cross-cuts in the mines have been completed and the stopping of ore will be resumed so as to have another accumulation for the mill.

###### Nevada County.

Keystone.—Work has been resumed on the Keystone gravel mine after a suspension of operations for several months, says the Nevada City "Transcript." The mine is situated on the ranch of Thomas Hughes, on the old Grass Valley road. The development of the Keystone is awaited with interest by owners of land along the ridge on

each side of this mine, as it will determine the general course and extent of the channel, as well as its richness.

###### Placer County.

According to the "Placer Herald" the drift mines east of Rocklin are showing up in good shape. Since the irrigation season closed and water has been available for power, the Harlow mine has started up again under the direction of Dr. Barton, and is said to be paying well. At present it is working some eight or ten men. The Leahy mine, near the Harlow, is also at work and reported as doing well for its owners.

Sterret.—The Colfax "Sentinel" reports that this mine, located about 12 miles south of Cisco, on the north fork of the American River, between it and Sailor Canyon, is to be developed. There is a large ledge of low-grade ore. The company will begin operations in the spring and will put in a 60-stamp mill.

(From our Special Correspondent.)

Mayflower Gravel Mining Company, Forrest Hill.—A dividend of 10 cents per share has been declared and will be paid on December 20th.

###### Plumas County.

Ninety-Three.—At this quartz mine, situated about half a mile east of McLearn's, in Mohawk Valley, the shaft is now down 50 ft., and will be sunk as many more, when the ledge will be drifted for. The vein is 3 ft. wide, and the ore will pay from \$10 to \$12 per ton. This 100-ft. shaft will tap the vein at a depth of 400 ft.

(From our Special Correspondent.)

Quincy Water and Mining Company.—Authority has been given by the Debris Commission to build dams of logs and brush across the outlet of an old hydraulic pit and one dam in a ravine; also to construct a stone dam 20 ft. high in Spanish Creek, near Devil's Elbow. The creek is tributary to Feather River. The company owns five mines and the workable gravel deposits amount to about 5,000,000 cu. yds. The drainage is into Spanish Creek, through the ravine mentioned. The restraining works authorized are not sufficient for the working of the entire ground and additional restraint will be needed from time to time before all the gravel is worked out. These mines, however, are the largest, as a whole, that have been so far authorized to construct debris dams in accordance with the Caminetti law. The works being completed to the satisfaction of the commission a permit will issue to resume hydraulic mining.

###### San Bernardino County.

(From an Occasional Correspondent.)

The Danby Salt Company intends to resume operation at once, having interested Daniel Best, the manufacturer of traction engines. The salt will be hauled from the salt marshes, where there is a large quantity, to the railroad, a distance of 30 miles, at a cost of \$3 per ton. At this marsh is seen one of the most curious houses in the United States—a house built of salt. So dry is the climate that, although built some years ago, there is no perceptible change in it.

Crescent District.—A Pasadena capitalist has expended \$25,000 in the purchase and development of a number of mines in this camp. His last investment is turning out well, although some of the others bought were abandoned after some development. A deal will soon be made by which the property of Amer & Siddell will pass into the hands of a company.

Old Woman Mountains.—Messrs. Parker and Nuckols recently made a shipment of 1,850 lbs. of ore from a new discovery to the Kingman, Ariz., samplers and received a check for \$429. They own seven properties which show gold ore and they will erect a steam arrastra. Some of the smaller properties produce rich ore.

Vanderbilt District.—The St. George mine, owned by Flood, Mackay and others, has closed down indefinitely. The Gold-Bronze has again started up and will be worked to its full capacity with the new hoisting works recently erected. A. G. Campbell has purchased his partner's interest in the Boomerang and other mines and will erect a plant to treat the ore. Work will begin on the southern Nevada railroad in a short time. Superintendent Blake having raised sufficient money in Los Angeles to complete it through the Vanderbilt Mountains to a point 10 miles beyond its present terminus. After this is accomplished it will be an easy matter to carry it to the Goode Spring or deposits, in Nevada, as only a level plain intervenes.

###### San Diego County.

Ella.—The output of the Ella mine, between Banner and Julian, is \$13,500 for the 60 days in which crushing has been done.

###### San Francisco County.

(From our Special Correspondent.)

During the month of November the receipts of quicksilver at San Francisco were 2,352 flasks; for the 11 months to November 30th, 23,417 flasks, against 18,004 in 1892 and 13,763 in 1891. Shipments were made by sea of 1,575 flasks, valued at \$53,600. The shipments during the 11 months of the year were 13,400 flasks, valued at \$534,815, against 7,058 flasks valued at \$292,490 in 1892. The shipments by rail during the first 10 months of the year were 10,697 flasks.

Debris Commission.—Applications for permits to mine by hydraulic process continue steadily to be made and when spring opens the number will be much more numerous. This week applications were received from the owner of the Badger mine, Cottonwood Creek; from owners of the Christmas Hill mine, drawing into the middle fork of the American; from the Tannery Ravine mine, on Dry Creek, a tributary of the Yuba, and from the Table Rock mine, on Howard Creek, or Slate Creek, a tributary of the Yuba. The commission is showing great care in the requirements regarding dams. Marsden Manson, engineer for the State commissioners of public works, accompanied Congressman Caminetti, in a tour of inspection of the Mokelumne River, and next week the neighborhood adjacent to the Tuolumne River will be inspected.

Gladiator Gold Mining Company.—This company incorporated to do a general business with a fully subscribed capital of \$1,000,000. The following directors have been appointed: J. G. Doolittle, W. A. J. Doolittle, J. Marks, H. B. Havens and J. M. Harper.

Malvina Gold Mining Company.—This company has filed incorporation papers this week, the capital stock being placed at \$50,000, with \$50 subscribed. The directors are S. H. Smith, G. W. Osborn, Jr., C. F. Bunker, G. W. Waitt and A. Summerfield, Jr.

###### Siskiyou County.

(From our Special Correspondent.)

Mayflower Gold Quartz Mining Company.—The facts in connection with the arrest of W. S. Kerr, one of the directors of this company, at the instance of H. M. Binckley, the company's treasurer, have already appeared in the "Engineering and Mining Journal." The preliminary examination of the defendant was held early in the present week, and resulted in the acquittal of Mr. Kerr. It was conclusively shown that the defendant had been authorized by the board of directors to sell \$2,000 worth of the company's capital stock, the proceeds of which were to be used in moving a milling plant from Kernville to the mine. Kerr disposed of the stock to personal friends in the East upon the express understanding that the money should not be turned into the treasury, but the milling plant be erected at once that returns from the mine might be obtained. Binckley, the treasurer, demanded, notwithstanding, that the money obtained be turned over to him, and upon Kerr refusing, had him arrested on the absurd charge of felony—embezzlement. Meantime the Eastern capitalists who had furnished Kerr with the money, read of the trouble and returned to Kerr their certificates of stock. These, with their cash value, were produced in court, and the case was at once dismissed. At present things at the mine are at a standstill.

###### COLORADO.

Colorado Fuel and Iron Company.—A press dispatch from Pueblo, Colo., states that the steel works of this company, which have been lying idle for months, will resume operations in all departments early in January. It is learned that the company has practically closed a contract with the receivers of the Union Pacific Railway for 30,000 tons of steel rails and has also secured an order for the rails for the new Florence & Cripple Creek Railroad. These orders will give employment to 1,200 to 1,800 men.

Western Oil Company.—The incorporation of this company, with a capital stock of \$100,000, has been completed. Although it is said that the incorporators are all interested in the Rocky Mountain and United Oil companies, they deny the report that the new company is to swallow up the two old ones. They claim that its sole object is to contest the newly opened oil-bearing territory near Pueblo with the Standard and Continental companies, and that it is wholly independent of all the others.

###### El Paso County.

The building of the railroad connecting Cripple Creek with the Santa Fe and Denver & Rio Grande roads, at Florence, some 30 miles west of Pueblo, is now assured, the contract having been let with the undersanding that grading shall begin December 26th. The new road will furnish the mines an outlet to the smelters of Pueblo, and will greatly encourage the development of the camp.

Work Mining Company.—It has been decided not to make a lease of the Morning Glory, of the Work company. For a period of 30 days the affairs of the company are to be in the hands of an executive committee of six, three from the directors and three from the stockholders. At the expiration of this time a special meeting will be held and a plan of future operations determined on. The sum of \$650 has been pledged to keep the mine free from water, and fire under the boiler and other work.

###### Gilpin County.

The ore shipments from Black Hawk over the Colorado Central Railroad for November were 168 cars, aggregating 5,376,000 lbs., showing a good increase over the corresponding period of last year. There is also a noticeable increase in milling ores. All of the stamp mills are being run to their full capacity.

Cashier Mill.—The machinery in this mill is being replaced preparatory to operation in connection with mining properties in which the owner is inter-

ested. The mill, for nearly two years, has been operated by W. S. Wing, who had the mill fitted up with machinery to save the gold from the creek which escapes from stamp mills higher up the stream. The process not proving entirely successful, the plant will again be operated as a stamp mill.

#### Lake County.

(From our Special Correspondent.)

The present low price of silver is greatly interfering with the production of leading properties, and it is only those mines which have by-products that can afford to work with silver at its present price. These are the Wolcott, Small Hopes, William Wallace, Shamrock and a few others, that have the lead value in their ore to keep them going. Such properties as the Little Johnny, Lillian, Florence and White Cap are kept going by the gold value; while the Leadville Consolidated, Lee, Big Chief, Welden, Wolf Tone, Grey Eagle, Morning and Evening Stars secure their silver value from a good iron excess. There are many other properties that must depend on their sulphide ores, and it is those mines which find it impossible to produce their mineral at present prices.

Penrose.—These people are at present figuring on the following proposition: If work is to continue the shaft must be sunk deeper. They are now working at the water level and if further sinking is carried forward there must be a lowering of the water level. The pumps now handling 1,500 gallons per minute are just able to hold the water at the present level. The sinking of the shaft a further distance of 100 ft. will create a great expense and it is not likely that such work will be commenced until the present level is thoroughly explored and the mineral in sight all taken out.

Star of Hope.—The Bohn shaft on this property has again been started up. A few men are now at work setting the new engine, preparatory to draining out the water which has risen 100 ft.

#### Ouray County.

American Belle Mines, Limited.—Mr. F. P. Crowther, one of the directors of this company, recently made an inspection of the mines with Captain Harvey, the manager, and Mr. Harold Wilson, his assistant, and consulted with them and others as to the treatment of the larger reserves of low-grade ore available for extraction. Mr. Crowther arrived at the mines early in October, and after a careful study of the situation, came to the conclusion that with the present prices of silver and copper, the charges for railway freight and smelting were too high to leave a profit upon the shipment of ore to the Durango smelters, but as preparations were being made for the erection of an "Austin" smelter at Silverton, the proprietors of which were desirous of obtaining the company's ores, Mr. Crowther entered into negotiations with them, which resulted in an arrangement by which this company becomes a shareholder in the Silverton smelter to the extent of about \$20,000, \$10,000 of which is payable in cash, and \$10,000 payable in ore from the company's mines—in consideration for which special terms have been obtained for the treatment of the large reserves of copper-bearing ores available. It is stated that the smelter will be completed within the next three months, and that the National Belle mine can make an output of about 2,000 tons per month. Mr. Crowther also arranged with the president of the Silverton railway a favorable contract for the carriage of ores, and this, together with lower smelting charges, should insure a fair margin of profit upon the ore treated. The capital of the Austin Smelter Company will be \$100,000, so that this company will be entitled to about one-fifth of the smelters' profits, in addition to the saving in treatment charges and freight. Two other mining companies (the New Guston and the Silverton Mining Company) are investing in a similar way in the smelter, inasmuch as co-operation is likely to produce more satisfactory results than if each company had to depend upon separate arrangements with customs smelters.

#### Pitkin County.

Mollie Gibson Consolidated Mining and Milling Company.—Advices from Aspen state that the water is now entirely out of the mine, and that the station where the 10th level is to be driven is practically dry. There is nothing now to prevent the placing of a large Knowles pump at the bottom of the shaft.

#### FLORIDA.

##### Marion County.

Piedmont Phosphate Company.—This company is now shipping rock from its mines, 15 miles north of Ocala.

#### IDAHO.

(From our Special Correspondent.)

Idaho may not have had a very pretty exhibit of ores at the World's Fair, in the Mines Building, but from the following facts one can best judge of their nature. At the close of the Fair 15 tons of the bulk material, that throughout the Fair had been piled up from the floor in different parts of the exhibit, was sent to the National Smelting Company, of South Chicago, for treatment, and netted the following: 82 oz. of silver, nearly 2 oz. of gold and 48% lead was the average per ton of ore worked. After paying cost of haulage, sampling and smelting charges, the net amount realized on the ore by the Idaho authorities was \$1,270,

#### Boise County.

El Dorado Mining Company.—An amended complaint has been filed by A. Neal, in the Federal Court, at Boise, against F. Page Tustin, H. Parker, K. P. Plowman et al. The main allegation is that a mine worth \$150,000 was obtained from the plaintiff by the several defendants by fraud. Neal asserts that he sold his mine to Plowman for \$150,000, the sum of \$5,000 being paid in cash and the balance in two notes secured by a mortgage on the mine; that Tustin & Parker contrived to get him drunk while at Seattle and while in that state the two notes were obtained from him ostensibly for collection. Later, however, they held the notes as their own and proceeded to foreclose the mortgage on the mine in their own names, Plowman finally deeding to them a part of the mine for four months' grace in which to pay the notes. Neal proceeds to allege that the above corporation was formed, and that stock was given out with his mine as the basis and that the mine has been worked and valuable ore extracted. The appointment of a receiver is asked for.

(From our Special Correspondent.)

Summit Gold Mining Company.—This company, in Placerville mining district, has six quartz mining claims. Development work on the property to date consists of about 400 ft. of tunnels and shafts. One vein of free gold-bearing quartz of an average thickness of 7 ft. has been opened up a considerable distance. Numerous shafts have been sunk along this vein, and 100 tons of fine ore are now on the dumps waiting to be milled, this having been taken out entirely in driving the tunnels, shafts, etc. No ore has as yet been milled from the fact that the owners are unable to buy the necessary machinery. There is said to be plenty of ore in sight that will average \$15 to the ton. There is an abundance of water and plenty of wood in the vicinity.

#### Coeur d'Alenes.

Tiger Mine.—This mine has 80 men at work and has begun to ship ore. Drifting has been begun on the seventh level.

#### Owyhee County.

De Lamar Mining Company, Limited.—The following is the return for the month of November: Crushed during the month 3,413 tons; bullion produced in the mill, \$77,218; estimated value of ore shipped to smelters, \$10,000; miscellaneous revenue, \$1,080; total revenue, \$88,298; total expenses, \$49,420; profit for the month, \$38,878.

#### ILLINOIS.

##### Bureau County.

Spring Valley Coal Company.—The Attorney-General of Illinois has begun suit against this company to forfeit its charter, on the grounds that it has established a monopoly of the coal business in its district by buying land and preventing others from mining, and that it has engaged in real estate, trading and other operations not authorized by its charter.

##### McLean County.

Seymour Coal Mining Company.—This company has been organized at Bloomington to mine coal. The capital stock is \$10,000. A new shaft is to be sunk at once.

##### Menard County.

Curtis Coal Company.—This company has struck coal on its property near Athens at a depth of 248 ft. The seam is 7 ft. thick and of good quality.

#### INDIANA.

##### Madison County.

Douglas Coal Mine.—Coal has been discovered on the Douglas farm near Elwood at a depth of 30 ft. The shaft is to be extended to ascertain the thickness of the seam.

#### KANSAS.

##### Lyon County.

Emporia Coal and Coke Company.—This company has been incorporated by W. B. Bair, F. M. Boswell, R. J. Roberts and others, to mine coal. The capital stock is \$250,000 and the office is at Emporia.

#### KENTUCKY.

##### Bell County.

Mt. Vincent Coal and Coke Company.—This company has been organized to work the coal mines at Mt. Vincent, which have been operated by J. H. Allen.

#### MASSACHUSETTS.

##### Berkshire County.

Richmond Iron Company.—A dispatch from Pittsfield says that at this company's Shaker ore beds, which had been shut down since August, operations were resumed on December 18th, and many miners obtained work.

#### MICHIGAN.

##### Copper.

Quincy Mining Company.—This company has bought from the St. Mary's Mineral Land Company a square mile, 640 acres, of new territory, adjoining its own and acquired Pewabic property. It embraces the northern half and southwestern quarter of Section 23; also the surface rights of the southeastern quarter of the same section, the mineral rights beneath which are already owned by the Pewabic or Quincy company, also the min-

eral rights in the northwestern quarter of Section 24. The Franklin owns the mineral rights in this last quarter section. The purchase price is \$500,000, payable \$100,000 down, and \$100,000 annually for four years. The Pewabic lode runs through the new property, and perhaps other lodes as well. At the present time, says the "Copper Journal," the mill has five stamps, of which four are in constant use. As soon as arrangements are completed for a larger supply of water the output of the mill can be increased. There are now 850 men employed, of whom 255 are miners and 100 trammers and landers. During the 11 months ending November 30th the product of refined copper was 13,170,701 lbs., being 2,066,083 lbs. more than for the entire year 1892.

##### Iron—Menominee Range.

Aragon Iron Mine.—This mine is now employing about 250 men and is steadily at work.

Penn Iron Mining Company.—This company now has 465 men at work. No further reductions in force are expected.

##### Salt.

The report of the State salt inspector showing the operations of the salt inspection law for the year ending November 30th, 1893, has been made public. The salt-producing territory of the State is divided into eight districts with 109 firms operating 112 salt plants having an annual capacity of 5,425,000 barrels of salt. The total quantity of salt inspected during the year was 3,514,485, a decrease of 297,569 barrels as compared with the previous year. Since the manufacture of salt was begun in Michigan in 1860 there has been produced 64,128,949 barrels. The wholesale price in 1886 was \$1.80 a barrel. It is 45 cents now.

#### MINNESOTA.

##### Iron—Mesaba Range.

(From our Special Correspondent.)

Contractors are figuring on stripping several hundred thousand yards of earth from this company's Iron King and Norman properties at once.

Duluth Iron Mining Company.—This company has given an explorer's option on 280 acres of fee land in 58-19 to A. E. Humphreys and others. They have six months in which to explore and the right to purchase at \$75,000.

Franklin.—This mine has shut down, probably till spring, discharging 250 men. It was the only operating property about Virginia village.

Minnesota Iron Company.—This company has taken an option on 240 acres in 58-16, close to the McKinley, at \$50,000, from the Rouchlean Iron Company. The property is subjected to a 30-cent royalty.

Mountain Iron.—An immense quantity of earth is being moved from the ore body, there being an average surface of 14 ft. Five large steam shovels, 10 locomotives and about 200 freight cars are now in use, and some 500,000 yds. of stripping are expected to be handled before spring. So far frost has not greatly interfered with the work, snow being very deep. In a below-zero temperature the machinery works slow and hard.

##### Iron—Vermilion Range.

(From our Special Correspondent.)

Chandler.—The daily average hoist is 1,500 tons of ore, three shafts working day and night. Between 400 and 500 men are at work.

Minnesota.—The daily average hoist is about 2,000 tons, most of which goes to the crushers.

##### Redwood County.

Redwood Falls Coal Mine.—Water was struck in the shaft recently. The coal is said to be harder and of better quality as the workings advance. An increased force has been put at work.

#### MISSOURI.

Garland Coal Company.—This company has been organized with office in St. Louis, by W. H. Garland, T. L. Garland and H. Murphy. The company will operate coal mines in Missouri.

##### Jasper County.

(From our Special Correspondent.)

##### Joplin, Dec. 18.

Saturday evening closed a fairly active week and showed a large production of ore. The zinc ore buyers were not inclined to take everything offered, but prices remained firm at \$19.50 to \$21 per ton. The lead market was unsettled and prices fluctuated from \$16.75 to \$17.25 per thousand. Producers are holding large stocks of lead ore in their bins for better prices. Following are the sales from the different camps: Joplin, 1,188,160 lbs. of zinc ore and 345,860 lead, value \$17,463; Webb City, 131,070 lbs. of zinc ore and 67,540 lead, value \$2,441; Cartersville, 904,600 lbs. of zinc ore and 225,140 lead, value \$12,817; Zincite, 48,610 lbs. of zinc ore and 18,850 lead, value \$806; Oronogo, 16,910 lbs. of zinc ore and 60,000 lead, value \$203; Galena, Kan., 1,302,000 lbs. of zinc ore and 227,360 lead, value \$14,818; district's total value \$48,648; Granby, 309,000 lbs. of zinc ore and 56,000 lead, value \$3,539; Aurora, 1,184,040 lbs. of zinc ore and 197,040 lead, value \$10,461; lead and zinc belt's total value \$62,648.

MONTANA.

Jefferson County.

Elkhorn Mining Company.—The statement for the month of November is as follows: Mill worked 24 days and crushed 870 tons; bullion produced in the mill, \$22,390; 267 tons of smelting ore sold, \$11,940; total produce, \$34,330; total expenses, \$22,330; estimated profit for the month, \$12,000. During the past quarter the sum of \$5,000 has been charged to revenue on account of the installation of the new pumping machinery. The directors have declared an interim dividend of 1s. per share, being at the rate of 20% for the three months ending November 30th.

Silver Bow County.

American Development and Mining Company.—This company, says the Butte "Inter-Mountain," has made important copper discoveries in its property, near Whitehall, known as the Golden Sunlight group. Manager Bacon says two carloads of ore shipped from there to the Heinze and the Colorado smelters show 20% copper, 25 oz. silver and about \$50 in gold. The company started out with the intention of developing a gold mine, and the recent developments have been unexpected. The copper ore was discovered in a winze and has widened from 1 to 4 ft.

Maiden Rock Mining and Smelting Company.—This company, which was incorporated a few days ago, by John O'Rourke, C. M. Colman, I. M. Jacobs, D. Goldberg, E. W. Kemper and J. F. Beck, says the Anaconda "Standard," has 25 claims, located at the junction of Moose Creek and the Big Hole River, about 26 miles from Butte. The company's scheme is to build a smelter, with improved electric machinery to cost \$150,000, and lay out a townsite with about 400 acres of ground. The assurance is given that work will actively begin as early in the spring as the weather will permit. The company's property consists of the Laclede, Brazilian, Nero, Colman, Speculator, Prospector, Octagon, Gold Quartz, Mahogany, Quartz Hill, Ruby Quartz, Sapphire, Quartz Point, Robert Bruce, Iron Clad, Iron Mountain, Continental, Independence, Red Lane, Blue Wing, Blue Jay, Golden Eagle, St. Jacobs, St. John and Goldbug lodes, and are situated on both sides of Moose Creek and near the Union Pacific Railroad.

Montana Mining Company, Limited.—The monthly report shows that the total output for November was: Gold, 1,520 oz.; and silver, 14,800 oz.; and that the estimated realizable value of the same was \$39,700. The tonnage of ore milled during the month was 5,591 tons, 90 stamps having been in operation. The expenditure was as follows: Working expenses on revenue account, \$29,000; outfit on shafts and developments, \$6,200. Extraneous expenses: Taxes and insurance, \$3,466; legal expenses, \$1,600; on tailing dams, etc., \$100; total, \$11,166; total of all expenses, \$40,366.

NEVADA.

Storey County—Comstock Lode.

Following are the latest weekly official letters from Comstock mining companies:

Consolidated California & Virginia Mining Company.—1,650 level.—The drift running north from the foot of the upraise on the sill floor of this level has now a total length of 165 ft.; face in clay and quartz. The drift running north (at a point 52 ft. down) from the winze sunk from the west cross-cut from the main northwest drift has been extended 9 ft.; total length, 135 ft.; in clay with a little quartz. At a point 8 ft. back from the face of the north drift, a west cross-cut has been advanced 14 ft. in quartz, which is of low assay value. The cross-cut running east from this north drift—at a point 40 ft. north from the winze, has been extended to a total length of 143 ft.; face in clay and porphyry, with some water. In the vicinity of the winze, at a point 20 ft. down, there has been extracted during the week 21 carloads of ore—about 20 tons—the average assay value of which is \$31.60 per ton. The southwest drift (the Rule drift), from the 1,000-ft. station of the Consolidated Virginia shaft, has been advanced during the week 60 ft.; total length 90 ft.; face in soft porphyry and clay.

Hale & Norcross Mining Company.—Main shaft—Have been easing timbers and making some necessary repairs. 1,300 level—We continue stoping out ore from the winze below this level, and extracted during the week 33 cars of ore assaying \$34.87 per ton per car sample, and 19 cars of ore average assay per car sample, \$18.57 per ton.

Kentuck Mining Company.—1,100 level.—The west cross-cut from the south lateral drift has been extended 8 ft. and then stopped. The cross-cut passed through 5 ft. of fair-grade ore and we have started to drift south in the ore. We have also started an upraise from the north cross-cut in ore of fair quality.

Mexican Mining Company.—1,465 level.—The south drift started from the top of the upraise which was carried up 45 ft. from the sill floor of this level—at a point 40 ft. west from the main northwest drift and 100 ft. north from the south line of the mine—has been advanced to a total length of 51 ft.; face in porphyry, clay and quartz of low assay value. Have continued, jointly with the Ophir company, the work of making repairs in the Ophir shaft.

Occidental Mining Company.—The latest weekly official letter says: From the west ledge above

the 400 level we continue to extract about 10 tons of ore per week of the average assay value of \$48 per ton. The west cross-cut, started at a point 75 ft. below the 300 level, is now in 160 ft. and continues in porphyry with seams of quartz. We milled during November 92 tons of ore and slums, and produced bullion valued at \$1,498.

Savage Mining Company.—The latest weekly official letter says: On the 1,100 level we are extracting fair-grade ore from the 11th up to the 21st floors. The north drift from the station on this level is now out 82 ft.; face in quartz and porphyry. The southeast drift on the 1,050 level was advanced 3 ft.; total length, 55 ft.; face in low-grade quartz. During the week we hoisted 291 tons of ore, shipped to the Nevada mill 210 tons and milled 110 tons. Car samples average \$28.07. Battery samples average \$24.43. Bullion yield for the week, \$2,052.13. The mill did not crush any ore on the 5th, 6th, 7th or 8th.

Yellow Jacket Mining Company.—During the week extracted about 100 tons of ore from the raise above the 1,100 level. The average assay value of car samples was \$37 per ton.

(From our Special Correspondent.)

The following is the weekly tabulated statement of the ore hoisted from the Comstock mines, and milled with the average car and battery assays, bullion product, etc.:

Mines.	Ore Hoist'd	Car Sample Assay.	Ore M'ld.	Av. Bat'ry Assay.	Bullion for Week.	Total.
Con. Cal. & Va....	21 <sup>1</sup>	31.60	.....	.....	.....	.....
Hale & Norcross	33 <sup>2</sup>	34.87	.....	.....	.....	.....
	19 <sup>3</sup>	18.57	.....	.....	.....	.....
Savage ...	291	28.07	110	\$24.43	\$2,052.13	.....
Y. Jacket.	100	37	.....	.....	.....	.....

123 Cars.

Consolidated California & Virginia Mining Company.—The repairs to the crankshaft were completed December 15th, and work has been resumed on the 1,000 level. The bins of the dump at the C. & C. shaft contain about 150 tons of accumulated ore. This is being constantly added to by extracting small bunches encountered in the workings below the 1,650 level. The average assay of the ore in the bins will run about \$40, but no shipments will be made until enough has been gathered and enough uncovered in the mine, to make it worth while to start up the Morgan mill. The point where exploration work is now being carried on is close to an extensive area of virgin ground.

Segregated Belcher & Midas Mining Company.—A raise has been started from the 1,100 level, from the south drift, on a small streak of quartz showing rich branches of ore scattered through it. The north drift, from the south raise above the 1,100 level, has its face in vein formation composed of porphyry and quartz and also shows some spots of good ore.

NEW MEXICO.

Grant County.

Baltimore.—This mine, at Gold Hill, now being worked under lease by James Wilson, is showing good results. A vein of \$30 ore is being worked, and Mr. Wilson will put on a larger working force soon.

Brockman.—John Brockman is pushing work on his Lone Mountain property again, says the Silver City "Sentinel." The mine and mill, which were both closed for a time during the summer, are now being operated to their full capacity with good returns. A larger force of men is employed now than for a long time in both the mine and mill.

Gaddis.—This mill, at Gold Hill, is running night and day on ores produced from Mr. Bragaw's mines and on custom ores from other mines in that camp.

Laura.—This mine, at Carlisle, is working again. This mine produces high-grade gold and silver ores. A shipment of 50 tons of ore was made last week. Ten men are now employed.

Texas.—This mine, at Central, is improving as the development work is pushed forward. The main working shaft is down 185 ft. A shipment of high-grade gold and silver-bearing ore was made on November 25th, and a carload was to be shipped to the smelter this week.

Walker Milling Company.—This company, of Pinos Altos, has its new mill ready to start up. The company has about 300 tons of ore ready for treatment.

Santa Fe County.

Santa Fe Copper Company.—This company's property was sold in May last under foreclosure and bought in by a committee representing the bondholders. Since that time nothing has been done, and no arrangements have been made for reorganization, or at least none have been made public.

Socorro County.

Silver Dell.—This mine, at Cooney, under the management of Hitchins & Menzel, is said to be showing up well. A shipment of several tons of high-grade ore was made to the Socorro smelter last week, and in the new tunnel good ore is being developed. The low-grade ore is being treated at the Captain Cooney's mill.

The following items of Mogollon mining news are from the "Southwest Sentinel":

A large stamp mill will be erected in Mogollon next spring. The ore will come from the Eberle and Clifton mines.

Deep Down.—It is expected that this mine will resume operations shortly. Pans and settlers will take the place of the cyanide tanks and fixtures, for the cyanide process has not proved a success with the ores of this camp.

Jennie.—This mine, better known as the Jeanette mine, owned by Dr. Kimball and Mr. Travis, is a prospect, located close to the famous Confidence mine. It shows well in free gold and sulphide. Two shifts are being employed.

Maud S.—The lowest drift on this property is expected shortly to penetrate the large ore chute which is now being stoped in the upper workings. Indications are said to be favorable.

Sheridan Mill.—Repairs are being made on the Sheridan mill, at Cooney. It will at once resume operations, a great amount of ore having accumulated during its enforced idleness.

NORTH CAROLINA.

Mecklenburg County.

(From our Special Correspondent.)

Surface Hill Mine.—It is reported that this mine has been sold to Mr. Tosh and associates, of Baltimore, for the sum of \$10,000. The same rumor, however, puts its output during the last few weeks at \$5,000, with operating expenses of only a few hundred dollars, in which case your correspondent may be permitted to express surprise that its owners have parted for such a small sum with the goose that layed this golden egg.

OHIO.

Columbiana County.

Ohio & Pennsylvania Coal Company.—The miners at Slope Coal mine, operated by this company, struck, on December 20th, against a 15% reduction, and day laborers against 30%. Two hundred men are out.

OREGON.

Baker County.

Bonanza Mine.—On this mine, the property of the Geiser estate, says the Baker City "Democrat," it is the intention to further develop the property by running a new tunnel, 500 ft. in length, to tap the ledge at a depth of 900 ft. During the past 18 months upward of \$75,000 have been expended in development and improvements at the mine.

Grant County.

Taylor Placer Mining Company.—This company has resumed operations, and has cleared off its outstanding obligations.

Morrow County.

Ollie Woodman Mine.—This mine is being worked by L. Durkee, of Baker City, under a bond. A shaft has been sunk 115 ft. and at this depth a cross-cut run 76 ft. on the ledge, which carries free gold.

PENNSYLVANIA.

Anthracite Coal.

Lanceliffe Colliery.—At this colliery, on December 20th, a fall of rock instantly killed three men. They had fired a blast which knocked from its place a prop which sustained the roof. The earth above them, weighing hundreds of tons, fell in on them, crushing them to death.

Oak Hill Colliery.—A large body of water that was imprisoned in an old abandoned colliery which was worked by the Harpers, in Black Valley, near Minersville, 30 years ago, broke into this colliery, one mile northeast of Minersville, December 20th, and three men who were at work in the gangway were drowned. Thirteen other men were at work in the gangway, but they were alarmed in time to escape the flood that poured in a big break in the wall of coal and rock separating the new colliery from the old mine workings. A loud, rumbling noise was first heard by the men. This noise was caused by the water pouring into the workings. Superintendent Gregory and Mine Foreman Lewis hurried to the colliery and went down in a car to the second level, where a number of men were at work, unconscious of the danger over their heads. The alarm was given by Mr. Lewis and the men were hurried to a place of safety. Attempts were then made to rescue the men in the gangway, but without success.

Bituminous Coal.

John C. Martin Coal Company.—This company has been organized to mine coal, the directors being P. F. Campbell, D. H. Hoover and J. C. Martin, of Portage; J. G. Lloyd and M. D. Beaver, of Ebensburg.

SOUTH CAROLINA.

(From our Special Correspondent.)

The Board of Phosphate Control has submitted its annual report upon the season's work; the following extract shows the comparison of the present year's business with that of the preceding one:

	1893.	1892.
Privilege tax collected.....	\$ 50,118	\$ 33,686
Am't of fertilizer sold in the State, tons	200,372	144,385
Number of samples drawn by inspectors	510	386
Number of samples analyzed.....	274	213
Number of samples f'nd below guarantee	50	45
Per c't. of samples f'nd below guarantee	18	21

Nearly \$250,000 royalty was paid to the State during the year. The request of the phosphate companies that the present royalty be lowered to 50 cents per ton for a period of five years has been considered by the Phosphate Commission and refused, though the following reduction is promulgated: During the year 1894, the State must set apart \$75,000 in phosphate royalty as a sinking fund to reduce the new bonds. Until that amount is raised the royalty on the rock mined next year must continue at the rate prevailing at the time the contract with the bondholders was made—\$1.05 per ton on dried rock, and after said amount of \$75,000 has been received all the rock mined during the year 1894 will be free of charge. Should the amount of rock mined next year be less than 75,000 tons, the royalty will remain as heretofore. Should any of the companies drop out of business, the \$75,000 to be raised will be prorated among those companies continuing to mine which notify us of such purpose by January 10th, 1894.

#### Aiken County.

Franklin Kaolin Mine.—This mine, near Aiken, was recently sold under foreclosure of mortgage and bought by D. Lamar, who intends to work the deposits.

#### York County.

(From our Special Correspondent.)

Carolina Reduction Company, Blacksburg.—The present stimulus to the mining activity of the South has caused the promoters of this reduction company to withdraw their proposed plant from the pigeon hole in which it has been reposing for some months. The idea of a smelter, or other reduction plant, centrally located in this district to work custom ores, is an old one and has failed as often as has been tried. Dr. Ricketts will no doubt make the present scheme a technical success, however, and it is therefore watched with more than ordinary interest.

#### SOUTH DAKOTA.

##### Lawrence County.

Black Hills Gold and Silver Extraction Milling and Mining Company.—This company has just completed and put in operation a new plant in Deadwood for the treatment of ores and concentrates by the cyanide process, as claimed under the McArthur-Forrest Company's patents. The officers of the company are: J. S. Childs, president; T. L. Taylor, secretary; J. S. Stevenson, chemist; M. Rossiter mill foreman. The works will be in full operation shortly.

Homestake Mining Company.—This company reports for the year ending October 1st as follows: Balance, October 1st, 1892, \$13,265; receipts from product of mine, \$1,217,991; total, \$1,231,256. The disbursements were: Expenses, \$799,293; 12 dividends, \$150,000; total, \$949,293, leaving a balance of \$281,963. The regular monthly dividend of 10 cents per share has been declared for November, payable on December 22d, at the office of the company, in San Francisco, or at the office of Lounsbery & Co., in New York. The transfer-books closed December 4th.

#### TENNESSEE.

##### Hamilton County.

(From our Special Correspondent.)

Signal Mountain Coal Company.—Mr. T. J. Nicholl, president, states that this company will, on January 1st, begin operations on the building of a railroad from Chattanooga to the summit of Walden's Ridge, or Signal Mountain, as their company desires it to be called. This is a spur of the Cumberland Mountain and is separated therefrom by the narrow Sequatchee Valley, and may be called the southeastern extremity of the Cumberland plateau. It is on the north bank of the Tennessee River and is 4½ miles from Chattanooga, which lies on the south bank. This mountain is about 60 miles in length and from 6 to 10 miles wide. The coal measures are situated in the extreme upper portion of the mountain, the lower known coal seam being 800 ft., and the highest about 1,400 ft. above the river. To tap these coal measures is the object of the company in building the railroad, which will be 14 miles in length from its terminus in Chattanooga to the first coal mine on the top of the mountain and will cost, probably, \$300,000 to \$350,000. The bridge, upon which it will cross the Tennessee River, will be a combined railroad and wagon bridge and will cost about \$300,000. Capitalists of Manchester, England, are furnishing money for this enterprise.

##### Polk County.

Ducktown Sulphur, Copper and Iron Company.—This company has its works at Ducktown now in full operation, and intends to run continuously.

#### UTAH.

##### Salt Lake County.

The shipments of ore and bullion from Salt Lake City for the week ending December 9th were 905,715 lbs. of bullion and 2,158,508 lbs. of silver and lead ores.

The receipts of ore and bullion at Salt Lake City for the week ending December 13th were to the aggregate value of \$229,617, of which \$156,817 was in bullion and \$72,800 was in ore. The receipts of Mingo bullion during the week were \$36,180; Hanauer bullion, \$12,400; base bullion, \$28,000; sulphides, \$41,244; Daly sulphides, \$10,000; bullion, \$993; Mercur sulphides, \$28,000.

Salt Lake Copper Company.—The orehouse and the crusher building at this company's plant have

been completed. There are 10 cars of iron construction work now on the way from Minneapolis to Salt Lake. Manager Cobb, of the Copperopolis mine, owned by the company, stated to the Salt Lake "Tribune" that all the new machinery for that property had arrived at the camp and was being put in rapidly.

##### Summit County.

Home Coal Company.—The suit of Thomas Wilde vs. this company was called on before Chief Justice Zane, at Salt Lake City, on December 4th, but it went over for the term at plaintiff's cost, and 10 days were allowed the defendants to amend their answer. The suit is brought to recover \$11,000 damages. Plaintiff is the owner of a tract of land—about 40 acres—at Coalville, and he alleges that on July 20th, 1890, and subsequently, the defendants caused a large quantity of water to flow thereon. About four acres were covered with coal slack and rock, and deep gullies and ravines were cut through other portions, thereby destroying the grass, hay and grain, and rendering the land itself utterly valueless. It is claimed that bridges and other property belonging to Mr. Wilde have been likewise washed away. The defense is a complete denial of the allegations contained in the complaint.

##### Tooele County.

(From our Special Correspondent.)

The following items of Camp Floyd mining news are from the local papers:

Lying north and northwest of the Golden Gate group and partly adjacent thereto, lies the Grand Central, Tough Knot, Arctic and Bellevue, owned by Sam Jones, Joseph Herman and William Williams, and the Gray Bull Nos. 1 and 2, owned by John Dix and Grish Sanders. These two groups, which, on account of their location with regard to the producing mines of the camp, as well as on account of their surface showing, are regarded as valuable properties, were bonded last week to Robert Skinner, James T. McHugh, Amos Mosier and J. E. Williams, the former group for \$12,000 and the latter for \$5,000. The bond in each case runs for one year. The parties will commence work at once and continue all winter.

Glencoe Mining Company.—This company continues to operate quite a force of men on contract work.

Golden Gate.—The north shaft of the Golden Gate group is down about 218 ft. and is now going through rock running \$2 or \$3 in gold, and identical in character with that which capped the ore body in the south shaft.

Marion.—At this property a night shift has been put on, and the mill is running to its full capacity.

Mercur Mining Company.—This company has been running the usual force, and the mill is treating from 60 to 75 tons of the product daily. A shipment of sulphides valued at \$28,000 in gold from this mine was received at Salt Lake City on December 11th.

(From our Special Correspondent.)

Maj. A. V. Bohn, one of the best known mining men in the camp, has just returned from the new gold district, about 50 miles from Salt Lake City, Utah, known as Camp Floyd, and speaks in flattering terms of the outlook there. There is considerable prospecting going forward, but there is only one large property in the camp as yet—the Mercur mine.

#### WYOMING.

##### Fremont County.

Miner's Delight.—This mine, near Lander, says the Laramie "Boomerang," was recently sold at sheriff's sale to satisfy a claim of \$28,500, and was bid in by the mortgagee. It is understood that the syndicate which will secure control of the property by this transaction intends to make extensive improvements thereon. The Miner's Delight lode is one of the most noted of all the gold-bearing properties in the South Pass country. When it was first opened it was a great producer. Over \$200,000 has been taken out of the mine.

##### Laramie County.

Oronogo Mining Company.—This company's working tunnel is now in 300 ft. and is being extended steadily, the object being to strike the vein opened up by the shaft sunk early in the year. The company intends to try the Fauvel process for working its pyritic ores.

#### FOREIGN MINING NEWS.

##### QUEENSLAND.

The output of gold for the nine months ending September 30th was 448,482 oz., an increase of 6,343 oz. over the corresponding period last year. The yield for the quarter ending September 30th was 148,079 oz. The principal producing mines reported for the quarter as follows: Charters Towers, 61,141 oz.; Rock Hampton, 29,317 oz.; Gympie, 24,566 oz.; Croydon, 18,443 oz.

##### REPUBLIC OF COLOMBIA.

Colombian Hydraulic Mining Company.—The superintendent reports under date of October 14th that he has sunk two prospecting shafts to look for the rich streak farther down the channel, and has struck very fair gravel. Four shafts have proved drifting ground for six months at a profit of \$1,000, but this cannot be worked when the

monitors are working, so he is contracting to sink more shafts in order to get gravel out quicker. On October 19th he shipped two bars of gold, weighing 364.1 oz. troy. This gold is the result of about 120 ft. of sluice, and \$3,063 bought gold (bought at \$2,478.40 Colombian dollars). There are yet 545 ft. of sluice to take up. Drifting ground is rather patchy; but two new shafts are being sunk. If these strike anything that will pay to drift, the management will sink farther.

Tolima Mining Company, Limited.—The superintendent, writing under date of October 18th, reports further developments in the 780-ft. west winze, of a satisfactory kind. He says: At the present date the lode continues 9 ft. wide, giving branches of rich mineral, and although the yield fluctuates day by day, a very fair average has been maintained. And referring to the 780-ft. level, he adds: The west end has slightly improved in yield since Captain Stephens' report, but both this and the 780-ft. east end continue unsettled. Further, speaking of the 720 east level cross-cut north, the superintendent says: We have struck a very promising branch of mineral, showing rich specimens of silver; in reference to the 540-ft. level east end, he reports: This end continues to improve, and we have every hope of opening out good mineral at this point. I consider our prospects in the east very bright from the appearance of the lode both in this level and the 600-ft. east end. The returns for September were 225 tons, valued at \$64,145; cost, \$28,930; profit, \$35,215.

#### COAL TRADE REVIEW.

NEW YORK, Friday Evening, Dec. 22.  
Statement of shipments of anthracite coal (approximated) for week ending December 16th, 1893, compared with the corresponding period last year:

	1893.	1892.	Difference.
	Tons.	Tons.	
Wyoming region .....	471,711	436,515	Inc. 18,166
Lehigh region .....	125,653	145,074	Dec. 19,421
Schuylkill region .....	287,643	274,976	Inc. 12,667
Totals .....	885,007	876,565	Inc. 11,412

Total for year to date, 41,465,381 40,847,128 Inc. 1,127,936

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs. for week ending December 16th, and year from January 1st:

	1893.		1892.	
	Week.	Year.	Week.	Year.
Shipped East and North:				
Phila. & Erie R. R. ....	568	75,514	623	92,812
Cumberland, Md. ....	75,293	4,013,692	3,696,000	
Barclay, Pa. ....	428	43,218	65,123	
Broad Top, Pa. ....	12,854	533,870	625,904	
Clearfield, Pa. ....	81,019	3,695,833	3,869,754	
Allegheny, Pa. ....	32,324	1,221,075	1,240,186	
Beech Creek, Pa. ....	41,784	2,619,998	2,155,200	
Pocahontas Flat Top. ....	53,721	2,714,126	2,577,277	
Kanawha, W. Va. ....	57,264	3,132,408	2,611,503	
Totals .....	355,680	18,467,734	26,936,719	

	1893.		1892.	
	Week.	Year.	Week.	Year.
Shipped West:				
Pittsburg, Pa. ....	29,614	1,183,715	1,225,379	
Westmoreland, Pa. ....	39,869	1,761,409	1,730,162	
Monongahela, Pa. ....	11,784	676,373	647,131	
Totals .....	81,267	3,621,497	3,602,672	

Grand totals .....

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending December 16th, 1893, and year from January 1st, in tons of 2,000 lbs.: Week, 58,903 tons; year, 3,764,008 tons; to corresponding date in 1892, 5,224,701 tons.

##### Anthracite.

Strictly speaking, no new feature has developed in the anthracite coal trade during the week under review. The market is dull and characterized by the usual flatness of the holiday period. The general depression of business is being felt in the coal trade just now more than for some time past.

A reduction in prices was made openly this week by the Lehigh & Wilkes-Barre Coal Company, amounting to 10c. in broken and stove, and 15c. in egg and chestnut. The company was impelled to do this in order to meet competition. It is said that a reduction of 10c., previously made by the Delaware & Hudson, had much to do with the action of the former company. It is well known, however, that for some time past certain individual operators have "shading" prices, and coal has been sold at figures even below the new ones named by the Lehigh & Wilkes-Barre Coal Company. While it is claimed that the latter company's new move has not disturbed the market to any appreciable extent, it stands to reason that it is by no means calculated to inspire much confidence as to the stability of the market in the near future. From a responsible source we learn that during the past two or three days there has developed among dealers hereabouts a still firmer determination to buy only when absolutely forced to do so, and this feeling is attributed to the recent cut.

The question which is now giving producers the greatest concern is the output. While there is no concerted effort in the matter of restriction, companies and individual operators alike recognize the necessity of a judicious curtailment, and are taking steps to bring about a decreased reduction by mining only what they can sell. This week many collieries will be idle one or two days. More coal is being mined than can be disposed of and accumulation of stocks in producers' hands is not conducive to firmness in prices. The only sizes which are scarce are pea and buckwheat, and they are very scarce, indeed. Other sizes are in abundant supply.



The Reading official circular rates, subject to the usual commissions, are as follows, f. o. b. at its New York harbor shipping ports:

	Broken.	Egg.	Stove.	Chestnut.
Hard white ash.....	\$4.00	\$4.25	\$4.60	\$4.60
Free white ash.....	3.90	4.15	4.60	4.60
Shamokin.....	4.50	4.80	4.60	4.60
Schuylkill red ash.....	4.50	4.95	4.75	4.75
Schuylkill Valley.....	5.15	5.80	6.25	5.50

Pea, \$2.75@3; No. 1 Buckwheat, \$2@2.25; No. 2 Buckwheat, \$1.75@2.

A meeting of the sales agents was held in this city to-day. It was not anticipated that any change whatever would be made in the schedule of prices, but rather that the matter of a restriction in the output would come up for discussion. The meeting was largely attended and it was decided to restrict the output for January to 2,500,000 tons. This shows the condition of the trade. Prices were left unchanged; that is, restored to full circular rates. Another meeting will be held next Friday.

NOTES OF THE WEEK.

The Bureau of Anthracite Coal Statistics issues the following statement of shipments of anthracite coal for November and the 11 months ending November 30th, compiled from the returns furnished by the mine operators:

	November, 1893.		Eleven months, 1893.		1892.	
Wyoming region..	2,122,517	1,943,993	21,970,238	20,908,584		
Lehigh region.....	591,781	613,613	6,370,593	5,837,305		
Schuylkill region..	1,188,189	1,212,105	11,312,300	11,551,350		

Total ..... 3,902,487 3,769,711 39,653,131 38,297,239  
 For November the total increase was 135,776 tons, or 3.6%; for the 11 months it was 1,355,892 tons, or 6.8%. The Wyoming region showing an increase of 5.1% and the Lehigh of 9.1%, while the Schuylkill had a decrease of 2.1%.

The stock of coal on hand at tidewater shipping points November 30th was 721,164 tons; on October 31st it was 725,566 tons, showing a decrease of 4,402 tons, or 0.6%, during the month.

Bituminous.

The bituminous coal trade is in precisely the same listless condition which we have been reporting for some time past. Orders are scarce, even with the best of the companies, and shipments are made only to meet immediate requirements. The trade is in a poor condition even for this time of the year when the more or less severe weather, to a certain extent, prevents shipments. The outlook for a good trade in the near future is not encouraging. Business in this line will not be good until the beginning of the contract season in March. Most of the coal producers are looking over their balance sheets for the year rather than looking for trade.

For the past two or three weeks all the trade that has been done is from points this side of Cape Cod and from Southern ports. Some effort, as before stated in this column, has been made by producers in the various regions supplying this market to capture some of the Western trade. Thus far, all efforts in this direction have been fruitless, being unable successfully to compete with the coals now on those fields.

The all-rail trade is feeling the general depression of business and is not in the condition in which we have lately been able to report it. Cars in good supply from the various main line roads. Transportation has been slow during the week, but sufficient to meet the requirements of such trade as there is.

Vessels are in good supply, there being but little demand for them. They are gradually going into winter quarters. A few orders have been taken during the week for Southern ports, but this trade will shortly be used up.

We quote ocean freight rates as follows from Philadelphia: To Boston, Salem and Wareham, \$1; Providence, New Bedford, New Haven, Bridgeport and Allyn's Point, 90c.; Portland, \$1@1.05; Portsmouth, \$1.05; Lynn, \$1.10@1.25; Newburyport, \$1.15; Bath, \$1.05@1.10. From Baltimore, Newport News and Norfolk rates are 10c. higher. To the following Southern ports rates from Philadelphia are: Jacksonville, \$1.25; Savannah, Fernandina and Port Royal, \$1.

NOTES OF THE WEEK.

A press dispatch from Roanoke, Va., states that the coal operators of the Flat-Top region held a convention in Roanoke last week, about 40 companies being represented. The meeting was presided over by Vice-President Bullitt, of the Norfolk & Western Railroad, and formerly president of the Pocahontas Coal Company. Castner & Curran, of Philadelphia, the general Eastern agents of the Flat-Top output, made complaint that the companies were furnishing too much slack, and stated that more lump coal must be shipped. A committee of five, consisting of John Cooper, J. J. Tierney, Frank A. Hill, W. H. McQuail and William Spencer, was appointed to go into mines and examine the process of mining. Coal containing too much slack will be condemned and not sent to the places where it comes in contact with other coal. The trade interests of the business were discussed. At the night session of the Coal Operators' Association resolutions were adopted protesting against the passage by Congress of the Wilson bill, about to be reported by the Ways and Means Committee, and that the operators and miners of 36 mines would earnestly represent that such action would

be ruinous to the interests of that section and that the representatives from Virginia and West Virginia use all legitimate means looking toward the defeat of the bill. These resolutions are signed by John Cooper, chairman, and Frank P. Harman, secretary. It is estimated that the capital represented by the different companies at the meeting will aggregate \$50,000,000.

Boston. Dec. 22.

(From our Special Correspondent.)

Business has been very quiet here this week. The retail dealers have light stocks and prefer to let the railroads carry the coal as they have for months past. The trade here is awaiting with interest the action of the sales agents to-morrow. No change in prices is looked for. The companies are maintaining prices in this market and outside operators are cutting to about the same extent as last noted.

The only business doing in soft coal is in the delivery on old contracts and just now there is considerably doing as the mills want a good winter stock. The prices quoted on soft coals here are: Cumberland, \$3.85; New River and Pocahontas, \$3.85; Clearfield, \$3.50@3.55.

Freight rates are maintained at 75c. from New York; \$1 from Norfolk, Newport News and Philadelphia; \$1.10 from Baltimore.

Retailers are doing very little; the weather is mild and consumers have apparently enough for their present needs. Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.75; Lehigh egg, \$6.25; Lehigh furnace, \$6; soft coal, \$4.25.

The receipts of coal at the port of Boston for the week ending December 16th were: 32,483 tons of anthracite and 7,347 tons of bituminous, against 41,623 tons of anthracite and 7,960 tons of bituminous for the corresponding week last year. Since January 1st the receipts have been 2,125,371 tons of anthracite and 1,052,730 tons of bituminous, against 2,027,843 tons of anthracite and 827,493 tons of bituminous for the corresponding time last year. Receipts from the Provinces thus far this year have been 13,260 tons bituminous.

Buffalo. Dec. 21.

(From our Special Correspondent.)

The cheering feature presented to the coal dealer for some days was the weather, which has been, and is, decidedly wintry, causing quite a brisk local and near by points demand for anthracite. Bituminous coal remains quiet at nominally unchanged quotations. Many factories are now only running on short time and several have closed up for a few weeks, so that consumption is quite limited. Business generally in the holiday lines is good, but otherwise there is but little doing. Money is easy at the banks, but the demand for it is light.

The anthracite coal dealers have little to say relative to the future. After New Years they may be more communicative on business matters.

Messrs. E. L. Hedstrom & Co., of this city, are contemplating the enlargement of their docks, at south Chicago, at an early day; presumably before the opening of navigation in 1894.

The receipts of coal at Milwaukee for the season of navigation 1893, aggregated 1,122,222 net tons, viz.: 754,251 tons anthracite and 367,981 tons bituminous; in 1892, 1,183,119 net tons, viz.: 862,696 tons anthracite and 320,423 tons bituminous.

Chicago. Dec. 20.

(From our Special Correspondent.)

Coal dealers all agree that the present situation in their line is the most disagreeable one that they have seen in many years. There has been any amount of frigid weather throughout the West and Northwest, but that fact has not helped the coal market to any perceptible degree. The extreme dullness is occasioned by the factories either being closed or those that remain open-running on a greatly reduced capacity. The amount of anthracite coal received at Chicago by vessel and rail for the 11 months ending with November 30th amounted to 1,890,000 tons, a falling off of nearly 50,000 tons over the same period last year. The Chicago Coal Trade Commercial Agency is particularly active now investigating the many cases where complaints have been made relative to short weight, and likewise those who do not pay their coal bills. This association is composed of coal dealers in Chicago and vicinity, and is organized to afford protection to them from fraud, etc.

Prices are: Lehigh lump, \$6.25; large egg, \$5.85; small egg, range or chestnut, \$6.10. Retail prices per ton are: Large egg, \$6.75; small egg, range or chestnut, \$7@7.25.

Bituminous tonnage amounts to about the same as previous week, but that is very far from the average of a good year. The same conditions affect sales as characterize anthracite, viz.: The many factories closed. Cuts continue to be made, and prices are thereby very unsteady. Quotations for bituminous coal per ton of 2,000 lbs. f. o. b. Chicago, are: Youghiogheny, \$3.40; Pittsburg, \$3.35; Hocking Valley, \$3.10; Brazil block, \$2.70; Illinois and Indiana lump, \$2.

Coke shows but slight improvement, and prices are quite low. Quotations are: Connellsville foundry, \$4.20; crushed, \$4.35; New River foundry, \$4.30; Walston furnace, \$4.10; foundry, \$4.25.

Pittsburg. Dec. 21.

(From our Special Correspondent.)

Coal.—The long-expected and highly welcome canalboat stage of water has arrived, making plenty

of water for the largest boats to take out big tows; in fact, they left with all they wanted. The fleet for Cincinnati consisted of 20 steamers, 32 coalboats, 231 barges, with 3,509,000 bushels of coal. For Louisville, 42 steamers, 319 coalboats, 153 barges, 10 fuels, containing 10,123,000 bushels of coal. At Louisville the tows have been arranged; the big towboats are now on the way to New Orleans and other points. The amount reaches 12,632,000 bushels; this and the November run will supply the lower markets with coal for the next six months. In the face of these facts the miners are asking an advance, which the coal men have refused as they have all the coal they want for some time. It is to be hoped that wise councils will prevail and that the men will make the best terms they can and go to work, as there is great distress in this part of the country, with thousands of men willing and anxious to work for \$1 a day and some for their board.

Connellsville Coke.—The improvement in the coke shipments noted last week continues, together with the firing up of a number of idle ovens. The McClure Coke Company has fired up 65 more ovens; Rainey, 54; Cochran, Sons & Co., 200; others are making ready to put more in operation. The Derry Coal and Coke Company will close down their works indefinitely in a few days; a lack of orders has necessitated this move; about 100 men will be thrown out of employment. The total number of ovens in blast is 8,574, leaving 8,947 idle; 28 plants with 5,220 ovens ran 6 days; 16 plants with 3,006 ovens ran 5 days, and the remaining plants ran 4 days. The McClure Coke Company ran 6 days all-round at its active plants, and so did the Rainey plants. The week's shipments were 82,188 tons, distributed as follows: To Pittsburg, 1,700 cars; to points East, 1,086 cars; to points West, 1,780 cars; total, 4,566 cars. Western shipments increased 430 cars; Eastern shipments decreased 14 cars and Pittsburg shipments increased 60 cars, a net increase of 476 cars. The nominal rates at the furnace are: Furnace coke, \$1.10@1.20; foundry, \$1.45; crushed, \$1.75 per ton of 2,000 lbs. f. o. b. at ovens; freights to Pittsburg, 70c. per ton

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Dec. 22, 1893.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending				From Jan., '92	From Jan., '93.
	Dec. 24, 1892.	Dec. 23, 1893.	F'ces.	Tons.		
Anthracite.....	71	33,740	33	16,665	1,650,316	1,365,436
Coke.....	137	132,649	73	77,511	6,753,356	6,344,681
Charcoal.....	43	9,703	24	4,340	521,371	382,886
Totals.....	251	175,693	130	98,716	8,965,043	8,093,003

Pig Iron.—The condition of the pig iron market is absolutely without change from last week. The dullness incident to the close of the year in almost all lines of business just now affects the iron trade, and therefore there has been but little doing. Within two months the market should be very nearly in a normal condition, so far as production and consumption go. Throughout the country everything in the iron trade continues about as we have been reporting it for several weeks. The production of pig shows an increase over last month and prices are not weaker or lower.

The only interesting item which was discussed in the local trade was the failure of the Crane Iron Company, a full account of which will be found below.

The tidewater prices of the Thomas Iron Company are as follows: No. 1, \$14.50 per ton; No. 2, \$13.50; No. 3 or No. 2 plain, \$12.75. For regular brands we quote as follows: Northern brands: No. 1, \$13.75@14.25; No. 2, \$12.50; gray forge, \$12. For Southern iron we quote: No. 1, \$13@13.75; No. 2 F, \$12@12.50; No. 1 soft F, \$12@13; gray forge, \$11@12—all at tidewater. Scotch irons are quoted: Coltness, \$21.50@22; Eglington, \$19.50@20; Summerlee, \$21.50@21.

Billets and Rods.—There have been no transactions of any consequence in this market. Advances from other places would indicate that prices continue weak and more or less unsettled. Quotations are nominally as follows: Domestic billets, \$19@20; foreign billets, \$28@30, tidewater. Wire rods, domestic, \$28@29; foreign, \$39@40, tidewater.

Manufactured Iron and Steel.—Some sales are reported none of which was very large. The market here continues dull. Prices are low and we quote nominally as follows: Angles, 1'60@1'80c.; axles, scrap, 1'75@2c. delivered; steel, 1'75@2c.; bars, common, 1'40@1'50c.; refined, 1'50@1'85c. on dock; beams, up to 15 in., 1'70@2c.; 20 in., 1'90@2'25c.; car truck channels, 2@2'10c.; channels, 1'70@2c. on dock; steel hoops, 1'75@1'9c. delivered; links and pins, 1'70@1'80c.; plates, flange, 2@2'10c.; firebox, 2'3@2'8c.; flange, 2'10@2'25c.; marine, 2'50@2'75c.; sheared, 1'81c.; shell, 1'65@1'95c.; tank, 1'50@1'70c.; universal mill, 1'50@1'75c.; tees, 1'85@2c., all on dock.

Merchant Steel.—There is no change to report of the merchant steel market. It continues quiet with prices unchanged. We quote: Tool steel, \$6.25@6.50; tire steel, \$1.90@2; toe calk, \$2.10@2.20; Bessemer machinery, \$2@2.10; open hearth machinery, \$2.10@2.20; open hearth carriage spring, \$2@2.10; crucible spring, \$2@2.10.

**Old Material.**—No business is reported in this market. Nominal quotations are as follows: Old iron rails, \$12@13; No. 1 wrought scrap at \$9.50@10, both delivered to vessels at this port. Other quotations are as follows: Old steel rails, \$8@10; old wrought tubes and pipe, \$7.50@8.50; wrought turnings at \$9@9.25 delivered at mill.

**Rail Fastenings.**—This market continues very quiet. Quotations are nominally: Fish and angle plates, 1-30@1-50c. at mill; spikes, 1-75@1-90c.; bolts and square nuts, 2-15@2-40c.; hexagonal nuts, 2-30@2-50c., delivered.

**Steel Rails.**—The price for steel rails is \$24.80 at tidewater. The Lackawanna Iron & Steel Company has started its South mill on double turn. This, we suppose, is the outcome of the reduction in prices, in bringing about which it is now known that this company had much to do.

**Spiegeleisen and Ferromanganese.**—No business worthy of mention is doing in either spiegel or ferro. We quote nominally: Spiegeleisen, 10@12%-\$21@22; 20%, \$25@26. Ferromanganese, \$55@56.

**NOTES OF THE WEEK.**

The Crane Iron Company, of Catsauqua, Pa., went into the hands of a receiver on December 15th. The company was incorporated in 1839 and has an authorized capital of \$2,000,000, of which \$1,500,000 is paid up. At present, besides the \$448,000 outstanding 6% bonds, there is \$460,000 in bonds in the company's treasury, which have been bought up by them and hypothecated for call loans, thus bringing up the total bonded indebtedness to more than \$900,000. President Hazard made a statement in which he says that the failure of the company is due primarily to bad debts. He says: Among its principal debtors are the Pottstown Iron Company, the Pennsylvania and Maryland Steel companies, the Oliver Iron and Steel Company and the Wellman Iron and Steel Company. The losses sustained by the failure of these companies were not merely serious in themselves, but affected the credit of the company so as to seriously cripple its operations. There had also been, during the last two or three years, a steady decline in the value of iron and materials on hand. In former years the furnaces of the Lehigh Valley were able to get much cheaper ores than those of Pittsburgh and vicinity, and this in some measure compensated for the dearer fuel which they were obliged to use; but in the last two or three years the ores tributary to the lakes have been so much lower that they have really been the cheapest sources of supply for the Lehigh and Schuylkill valleys. In this way the Western markets have been cut off, owing to the very low freight rates made from Alabama and Virginia, the New England and New York markets have been largely taken by the iron made in that section of the country.

The company's plant at Catsauqua is in good condition and one of the most valuable in the Lehigh Valley. It is claimed that it could not be duplicated for \$100,000, but at the present time it cannot be run at a profit. It consists of four blast furnaces erected during the period from 1839 to 1846, and since remodeled from time to time. In addition to its own furnaces, the company leased the Macungie Furnace, at a rental of \$5,375 a year, making the capacity 133,000 tons annual output. The entire plant was renovated in 1891 and completely modernized. The products of the works have been high-grade, foundry, open-hearth and Bessemer pig iron. Besides its furnace plant, the company owns a large railroad equipment, including the railroad, with two bridges across the Lehigh, connecting Catsauqua with the Lehigh Valley Railroad and the Catsauqua & Fogelsville Railroad; also the water-works which supply the town of Catsauqua, valuable water power and large amounts of mineral property in New Jersey and different parts of Pennsylvania. A dispatch from Allentown says the only incumbrance against property of the company in Lehigh County is a mortgage for \$1,000,000, given on May 1st, 1876, to the Provident Life and Trust Company, of Philadelphia, in trust for the bondholders.

**Buffalo.** Dec. 20.

(Special Report of Rogers, Brown & Co.)  
The holiday dullness has thoroughly settled down upon the pig iron business. There is very little iron selling, and as it is not the period for contracting to cover future wants, the sales are all for early consumption. Prices are firm, however, chiefly because there is no margin for reductions. Sellers prefer to keep their iron rather than to sell at anything less than the prevailing figures. We quote below on the cash basis f. o. b. cars Buffalo: No. 1 X foundry strong coke iron, Lake Superior ore, \$13.25; No. 2 X foundry strong coke iron, Lake Superior ore, \$12.75; Ohio strong softener No. 1, \$13.25; Ohio strong softener No. 2, \$12.75; Jackson County silvery No. 1, \$16.80@17.30; Jackson County silvery No. 2, \$16.30@16.80; Lake Superior charcoal, \$15.75; Tennessee charcoal, \$15.75; Southern soft No. 1, \$12.75; Alabama car wheel, \$16.50@17.50; Hanging Rock charcoal, \$18.50@20.

**Chicago.** Dec. 20.

(From our Special Correspondent.)  
But little interest has characterized the market here during the past week. What little buying that has been done is mostly of very small lots. It is not likely that consumers will begin to stock up to any extent much before the middle of January. There has never been known a period before where the stocks in buyers' hands are as large as at the present

time. All are now looking forward with rising expectations for the new year. The Chicago & Minnesota Company, which recently bought the Iron King Mine on the Mesaba, will at once put a large force of men to work developing the property.

**Pig Iron.**—The pig iron market has shown quite a little improvement over the previous week. The tonnage for round lots for delivery through the early part of next year have been quite numerous, and some business has been consummated. The tonnage on the whole has improved a considerable over previous week. Quotations per gross ton f. o. b. Chicago are: Southern coke, foundry, No. 1, \$13.65; No. 2, \$12.15; No. 3, \$11.65. Southern coke, foundry, soft, No. 1, \$12.40; No. 2, \$11.65; Lake Superior charcoal, \$15.50@16.00. Lake Superior coke No. 1, \$13.50; No. 2, \$12.25@12.50; No. 3, \$12.00@12.25. Lake Superior Bessemer, \$14; Lake Superior Scotch, \$13.75@14.25; American Scotch, \$15.50@16. Ohio silveries No. 1, \$16.50; No. 2, \$16. Ohio strong softeners No. 1, \$16.25; No. 2, \$15.75; Tennessee charcoal No. 1, \$16.50; No. 2, \$16. Standard Southern car wheel, \$18.25@18.75.

**Structural Iron and Steel.**—It is understood that a large brewery and apartment house are in the market here for beams and other shapes. Outside of town a few large buildings in Northwest cities are being projected. Quotations are as follows. Chicago delivery: Angles, 1-70@1-80c.; tees, 1-95@2-00c.; universal plates, 1-70@1-80c.; sheared plates, 1-70@1-80c.; beams and channels, 1-75@1-85c.

**Plates.**—Sales from stock continue light. In mill business there is nothing doing of note. Prices are: Flange steel, 2-30@2-50c.; best firebox steel, 4-00@4-50c.; tank steel, 1-70@1-80c.; shell steel, 2-15@2-35c.; iron or steel sheets from No. 10 to 14, 2-10@2-25c.

**Merchant Steel.**—There has been some slight improvement in orders from manufacturers in placing specifications for winter work. Smaller orders are a trifle more numerous. Quotations are: Smooth finished machinery steel, 2-10@2-30c.; open hearth tire steel, 1-90@2-10c.; ordinary Bessemer bars, 1-65@1-75c.; toe calks, 2-20@2-30c.; ordinary tool steel, 6-50@7-00c.; special brand tool steel, 12@20c.; crucible spring, 3-50@3-75c.

**Galvanized Sheet Iron.**—The market for galvanized iron remains in its torpid state, and prices are having a tendency to decline. The general quotation on Juniata is 70, 10 and 5% off for mill shipments. Jobbing quantities are selling at 70 and 10%.

**Black Sheet Iron.**—No improvement whatever is to be seen in this market the past week. Even small orders are a rarity, and ridiculously low prices are being quoted, but withal buyers are few. Prices are for small lots from stock: Nos. 24, 25 and 26, 2-85c., and No. 27 common, 3-00c. Same gauges and steel sheets are 3-10@3-20c. less 10c. per 100 lbs. for large lots.

**Bar Iron.**—A better feeling seems to pervade the market, although trade is yet very dull. A firm here tested the market on Ohio strong softeners, and they report a fair inquiry on 100-ton lots and upward, which looks as though customers were beginning to realize that we are now going through as low prices as will be seen in this present depression or any other for years to come. About all the business that is now being done is specifications on contracts made some time previous. Demand for small lots from stock is not above last week, but nominal prices prevail at 1-60@1-70c. for bar iron and 1-65@1-75c. for soft steel bars. Mill prices are f. o. b. Chicago, 1-40@1-45c.

**Billets.**—Nothing new to record, nothing of any account doing. Quotations are \$19.25@19.50 Joliet. No call for rods.

**Steel Rails.**—The aggregate of small lots is a trifle more than usual, but business remains exceedingly dull at \$25@27.

**Scrap.**—Business in scrap shows no signs of improvement. A little better inquiry for mill scrap is noted. Prices are: Railroad, \$10.75; No. 1 forge, \$10; cast borings, \$4.50; wrought turnings, \$6.50; axle turnings, \$8; leaf steel, \$14.50; mixed steel, \$7; tires, \$12.50; iron axles, \$14.50@15.50.

**Nails.**—Orders continue small for either steel cut or wire nails, such orders being mainly for quick shipment. Jobbing prices are: Cut nails, per keg, \$1.25@1.30, and for wire nails \$1.35@1.45.

**Old Rails and Wheels.**—Old iron rails are a trifle weaker. There is hardly any movement in old steel rails. Quotations are: Old steel rails, \$7.50@10; old iron rails, \$12. Old car wheels are quiet, \$11 being offered for quantities.

**Philadelphia.** Dec. 22.

(From our Special Correspondent.)

**Pig Iron.**—The only fact connected with the pig-iron market worth noting is that several large lots of iron have been sold but have not changed hands. The transactions are said to be of a speculative character. Shaded quotations in Western Pennsylvania have not been followed by lower prices here and our brokers say they will not quote any lower than they are quoting. No. 1 F is offered at \$13.75@14; No. 2, \$13; forge, \$11.25@12.

**Muck Bars.**—There is no business, though orders are expected for January for certain quality of bar.

**Steel Billets.**—The willingness to take \$19 has not resulted in any large orders, owing to a sudden drop telegraphed by certain Western makers. Small lots are taken at \$19.50@20.

**Merchant Iron.**—The stoppage of mills next week and probably week after will be quite general. It would be well if the suspension continued a month. Scarcely any business is done, but people who use iron have very little to work on. Prices 1-40@1-55.

**Nails.**—Manufacturers are making no further effort to reduce stocks at factories as competition in car lots has left no margin.

**Skelp.**—Active canvassing for January business has been going on with unsatisfactory results. Business would be taken at 1-40.

**Sheet Iron.**—The suspension of Eastern sheet mills might profitably continue a month from present indications. Stocks are ample for all demands. Card rates are scarcely to be quoted.

**Merchant Steel.**—Several small buyers of merchant steel were canvassed up this week, but no sales were made. Prospects for quite a good business in this line are favorable.

**Plate and Tank.**—If everything goes right there will be a fair run of boiler plate orders next month. Stocks are exhausted among all consumers, so that manufacturers are anticipating a good business as soon as the clouds roll by. Tank steel is 1-50; shell, 1-60; flange, 1-90.

**Structural Iron.**—The only business our people know of is small orders for buildings. Manufacturers have the assurance that considerable new business will be placed next month.

**Steel Rails.**—The local concerns give a poor account of trade. Intimations have been given, however, that in view of the possibility of better conditions after February 1st fair sized orders will probably be placed.

**Old Rails.**—In the absence of sales, quotations cannot be given, but perhaps \$12.50@13 is near it.

**Pittsburg.** Dec. 21.

(From our Special Correspondent.)

**Raw Iron and Steel.**—There is very little change to note as regards prices or demand; prices for certain descriptions are still on the down grade. Trade generally, is at a stand-still with no prospect of an improvement, at least during the present year. There must be a change; it is out of the question to suppose that matters can continue in the present situation much longer. The conditions of light demand, weak and irregular prices, and close competition for what little business appear, continue as the dominating features in the market, with the outlook for the immediate future far from encouraging to the producers of crude and finished products. Prices are very low at present, lower than ever before in many lines. Costs of manufacture are also much lower than they have been in their part, but the margin is uncomfortably small on nearly every product. The trade is almost at a standstill and promises to remain quiet until the new tariff measure is decided upon.

In manufactured iron the situation is nearer stagnation than it was. Unsuccessful efforts have been made to induce consumers to give orders now. Certain mills are reported as cutting prices savagely when any business comes up. From the Mahoning and Shenango valleys the reports of business continue unfavorable; many of the mills had to close down for the want of orders. This is certainly the situation at other points.

**Finished Material.**—The events of the week have developed nothing more favorable than we have had for some time past; limited amounts have been taken pretty freely, but large work is not coming out any more freely so that everything is of the hand-to-mouth order. There is some talk of several good sized lots being wanted, and there is some reason to believe that actual business will be the outcome, but there will be more or less delay, so that no increase in demand is looked for until after the turn of the year. Prices continue at the lowest point ever reached.

Coke Smelted Lake and Native Ore.		1,000 Billets, prompt, at mill.....	16.90
5,000 Bessemer, Dec.	Cash.	500 Billets, Dec., at mill.....	17.00
Jan., Feb.....	\$10.90	400 Billets, spot, at mill.....	17.00
2,500 Bessemer, next 3 mos.....	11.00	<b>Muck Bar.</b>	
1,000 Bessemer, Dec.	11.25	500 Neutral, Dec., Jan.	21.00
1,000 Bessemer, Jan.	11.00	350 Neutral, Dec.....	21.00
500 Bessemer, Jan	10.95	300 Neutral, spot.....	21.00
500 Bessemer, prompt.	11.00	<b>Skelp Iron.</b>	
1,000 Gray Forge, Dec., Jan.....	10.50	400 Wide grooved.	1-32 4 m.
1,000 Gray Forge, Jan.	10.25	300 Sheared.....	1-45 4 m.
500 Gray Forge, Dec.	10.00	250 Narrow grooved.	1-32 4 m.
300 Mill City Furnace.	10.50	<b>Ferro-Manganese.</b>	
300 No. 2 Foundry.....	11.25	150 80% Domestic.....	52.40
300 Bessemer.....	11.15	50 80% Domestic.....	53.00
300 Mill.....	10.50	<b>Spelter.</b>	
250 No. 2 Foundry.....	12.25	450 Jan., Feb., March.....	3.67
200 No. 1 Foundry.....	11.25	<b>Skelp Steel.</b>	
200 No. 3 Foundry.....	11.00	385 Wide grooved.....	1-20 4 m
100 No. 1 silvery.....	15.25	<b>Sheet Bars.</b>	
50 No. 1 Foundry.....	12.50	300 At maker's mill.....	\$22.60
<b>Charcoal.</b>			
50 Cold Blast.....	26.00	<b>Steel Wire Rods.</b>	
50 No. 2 Foundry.....	17.50	700 5 gauge American at mill.....	24.80
25 Cold Blast.....	25.00	<b>Blooms, Billets and Bar Ends.</b>	
25 Warm Blast.....	18.00	1,000 Billet and Bloom Ends.....	12.00
25 No. 2 Foundry.....	17.50	<b>Steel Melting Stock.</b>	
<b>Blooms, Billets and Slabs.</b>			
2,500 Billets, Jan., Feb., March, at mill.....	16.75	300 Melting Stock.	Gross. 13.50
1,500 Billets and Slabs, Jan. to April, at mill.....	16.85	500 Melting Stock.	Gross. 13.50
1,000 Billets, Jan., Feb., at mill.....	17.00	<b>Old Rails.</b>	
		150 Iron.....	14.75

METAL MARKET.

NEW YORK, Friday Evening, Dec. 22, 1893.

Prices of Silver per Ounce Troy.

Dec.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.	Dec.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.
16	1:86 3/4	32	66 5/8	.538	20	1:86 3/4	32 1/2	70	.541
18	1:86 3/4	32	66 5/8	.538	21	1:86 3/4	32 1/2	69 1/2	.537
19	1:86 3/4	32 1/2	70	.541	22	1:86 3/4	32 1/2	69 1/2	.535

Owing to a demand in London for silver for immediate delivery the price advanced to 32 1/2 this week, but as soon as these orders were supplied declined, and closes nominally at 32 1/2, but very dull owing to the holidays. The possibility of an import duty on silver in India renders buyers very cautious.

The United States Assay office at New York reports the total receipts of silver for the week to be 113,000 ounces.

Gold and Silver Exports and Imports at New York, Week Ending December 16th, 1893, and for Years from January 1st, 1893 and 1892.

Week	Gold.		Silver.		Excess of Ex. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1893...	\$1,740,573	\$16,323	\$916,514	\$2,217	E \$2,685,547
1892...	72,718,310	62,303,435	31,887,708	3,131,309	E 38,689,072
1892...	66,152,249	8,449,967	22,161,658	2,979,638	E 76,884,402

Of the gold exported for the week nearly all went to Germany; the silver went to London. The gold and silver imports were from Mexico and Central America.

During the five days ending December 21st the exports and imports of gold and silver at New York have been as follows: Exports: Gold, \$81,100; silver, \$709,957. Imports: Gold, \$159,107; silver, \$22,252. Of the gold exported \$8,600 went to London and \$72,500 to the West Indies. All the gold was in American coin and bullion. Of the silver exported \$79,000 was in Mexican coin and \$630,957 was in American coin and bullion, and all of it went to London.

NOTES OF THE WEEK.

But little change can be reported in business conditions, although a gradual improvement continues. The accumulation of money seeking use and finding none shows a slight check, and in the iron and other metal markets some increase in production is reported to meet demand.

The most notable event of the week has been the publication of the report of the Secretary of the Treasury. A considerable part of it is naturally devoted to the currency question, and on this point Mr. Carlisle does not hesitate to declare the policy of issuing government notes unwise. If, however, the present policy is to be continued, as it must be for a time, there is a pressing need for such legislation as will make the department more independent of speculative interests and operations and enable it to maintain the credit of the government upon a sound and secure basis. Whatever objections may be urged against the maintenance of a large coin reserve, procured by the sale of interest-bearing bonds, he says, it must be evident that this course cannot be safely avoided unless the government abandons the policy of issuing its own notes for circulation, and limits the functions of the Treasury Department to the collection and disbursement of the public revenues for purely public purposes, and to the performance of such other administrative duties as may be appropriate to the character of its organization as a branch of the executive authority. The recent repeal of so much of the act of July 14th, 1890, as required the Secretary of the Treasury to purchase silver bullion and issue Treasury notes in payment for it, makes such a radical change in the policy of the government respecting the currency of the country that until its effects are more fully developed he does not consider it advisable to recommend further specific legislation upon that subject.

Mr. Carlisle points out that the amount of money in the country outside of the treasury, on December 1st, 1893, was \$112,404,947 greater than on November 1st, 1892, and says: That the amount of money in the country is greater than is required for the transaction of the business of the people at this time is conclusively shown by the fact that it has accumulated, and is still accumulating, in the financial centers to such an extent as to constitute a serious embarrassment to the banks in which it is deposited, many of which are holding large sums at a loss. This excessive accumulation of currency at particular points is caused by the fact that there is no such demand for it elsewhere as will enable the banks and other institutions to which it belongs to loan it to the people at remunerative rates, and it will continue until the business of the country has more fully recovered from the depressing effects of the recent financial disturbances. Money does not create business, but business creates a demand for money, and until there is such a revival of industry and trade as will require the use of the cir-

culating medium now outstanding it would be hazardous to arbitrarily increase its volume by law or to make material changes in its character by disturbing in any manner the relations which its different forms now bear to each other.

The Secretary speaks of the unsatisfactory condition of our currency legislation, which has been, he says, for many years the cause of much discussion and disquietude among the people, and although one great disturbing element has been removed, there still remain such inconsistencies in the laws and such differences between the forms and qualities of the various kinds of currency in use that private business is sometimes obstructed and the Treasury Department is constantly embarrassed in conducting the fiscal operations of the government. He refers at some length to the difficulty experienced in keeping silver certificates and silver dollars in circulation, the public declining to use them.

With regard to gold exports he says: Largely on account of apprehensions as to the ability of the government under the legislation then existing to continue the current redemption of its notes in coin and maintain the parity of the two metals, the shipments of gold from this country during the fiscal year 1893 reached the unprecedented amount of \$108,680,844, nearly all of which was withdrawn from the public treasury by the presentation of notes for redemption.

As to the condition of the Treasury, the Secretary estimates the revenues of the Government for the fiscal year ending June 30th, 1894, at \$430,121,000, and that the expenditures for the same period will amount to \$458,121,000, leaving a deficit of \$28,000,000 for the year. He mentions that there are Pacific Railroad bonds, known as "currency sixes," issued in aid of the Pacific railroads, falling due within the year 1894 to the amount of \$2,362,000 which must be paid at maturity, and recommends that Congress take action at this session to provide for them. He suggests as a means of enabling the Government to promptly meet the emergency and to provide a larger reserve fund several courses of action. One is the issue of 3% five year bonds in small amounts, to be disposed of through the sub-treasuries and post offices to our own people. Another is the issue of \$50,000,000 in one-year 3% bonds. Either form of bond, he believes, could be readily sold at par to any amount likely to be required.

The report has been well received, and many of its suggestions meet with general approval. There is some exception to his views on Government issues of paper currency, and our people have become so accustomed to such issues by over 30 years' use that a change would be, or at any rate seem, exceedingly difficult.

The House Committee on Banking has several measures relating to the currency under consideration, the first of which in order is the repeal of the tax on State Bank circulation. It is quite probable that a bill for that purpose will be introduced in the House early in January.

Senator Voorhees is reported as saying that he intends to push his unwise bill for the coinage of 2,000,000 silver dollars monthly, but it does not seem to meet with much favor, the anti-silver men, of course, being opposed to it, while on the other hand the extreme silverites, like Stewart, Peffer and their congeners look upon it as a half-way measure which would stop agitation for free coinage or anything like it.

The Bi-metallic League, as it is called—though "The Cheap Money League" would be a more appropriate name—has held several meetings in Washington lately, the outcome of which is a circular recommending continued agitation in favor of free coinage, with a view to affecting the Congressional elections next year.

The report of United States Treasurer Morgan for the fiscal year ending June 30th shows that for two years ending September 30th, 1893, the total amount of legal tenders and treasury notes redeemed in gold was \$112,572,147, while during the same period the exports of gold from the country were \$154,256,615. Mr. Morgan says: In December, 1892, with the gold reserve at \$125,000,000, there began a heavy demand for the redemption of notes in gold, which continued until the end of June, 1893. A total of upward of \$81,000,000 of gold was drawn out of the Treasury in this way, for export, in the course of seven months. Almost the whole net loss of gold sustained during this time was, therefore, due to the redemption of notes. It reduced the gross holdings by \$59,000,000, and the reserve by \$29,000,000. Most of the gold exported in former years was drawn from the Treasury, but gold certificates were paid for it. Not only for the first time in the experience of the Department have any considerable sums of notes been presented for gold, but, what is more significant still, the whole, nearly, of the unusual amount of the metal taken for the export was drawn out in that way.

In the annual report of the Comptroller of the Currency, Mr. Eckels discusses at length the requirements of the law as to reserves of national banks, and comes to the conclusion that these requirements cannot safely be reduced,

The United States Treasury statement on Thursday, December 21st, shows total balances in excess of outstanding certificates amounting to \$94,242,813. Of this there was in gold \$82,886,334; silver, \$5,682,284; legal tenders, \$4,409,708; treasury notes, etc. \$1,264,487. For the week there was a decrease of \$140,895 in the total balance and of \$1,082,110 in the gold balance.

The statement of the New York banks for the week ending December 16th shows increases of \$2,748,800 in deposits, \$1,651,900 in legal tenders and \$3,078,300 in loans; decreases of \$396,600 in surplus, \$1,361,300 in specie and \$145,700 in circulation. The reserve was \$76,168,825 above the legal requirement of 25%. It is \$82,282,500 greater than on the corresponding date last year.

Some local excitement was caused on Thursday, 21st, by the closing of the St. Nicholas Bank by the State Bank Superintendent. This is a State bank, and its last report showed \$500,000 capital and \$105,600 surplus. It is now stated that the surplus has disappeared and the capital has been seriously impaired, chiefly on account of unwise loans and the effort to carry concerns to which the loans had been made. The bank has been considered doubtful for some time by well informed parties.

The Bank of England on December 21st held £25,001,479 gold, an increase of £432,455 over the corresponding date last year.

The specie holdings of the Bank of France on December 21st were, in sterling, £68,530,763 gold and £30,746,718 silver; an increase of £351,955 gold and a decrease of £293,996 silver, as compared with the corresponding week in 1892.

The London "Economist" notes that the total amount of capital subscribed in London to new loans and stocks of new companies for 11 months of the current year has been £44,030,740, against £76,254,673 for the corresponding period in 1892, and £100,608,176 in 1891. The very great reduction this year is a significant sign of the disturbed state of the money market.

In the lower House of the Hungarian Diet at Buda Pesth on December 7th, the Finance Minister announced that the subsidy at present guaranteed to the silver mine operators could not be maintained. Purchases of silver will be continued, but the price will be gradually reduced until it reaches the level of the general market. The reduction will be extended over three years.

The monetary crisis in Italy has grown to be a very serious one. The condition of the national treasury, which has met its interest payments with great difficulty, the failure of the Roman Bank, and the scandals attending it have led to a political crisis also, and caused the resignation of the ministry. Italy is not a rich country and its industries have been suffering from excessive taxation, while the poverty of the people has been increasing and their purchasing power diminishing for several years, so that the present crisis was not unexpected.

In addition to the general business depression and disturbance which is now affecting the whole world to some extent, the European exchanges are affected by the war rumors which continue current. No one knows when or how a war will come, but every one seems to expect it. Meantime the burden of great military establishments is felt more and more each year. As a relatively poor country Italy has been the first to break down under the load. The increase in cost of living and manufacturing which these heavy and non-productive expenditures are bringing about must inevitably send both men and money to this more fortunate country, where opposite conditions are becoming evident. The United States will therefore become the workshop of the world all the sooner as the European countries load themselves down with debt and taxes which increase their cost of production. In no other country in the world can capital find so safe and profitable a present field for investment or so encouraging a future as in the United States.

It is noted by "L'Economiste Francais" that the Russian currency has not been affected by the fall in the price of silver, since the silver rouble has been practically out of circulation for a considerable time. There are still some 20,000,000 silver roubles outstanding, but these are apparently hoarded, for they do not appear. Taking the actual value at the present price of silver, they are really worth less than the paper rouble, which constitutes the principal circulation. In order to prevent the silver from coming into general use, or from increasing its amount, an imperial order has forbidden the mints from receiving for coinage silver, either in bars or in foreign or ancient coin.

It is further noted that since the extension of the Russian dominion in Central Asia the native coin has been almost entirely replaced by Russian money, not only in Turkestan and the other provinces actually under Russian rule, but also in the adjoining countries, such as Bokhara and to a considerable extent also in Persia.

Silver exports to the East for the 11 months to November 30th are given as below by the British Board of Trade returns:

	1893.	1892.
British India .....	£7,900,277	£3,256,877
China .....	1,916,512	197,187
Japan .....	58,150	2,083,060
Total .....	£10,874,939	£5,537,124

The small decrease in exports to India and the large decrease to Japan were nearly made up by the great increase in shipments to China this year. The November shipments to India show a decrease from £324,700 in 1892, to £436,209 in 1893.

The London "Economist" says that commercial difficulties are threatened in Persia. The foreign trade of that country is largely carried on with the Russian possessions in the Caucasus and Central Asia. Purchases have hitherto been made in Persian silver coin, but this currency has, with other silver, latterly fallen in value, and it has become further depreciated by the recent coinage having been debased. The Russian Government last September prohibited the importation of Persian silver coin, and as a large surplus stock of silver currency has thus been kept back in the country, its value there has fallen, and foreign trade generally is likely to suffer from violent fluctuations of exchanges.

**Domestic and Foreign Coins.**

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

	Bid.	Asked.
Mexican dollars .....	\$3.57 1/4	\$3.57
Peruvian soles and Chilean pesos .....	.52 1/2	.51
Victoria sovereigns .....	4.87	4.89
Twenty francs .....	3.87	3.90
Twenty marks .....	4.71	4.78
Spanish 25 pesetas .....	4.78	4.82

**Other Metals.**

**Copper.**—The principal item of news of the past week is the reported purchase, by the Quincy Mining Company, of the mineral rights of land surrounding the Franklin Company's mine, which afforded the latter the only chance to extend their workings, as the deposits now being drawn upon were exhausted. Unless in the Franklin mine there should be found as yet undiscovered bodies of ore, its term of life cannot be more than a few years.

The copper market has been dull, with Lake unobtainable from first hands, but to be had from second hands at 10¢, at which price a few transactions have been closed. Electrolytic copper is freely offered at 9 1/2¢, while casting is nominally about 9 3/4¢. Arizona pig copper, guaranteed to contain 96% of copper, is still held above real market value as 9 1/2¢ continues to be the asking price of holders.

From the somewhat better demand for spot copper it is apparent that manufacturers are better placed, as to orders, than has been the case with them for some time past, and this, we suppose, must be taken as an encouraging sign for a more normal volume of business after the turn of the year. Exports continue to be large.

The London market has been rather dull and is somewhat lower, as we have to quote spot G. M. B's at £13, and three-months prompts at £13 10s, with refined and manufactured rolling as follows: English Tough, £45 5s. @ £45 10s.; Best Selected, £46 15s. @ £47; Strong Sheets, £53 5s. @ £53 10s.; India Sheets, £51 @ £51 5s.

Statistics showed no change at the expiration of the first half of the month, as compared with the last half of November, and this, certainly, is another favorable sign.

The exports of copper from the port of New York during the week ending December 22d, as reported by the New York Metal Exchange, were as follows:

<b>Copper:</b>		
Havre—La Bourgogne .....	Ingots	50 Tons.
Liverpool—Bovic .....	Ingots	85 "
Rotterdam—Werkendam .....	Ingots	206 "
" .....	Cakes	132 "
" .....	Pigs	51 "
" .....	Plates	85 "
" .....	Bars	20 "
Liverpool—Britannic .....	Bars	25 "
" .....	Ingots	45 "
" .....	Pigs	25 "
Swansea—Wells City .....	Bars	100 "
" .....	Pigs	126 "
Hamburg—Scandia .....	Ingots	16 "
" .....	Pigs	14 "
Bordeaux—Panama .....	Pigs	75 "
" .....	Bars	125 "
Havre—La Gascogne .....	Pigs	40 "
Rotterdam—Amsterdam .....	Ingots	351 "
" .....	Cakes	5 "
" .....	Bars	113 "
" .....	Plates	55 "
Leghorn—Kr. Fr. Wilhelm .....	Ingots	25 "
Liverpool—Runic .....	Ingots	100 "
<b>Copper matte:</b>		
Liverpool—Bovic .....		150 Tons.

The exports of copper from Baltimore for the week ending December 19th were as follows:

<b>Copper:</b>		
Dec. 11. London—Montana .....	6,959 ingots	112,000
" .....	2 plates	151
" .....	30 ingot bars	1,453
Dec. 13. Liverpool—Queensmore .....	435 bars	77,143
" .....	112 barrels	112,000
" .....	571 cakes	111,718
" .....	7,951 ingots	112,000
Dec. 14. Hamburg—Stubbenbuk .....	257 cakes	119,891
" .....	250 barrels	250,000
" .....	1,370 ingots	67,200
" .....	1,291 plates	24,650
" .....	56 bars	13,783
Dec. 16. Antwerp—Otranto .....	729 cakes	235,002
" .....	749 ingots	11,240
" .....	1,664 ars	224,458

**Tin.**—The market is quiet, but with a great deal of underlying strength. Nothing is to be had cheaply and we have to quote 20 55 @ 20 65 for both spot and December deliveries.

Prices in London have given way some, closing at £75 for spot and £75 15s. for futures, but still nothing can be laid down in New York below 21c. ex-ship.

**Lead.**—The market has been rather dull, and, in the beginning of the week, the official quotation was made 3 10 New York. Later on it was advanced to 3 20, then to 3 22 1/2, then again lowered to 3 20, at which it closes. There are practically no sellers below 3 1/4. For some unexplained and far from apparent reason, the London market shows an advance, as Spanish lead is quoted at £9 12s. 6. and English at £9 15s.

**St. Louis Lead Market.**—The John Wabl Commission Company telegraph us as follows: Pig lead since our last has undergone a radical change for the better, and the metal has advanced fully 15 cents per hundred pounds within three days. Latest sales are at 3 15. Many buyers who a few days ago regarded lead as too high at 3c. a pound, now find it quite convenient to pay 3 15, because they observe very much to their surprise that the visible supply of lead is very much smaller than their imaginations led them to believe.

**Aluminum.**—The prices, as at present fixed by the manufacturers, are: 65c. per lb. for 96% pure, and 75c. per lb. for 98% pure metal.

**Quicksilver.**—There is no change to report of this market. It continues quiet. Quotations remain \$37.50 @ \$38 for New York, and £6 7s. @ £6 7s. 6d. for London.

**Antimony** is in better demand and Cookson's now rules at 10 1/2 @ 11, L. X. at 9 1/2 @ 10 and Hallett's at 9 1/2 @ 10.

**Spelter** is rather unsettled and it is evident that certain supplies are having a depressing influence upon the market, which has been irregular with limited transactions, closing nominally at 3 3/4 @ 3 1/2. Abroad, also, values are lower, good ordinaries being worth £16 12s. 6d. and specials £16 15s.

**Sodium.**—Prices, as quoted by the manufacturers, are 90c. @ \$1 per lb.

**CHEMICALS AND MINERALS.**

NEW YORK, Friday Evening, Dec. 22.

**Heavy Chemicals.**—There is nothing of interest to report of the heavy chemical market this week. It continues quiet and featureless and no business of consequence is reported. This state of affairs generally prevails during the closing weeks of the year.

Quotations are nominally as follows: Caustic soda, 60%, 3 05 @ 3 20c.; 70%, 2 80 @ 3c.; 74%, 2 82 1/2 @ 3 05c.; 76%, 3 @ 3 10c. Carbonated soda ash, 48%, 1 15 @ 1 25c.; 58%, 1 10 @ 1 20c. Alkali, 48%, \$1.10 @ \$1.20; 58%, \$1.05 @ \$1.15, according to package. Sal soda, English, 1 @ 1 05c.; American, 90 @ 92 1/2c. Bleaching powder, 2 25 @ 2 50c.

**Acids.**—Some business for future delivery, but on the whole, the acid market is quiet. Prices are without change of importance and we quote this week: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, \$1.75 @ \$1.87 1/2; muriatic, 18°, 90c. @ \$1.10; 20°, \$1 @ \$1.25; 22°, \$1.10 @ \$1.35; nitric, 40°, \$1; 42°, \$1.50 @ \$1.75; sulphuric, 75c. @ \$1. Mixed acids, according to mixture, oxalic, \$6.30 @ \$6.50. Blue vitriol is quoted all the way from \$3.50 to \$3.75; glycerine for nitro-glycerine, 1 1/4 @ 1 1/2c., according to quality and quantity.

**Brimstone.**—The market for Sicilian brimstone is quiet but firm, and prices slightly higher than last week. Quotations for best unmixed seconds are \$21 for spot and \$18 for shipments. Best thirds are 75c. @ \$1 less.

**Fertilizing Chemicals.**—The fertilizer market is dull but firm. Some buying is still being done, but the trade is devoid of features of especial interest. Prices are practically as they were last week, few of the articles having undergone any noteworthy change. We quote: Sulphate of ammonia, on the spot, gas, liquor, \$3.40 @ \$3.50; bone, \$3.30. Dried blood, \$2.55 @ \$2.60 per unit for high grade, and \$2.30 @ \$2.40 for low grade. Azotine, \$2.50 @ \$2.60. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acid phosphate, 13% to 15%, av. P<sub>2</sub>O<sub>5</sub>, 60c. per unit at seller's works in bulk. Dissolved bone-black, 17% to 18%, P<sub>2</sub>O<sub>5</sub>, 92 1/2c. per unit. Acidulated fish scrap, \$15 @ \$16, and dried scrap, nominally \$25 f. o. b. fish factory; wet scrap, \$15 f. o. b. fish factory. Tankage, high grade, \$25.50 @ \$26.50; low grade, \$22 @ \$22.50. Bone tankage, \$23 @ \$24; bone meal, \$24 @ \$25.50.

The price of double manure salts as fixed by the syndicate is as follows: New York and Boston, \$1.12; Philadelphia, \$1.14; Charleston and Savannah, \$1.17 cwt., basis 48 @ 50%, in 50-ton pots on foreign weights and analyses. Sulphate of potash, 90-96%, basis, 90%; New York and Boston, \$2.07, Philadelphia, \$2.09 1/2; Charleston and Savannah, \$2.127, sulphate of potash, 90-90%, basis 90%; is 4% higher.

**Phosphates.**—Quotations are as follows: Land rock, 60% bone phosphate of lime, \$5 f. o. b. vessel Charleston; 62%, \$5.25; river rock, 58%, \$6 all kiln-dried.

**Muriate of Potash.**—This market continues quiet. Arrivals this week amounted to 900 tons, all of which have gone into consumption. The prices fixed by the syndicate for 1893 are as follows: New York or Boston, \$1.78; Philadelphia, \$1.80 1/2; Southern ports, \$1.83.

**Kainit.**—Quotations for shipments are as follows: New York, Philadelphia and Boston, \$9 for foreign invoice weight and test, and \$9.25 for actual weight; Charleston, Savannah and Wilmington, \$9.75 for invoice weight and test, and \$10 for actual weight.

Nitrate of Soda.—Nitrate is selling freely at \$1.80 both for spot and for near arrivals.

**MINING STOCKS.**

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, St. Louis, London and Paris, see pages 533 and 63.]

NEW YORK, Friday Evening, Dec. 22.

The past week in the mining stock market has been one of the duller of this exceedingly dull year. It has been duller than usual, and to those who know how chronically quiet the market, this statement will cause wonder.

There were absolutely no features. The total number of shares sold was 2,350, on which the brokers' commission, at the regular rates of the Consolidated Stock and Petroleum Exchange amounted to the astonishing sum of \$41! Almost \$50 to be divided among the "old reliable" mining brokers on the week before Christmas.

So far as it is possible to classify in groups the few stocks which were traded in during the week, it may be said that the Comstocks were the most popular. Prices are almost without exception lower than they were last week. Consolidated California & Virginia declined from \$3.65 to \$2.75, with total sales of 350 shares. Ophir shows a solitary sale of 100 shares at \$1.40; Comstock Tunnel, which usually shows comparatively large transactions this week had only one sale, of 100 shares at 7c.; Mexican declined from \$1.15 to 85c.; total sales, 200 shares. Other sales were as follows: 100 shares of Sierra Nevada, at \$1; 100 shares of Yellow Jacket, at \$1.10; and 100 shares of Union Consolidated, at \$1.10.

Of the California stocks, the only one to be traded in during the week was Brunswick Consolidated, which reports a sale of 100 shares at 7c.

Phoenix of Arizona was the most active, 800 shares being disposed of at 50 @ 53c.

**NOTES OF THE WEEK.**

**New Guston Company, Limited.**—This mine still has a force of about 100 men at work and ships from \$15,000 to \$18,000 worth of ore per month. Wages were reduced to \$3 for miners, and \$2.65 for ore sorters last July, and on December 1st another cut of 25 cents per day all around was made, the men with one or two exceptions accepting the cut without a murmur. Quite recently the ore body opened in No. 9 level last February has been cut in No. 10, showing ore running about 10% in copper and some of it as high as 3 oz. in gold. Very little ground has been stoped between levels 7 and 10 which gives a large amount of ore reserved to be mined in the spring. When the Silverton railroad stops running the main shaft is to be sunk 200 ft. and levels 11 and 12 will be driven.

The directors and shareholders of the Dickens-Custer Mines, Limited, have decided to sell their property in Idaho and go out of business. It is quite a year and a half since anything has been heard of the doings of this company, and in the meantime transactions in the shares have been at a standstill. At the meeting held on November 27th the chairman announced that in October, 1892, the mine was shut down and all hands discharged. The directors then tried to find a suitable South African property, but after spending money examining a property that turned out to be useless, they determined on trying to find another American property. In this quest they also were unsuccessful and they came to the conclusion that it is best to wait for a suitable opportunity of disposing of their mine. This resolution the shareholders have confirmed.

**Geneva Gold and Silver Mining Company.**—The work of development was begun on the Geneva mining location on December 12th, says the Virginia "Enterprise." The Geneva is a relocation of the old West Potosi, and joins the western boundaries of the Potosi and Bullion mines. The relocation was made by Russ Lamb, a well known miner, about three years ago. William Lent, of San Francisco, has had the property incorporated under the title of "The Geneva Gold and Silver Mining Company," and is president of the incorporation. Andrew Charles, of Silver City, has been appointed superintendent, and has put four men at work sinking a winze below the floor of the main tunnel on a promising vein of gold-bearing quartz. William Lent, the president of the company, was the original locator of the Ophir ground, and in the early days of the Comstock was prominent in local mining enterprises. Enough of the Geneva stock has been sold at private sale, it is said, to provide for the payment of initial operating expenses.

The San Francisco "Post" gives the following list of the largest producing mines in each county: The largest producing mine in Amador County is the Kennedy, and it is also the leading gold producer in California. The largest producer in Butte County is the Paxton; in Calaveras County, the Utica; in El Dorado, the mines about Greenwood; in Fresno, those about Course Gold Gulch; in Humboldt, those near Arcata; Inyo, the Magnet, near Big Pine; Kern, the mines near Caliente, at Greenhorn district, and at Sageland and Kelso Valley; Lassen, the Golden Eagle, at Hayden Hill; Los Angeles, the Kelsea, at Azusa; Mariposa, the Diltz; Mono, the Standard Consolidated; Napa, the Palisade; Nevada, the North Star; Placer, the Morning Star drift mine; Plumas, the Thomas Eureka; Sacramento, the Chinese mines at Folsom; San Bernardino, the Morongo, at Victor; San Diego, the Paymaster, at Ogilby; Shasta, the Uncle Sam, at Kennet; Sierra, the Union Consolidated drift, at Port Wine; Siskiyou, the Montezuma mines, at Callahan; Stanislaus, the drift mines, at La Grande; Trinity, the Brown Bear, at Deadwood; Tulare, the small mines at White River; Tuolumne, the Golden Gate, at Sonora; Yuba, the Chinese mines around Strawberry Valley.

At the meeting of the directors of the Consolidated California & Virginia Mining Company, at San Francisco, on December 5th, alluded to above, all the differences between the Rule party and the management of the company were settled by Mr. Rule agreeing to a form of contract which the company had submitted. The main point in dispute was this: Mr. Rule wished to have supervision of the drift which has been started on the 1,000-ft. level of the old Consolidated Virginia shaft, and wanted the right to select the men who are to run it. The company refused to accede to this. It insisted that the only authority Mr. Rule should have in the entire matter would be in laying the course of the drift, and that Superintendent Lyman should direct all the other work and have complete charge, as heretofore. The Rule party did not like this, but finally came to terms. The contract is to last six months from December 1st, 1893. Should any ore be found in the workings under the Rule contract, Mr. Rule is to receive 10% of the net profits thereof until he has received \$10,000.

At the annual meeting of the Mexican Mining Company, held in San Francisco, Cal., last week, 82,231 shares were represented and the following directors and officers elected: Charles H. Fish, president; A. W. Havens, vice-president; and H. Zadig, C. O'Connor and C. Hirschfeld, directors. Charles Elliot was re-elected secretary, and his financial statement showed a credit balance of \$9,339.03. During the year there were raised to the surface 33 tons of ore, which was collected from different points during the prospecting work. The average assay value of this ore was about \$25 per ton.

Following is a statement of the cash balances of certain mining companies on December 1st: Alpha, \$4,712; Andes, \$6,128; Belle Isle, \$2,226; Best & Belcher, \$11,346; Bullion, \$6,422; Bodie, \$10,499; Caledonia, \$8,149; Challenge, \$2,009; Chollar, \$4,822; Consolidated Imperial, \$1,262; Confidence, \$1,439; Consolidated New York, \$4,896; Consolidated California & Virginia, \$52,657; Crown Point, \$9,138; Exchequer, \$4,312; Gould & Curry, \$8,593; Hale & Norcross, \$24,266; Julia, \$3,206; Justice, \$6,620; Kennet, \$1,498; Lady Washington, \$1,694; McNo, \$4,731; Mexican, \$9,339; Nevada Queen, \$2,756; Ophir, \$8,258; Syndicate, \$1,251; Savage, \$1,394; Segregated Belcher, \$4,201; Scorpion, \$710; Silver Hill, \$885; Sierra Nevada, \$12,518; Standard Consolidated, \$26,211; Union Consolidated, \$20,655; Utah, \$2,744.

The indebtedness of other companies on the 4th is reported as follows: Alta Consolidated, \$6,790; Belcher, \$963; Bulwer, \$4,254; Commonwealth, \$24,446; Del Monte, \$25,786; Grand Prize, \$713; Potosi, \$3,664; Navajo, \$59; North Belle Isle, \$2,200; North Commonwealth, \$337; Occidental, \$597; Overman, \$51; Summit, \$1,054.

During the month of November the total output of the Montana Mining Company, Limited, was 1,520 oz. of gold and 14,800 oz. of silver, the estimated value of which was \$39,700. There were milled during the month 5,501 tons of ore, 90 stamps having been in operation. The expenses for the same month were \$40,366. Under date of December 2d, the superintendent cabled as follows to the directors of the company: Castletown cross-cut, on No. 3 level, near No. 1 shaft, has encountered fine body of ore, 54 ft. from the slope. The distance to the hanging wall is 14 ft.; the hanging wall is well defined; ore in the drift has an average assay of \$50 per ton; we have commenced to drive on the lode in each direction.

Boston. Dec. 21.

(From our Special Correspondent.)

The market ruled extremely dull during the early part of the week, and prices were inclined to be weak, although the decline was not so marked as the absence of orders to either buy or sell. Yesterday and to-day there has been more doing and the activity has resulted in a firmer tone to the market, and, in some instances, to an advance over the lowest figures for the week.

Boston & Montana sold down to \$26½ on small transactions, but to-day there were good buying orders for the stock and it went up to \$28½, with later sales at \$28¼. It is stated that the company is now upon a dividend-paying basis, and that stockholders may be made happy early in 1894.

Butte & Boston declined in the early dealings to \$8¾, with recovery later to \$9¾. There is a good deal of bull talk on this stock and much higher prices for it are predicted.

Calumet & Hecla advanced to \$300, declined to \$297, and recovered to \$300. The dealings were light. It is not thought that the Red Jacket shaft will materially increase the product of the company for a year yet.

Tamarack sold at \$158 and advanced to \$163. The prospects for the coming year are considered highly favorable, and increased dividends are looked for.

Quincy has been very steady at \$125. There is a rumor that the company may increase its capital stock to 100,000 shares to pay for a recent purchase of territory.

Oscocla has been very quiet this week at \$29¼@ \$30.

Franklin has declared a dividend of \$2 per share, payable January 1st, 1894. The stock has sold in small lots at \$12@ \$12½.

Atlantic sold at \$11½, declined to \$11 and recovered to \$11½ in later sales. The holders fully anticipate a dividend in the near future with the present outlook of copper.

Centennial declined from \$3¾ to \$3¾, with later sales at \$3¾.

Kearsarge sold in a small way at \$8, an advance of ¼.

Tamarack, Jr., sold at \$20, but declined to \$19. To-day it was in demand and sold up again to \$20.

Wolverine sold at \$2½, a decline of ¼, and National declined from \$1 to 75c.

About 9,000 shares of Arnold mining stock was sold this week for non-payment of the last assessment, at 50c. The payment of this assessment will provide funds to continue development work until January, 1895. There were no sales of the stock at the board, but 50c. is bid for it.

3 P. M.—There was but little doing after the noon hour. Boston & Montana declined ¼ to 23½. Centennial advanced ¼ to \$3¾, and Tamarack from \$163 to \$164, with a sale of 50 shares, buyers' option, 30 days at \$164½. Balance unchanged.

Colorado Springs. Dec. 18.

(From our Special Correspondent.)

The average tone of our market the past week ruled firm. Sales, 850,000 shares. Of these Golden Dale heads the list with 173,000; Union, 100,000; Work, 108,000, while Isabella, Calumet, Cripple Creek Consolidated and Creede and C. C. each score over 50,000.

The notable advances have been in Anaconda, Isabella and Summit. Calumet and Work have settled to a lower range of prices. Mr. J. K. Miller has resigned as president and director of the Calumet company, and Mr. B. F. Crowell has been elected president in his place. Anaconda shipped a car of 8-oz. stuff; developments are progressing favorably.

The Buena Vista lode is turning out regular shipments, while the Victor vein is showing improvement; both belong to the Isabella company.

The cheaper football stocks have held their own without material change. Transactions in the silvers have been confined to Mollie Gibson, which has ruled stronger. The mine is now free of water and developments on the 8th, 9th and 10th levels ought to proceed forthwith.

The recent violent derangement of business has gone far to make mining appear conservative and mercantile pursuits highly speculative. Gold mining is generally considered extremely hazardous, yet, compared with many industries ordinarily rated conservative, it is now apparently, safer and more profitable.

Cripple Creek is one of the most prosperous places in the United States to-day, and with the nearer approach of the railroad, now only eight miles distant, a new impetus is given to the low and medium grade ore.

San Francisco. Dec. 15.

(From our Special Correspondent.)

During the early days of the week the mining market received quite a setback and prices languished under forced sales. To-day a better feeling made itself felt and prices advanced a few cents all along the line. As large buying orders were received by several of the brokers, from points outside the city, this accounted in large measure for the stimulation of the general market.

On the Comstock everything is very quiet and no news is at hand calculated to influence prices. Notwithstanding this, however, much work is being done that is being watched eagerly. The old Geneva company has taken a new lease of life and early in next year the stock, it is said, will be listed in the San Francisco board. The Geneva joins the west boundaries of the Potosi and Bullion mines, and William Lent, who was the original locator of the Ophir ground, is president of the newly incorporated company. Enough stock has been sold to defray preliminary operating expenses and when the stock is listed there is no reason

why money should not be raised as in the case of other Comstock wildcats.

The business done in the Pacific board to-day was quite large, the middle group of Comstocks being especially in favor.

At the north end of the lode Consolidated California & Virginia opened at \$3.55 and advanced during the day, closing at \$3.70 strong. Ophir ruled at \$1.70; Mexican at \$1.10; Sierra Nevada at \$1.35; and Union Consolidated at \$1.05.

Of the middle Comstocks Best & Belcher ruled at \$2.45; Chollar at 45c.; Gould & Curry at \$1.10; Hale & Norcross at 85c.; Potosi at 85c., and Savage at 60c.

In the group of Gold Hill stocks Yellow Jacket has shown the greatest decline during the week, selling to-day—when prices are stronger—for 85c., a falling off of 50c. on the week's trading. Belcher opened at 80c. and closed one point in advance; Bullion sold for 30c.; Challenge for 50c.; Confidence for \$1.35; Overman for \$35c.; and Occidental for 12c.

The only outside stock dealt in has been Mayflower, quoted to-day at \$2.20.

The market closed with trading active and prices well sustained.

San Francisco, Dec. 22d. (By telegraph.)—The opening quotations to-day are as follows: Best & Belcher, \$1.90; Bodie Consolidated, 20c.; Belle Isle, 5c.; Bulwer, 5c.; Chollar, 40c.; Consolidated California & Virginia, \$2.95; Gould & Curry, 75c.; Hale & Norcross, 70c.; Mexican, 75c.; Mono, 10c.; Navajo, 10c.; Ophir, \$1.40; Savage, 45c.; Sierra Nevada, \$1.15; Union Consolidated, 80c.; Yellow Jacket, \$1.

London. Dec. 12.

(From our Special Correspondent.)

The coal strike has much to answer for, says the London "Electrical Review," but among the most serious evils laid to its door may be included the "frustration of all the efforts" of the directors of Elmore's Patent Copper Depositing Company to arrive at prosperity. In the report for the year ended June 30th, the directors state: A steady trade is being done in coating hydraulic rams and building up calico rollers. The delay caused by the coal strike has been very hard on the resources of the company, which were, at best, barely adequate, as shareholders will remember; besides which, several considerable payments have had to be made to meet liabilities incurred by the old board, and which did not appear in the books and could not have been included in the estimates submitted by the present directors; consequently, if a large trade is to be done, more money will be required to restore sufficient capital for furnishing the £10,000 worth of copper originally stated as being necessary. It will be evident that before dividends can be paid, even on the preference shares, it will be necessary to write down the value of the ordinary shares, so as to wipe off the amount standing to debit of profit and loss. As an extraordinary general meeting of the shareholders will be required to carry out the necessary resolutions, the directors intend taking the needful measures for that purpose.

The loss for the year is £13,655, which, added to the debit balance of £7,862, as at June 30th, 1892, makes the total loss £21,517. The books show orders on hand for 126,048 lbs., against 23,301 lbs. at June 23d, or, say, 56 tons, against 12½. Wonderful!

Frontino & Bolivia (South American) Gold Mining Company, Limited.—The accounts of this company for the six months ending June 30th show a profit of \$52,027, while the profit on the previous half-year was \$53,020. There remained to profit and loss as on June 30th last, \$128,550. Out of this sum the dividend of 18 cents per share, declared at the general meeting in July, amounting to \$23,160, was paid. The directors declared an interim dividend of 12 cents per share in October, and put a further sum of \$1,440 to reserve, amounting together to \$16,876. The directors now recommend a dividend of 36 cents per share, payable as to 12 cents per share in cash on December 30th inst., and as to the remaining 24 cents per share, by payment of the call of 24 cents per share, made payable on December 29th, pursuant to notice sent out. They propose to put a further sum of \$1,440 to the reserve fund. After the above several payments a sum of \$40,652 will remain to the credit of profit and loss account, and the amount of the capital will be augmented by \$30,880. The reserve fund now amounts to \$35,006, invested in Consols. We gather from the report that the general position of the mines is satisfactory, and that their output is being well maintained. Messrs. Harvey & Co., the engineers of Hayle, and Messrs. Fraser & Chalmers, from their works at Erith, are furnishing the company with additional machinery.

**DIVIDENDS.**

Franklin Mining Company, \$2 per share, payable January 1st, 1894, to stockholders of record on December 23d.

Homestake Mining Company, dividend No. 185 of 10 cents per share, \$12,500 payable December 26th, at the office of the company, in San Francisco, Cal., or at the office of Messrs. Lounsbury & Co., Mills Building, No. 15 Broad street, New York City. Transfer banks close December 22d and reopen December 27th.

NEW YORK MINING STOCK QUOTATIONS.

Table with columns for 'DIVIDEND-PAYING MINES' and 'NON-DIVIDEND-PAYING MINES'. Each column contains a list of company names and their stock prices for various dates from Dec. 16 to Dec. 22. Includes a 'SALES' column for each.

\*Ex-dividend. †Sold in at New York Stock Ex. ‡Unlisted securities. §Assessment paid. ¶Assessment unpaid. D... non-dividend shares sold, 1,600. Total shares sold, 2,350.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for 'BOSTON MINING STOCK QUOTATIONS'. Lists company names and their stock prices for dates Dec. 15 to Dec. 21. Includes a 'SALES' column.

Dividend share sold, 4,664 Non-dividend share sold, 5,166 Total shares sold, 9,270.

CURRENT PRICES.

These quotations are for wholesale lots New York unless otherwise specified. Lists prices for various commodities like Acetic, Carbonic, Chromic, Hydrobromic, etc.

Cadmium iodide—lb. \$5.50 Chalk—ton. \$1.50 China Clay—English, lb. \$13.00 Chlorine Water—lb. \$1.00 Chrome Yellow—lb. \$10.25 Chrome Iron Ore—ton, San Francisco \$10.00 Chromalum—Pure, lb. \$35.40 Cobalt—Oxide, lb. \$1.60 Copper—Sulph. English Wks. ton \$20.22 Vitriol (blue), ordinary, lb. \$0.34

Mineral Wool—Ordinary slag... 01 1/2 Ordinary rock... 02 1/2 Naphtha—Black... 01.00 Nitre Cake—ton... \$10.00 Ochre—Rochelle, lb... 01 1/4 Washed Nat Ox'rd. Lump, lb... 06 1/4 Washed Nat Ox'rd. Powder, lb... 07 1/4 Golden, lb... 03.06 Domestic, lb... \$12.00

Tin—Crystals, in kegs or bbls... 14@15 Muriate, single feathered or flossed... 07@12 Double or strong... 10@12 Oxymur, or nitro... 19 Vermilion—Imp. English, lb... 80 Am. quicksilver, bulk... 57 @.59 Am. quicksilver, bags... 58 @.60 Chinese... 85 @.60 Trieste... 90 @.96 American... 11 1/2 @.12 Zinc White—Am. Dry, lb... 04 1/2 @.06 Antwerp, Red Seal, lb... 06 1/4 @.07 Paris, Red Seal, lb... 07 1/2 @.08 Muriate solution... .06 Sulphate crystals, in bbls, lb... 03 @.03 1/2

THE RARER METALS.

The prices given below are the prices in Germany, and are per gramme except where otherwise stated: Arsenic (metallic), per kilo... \$0.25 Barium (ex amalgam)... 2.12 (per electro)... 7.75 Bismuth (metallic), per kilo... 6.25 Cadmium (metallic)... 2.75 Calcium (per electro)... 5.25 Cerium (pulv.)... 2.25 (fusum in globulis)... 5.50 Chromium... .40 (cryst.)... .75 Cobalt (metallic), per kilo... 10.00 (pure), per kilo... 40.00 Didymium (pulv.)... 5.50 Erbium-Strontium (oxydat.)... 10.00 Gallium (cryst.)... 100.00 Germanium (fus.)... 37.50 (pulv.)... 35.00 Glucium (pulv.)... 10.75 (cryst.)... 10.75 Iridium... 5.00 Iridium (fusum)... 1.25 Lanthanum (pulv.)... 6.00 (per electro)... 11.00 Lithium (in glob.)... 5.00 (wire)... 6.25 Magnesium (bars)... 01 1/2 (pulv.)... 01 1/2 Manganese (fusum)... .25 Molybdenum (pulv.)... 12 1/2 Niobium (pulv.)... 4.25 Osmium... 1.00 Palladium (wire)... 1.00 (pulv.)... 1.00 Potassium (metal), per kilo... 27.50 Rhodium... 1.63 Ruthenium... 2.50 Rubidium... 6.25 Selenium (cryst.)... .61 (precipitates)... .62 Strontium (per electro)... 7.25 (ex amalgam)... 3.25 Tantalum... 4.75 Tellurium (fusum)... .50 (precipitates)... .22 Thallium... .03 1/2 Tellurium... 1.13 Tungsten (pure)... .08 Uranium... .60 Vanadium... .01

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares, Par, Assessments (Total Levied, Date and amount of last), Dividends (Total paid, Date & amount of last), Name and Location of Company, Capital Stock, Shares, Par, Assessments (Total levied, Date and am't of last).

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. \* Non-assessable. + The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. | Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$12,390,000. | Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. | Previous to this company's acquiring Northern Bell, that mine paid \$1,000,000 in dividends against \$425,000 in assessments.

COAL AND COAL RAILROAD STOCKS.

Table with columns for stock names, dates (Dec. 16, 18, 19, 20, 21, 22), and sales. Includes stocks like Am. Coal, Balt. & Ohio, Buff. R. & P., etc.

Total shares sold, 100,921.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for stock names, dates (Dec. 16, 18, 19, 20, 21, 22), and sales. Includes stocks like Adams Express, Am. Cotton Oil, Am. Dist. Tel., etc.

Total shares sold, 319,669.

CALIFORNIA.

Table for California stocks, San Francisco, with columns for stock names and closing quotations (Dec. 15, 16, 18, 19, 20, 21).

COLORADO.

Table for Colorado stocks, Colorado Springs, Dec. 17. (Specially reported by W. H. McIntyre). Includes stocks like Alamo, Anaconda Gold, Anchoia Lel'd., etc.

Denver.

Table for Denver stocks, with columns for stock names and prices/sales. Includes stocks like Alamo, Anaconda, Bangkok, etc.

Table with columns: High, Low, Sales. Includes stocks like Mollie Gibson, Ophir, Puzler, Run. Lode, etc.

MARYLAND.

Table for Maryland stocks, Baltimore, Dec. 21. Includes stocks like Comp. Balt. & N. C., Conrad Hill, etc.

MINNESOTA.

Table for Minnesota stocks, Duluth, Dec. 12. Includes stocks like Biwabik M. Iron Co., Cincinnati Iron Co., etc.

Table for Missouri stocks, St. Louis, Dec. 20. Includes stocks like Adams, American & Nettie, Bi-Metallic, etc.

Table for Montana stocks, Helena. Includes stocks like Bald Butte, Benton (Group), etc.

Table for Pennsylvania stocks, Philadelphia, Dec. 21. Includes stocks like Bloomington C. & C., Buck Mountain, etc.

Table for London Quotations, Dec. 5, 1893. Includes stocks like Alaska Treadwell, Alaska Ter, etc.

Table for Paris, Dec. 8, 1893. Includes stocks like Belmez, Spain, Golden River, etc.

Table for New York Mining Stocks, Dec. 22. Includes stocks like Alice, Alta, Belcher, etc.

Table for Assessments, with columns for company, no., date in office, day of sale, and amt. per share. Includes stocks like Alta, Nev., Belcher, Nev., etc.



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Bucyrus Steam Shovel and Dredge Co.

**Pipes**  
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Johnson Matthey & Co.

**Powder**  
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Atlantic Dynamite Co.

**Pumps**  
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Cameron, A. S., Steam Pump Works.  
Groetzinger, A., & Sons  
Jeanesville Iron Wks.  
Knowles Steam Pump Works.  
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Pulsometer Steam Pump Co.  
Stillwell-Bierce & Smith-Valle Co.  
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Financial Times.  
Pyrites  
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**Quarrying Machines**  
American Diamond Rock Boring Co.  
Ingersoll-Sergeant Rock Drill Co.  
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Porter, H. K., & Co. | Young Lock Nut Co. (See Machinery.)

**Refrigerating Machines**  
De la Vergne Ref. Machine Co.

**Regulators, Dampers, Heat, Etc.**  
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**Rock Drills.** (See Air Compressor.)

**Roofing**  
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Pencoyd Bridge and Pittsburg Bridge Co.  
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**Rubber Goods**  
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Harrington & King Perforating Co.  
Mundt & Sons.  
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Baltimore Cop'r Wks. | Penna. Salt Mfg. Co.  
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Matsillon Smelting Co. | Smelt. Co.  
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**Steel Rails, Castings, Rolls, Drill**  
See  
Abbott, Wheelock & Co.  
Baltimore Iron Co.  
Billings & Spencer Co.  
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Chester Steel Cast. Co.  
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**Moore, S. L., & Sons Co.**  
Reliance Steel Co.  
Roberts, A. P., & Co.  
Robinson & Orr.  
Whitney, A., & Sons. (See Metal Dealers.)

**Tanks**  
Pollock, Wm. B. & Co.  
Scaife, Wm. B. & Son.  
Star Boiler & Sheet Iron Works.  
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**Telegraph Wires and Cables**  
Okonite Co., The, Ltd.

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Oil Well Supply Co. | Williams Bros.

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American Diamond Rock Boring Co.  
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Harrington & King Perforating Co.  
Mundt & Sons.  
Tyler, W. S., Wire Works.

**Wire Rope and Wire**  
Abbott, Wheelock & Co.  
California Wire Works.  
Cooper, Hewitt & Co.  
Hunt, C. W., Co.  
Phelps, Dodge & Co.  
Roebling, J. A., Sons & Co.  
Ropeways Synthesize, Ltd.  
Trenton Iron Co.  
Washburn & Moen Mfg. Co.

**Wire Rope Tramway**  
Brown Hoist. & Convey. Machine Co.  
California Wire Works.  
Colorado Iron Works.  
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Hunt, C. W., Co.  
Roebling, J. A., Sons & Co.  
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Vulcan Iron Works.

**FREE ADVERTISING.**

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE, whether subscribers or not.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

Applicants should inclose the necessary postage to insure the forwarding of their letters.

**Positions Vacant.**

**1294 WANTED—A YOUNG MACHINERY** molder as workman and instructor in a college foundry. Wages will include the chance for a good mechanical education and the cost of living. Send copy of references, and state age and experience in detail, to LAS CRUCES, ENGINEERING AND MINING JOURNAL.

**1296 WANTED—AT A POINT IN NEW** Jersey—a chief engineer of experience to take charge of a large power plant of compound and triple expansion engines; must be a practical mechanic, thoroughly familiar with the theory and practice of modern engineering. Full references must be given; salary required, and time when applicant could accept position must be stated. Address BARBETTE, ENGINEERING AND MINING JOURNAL.

**1297 WANTED—AN EXPERIENCED** mill man, with unquestionable references as to character and ability, willing to go to Mexico. Must have had at least five years' experience with refractory ores. Address with references and salary expected MILLMAN, ENGINEERING AND MINING JOURNAL.

**1298 WANTED—TWO MACHINIST ENGI-** neers with unquestionable references as to character and ability, willing to go to Mexico. Address giving references, experience and salary expected MACHINIST, ENGINEERING AND MINING JOURNAL.

**1299 WANTED—A MINING ENGINEER** of practical experience for a gold and silver mine in Central America. Address CENTRAL AMERICA, ENGINEERING AND MINING JOURNAL.

**1300 WANTED—A COMPETENT CHEM-** ist for general analytical work, particularly analyses of clays, limestone, and cements and mineral waters. Also an instructor in mathematics, preferably with some knowledge of mining or geology. Address STATE SCHOOL, ENGINEERING AND MINING JOURNAL.

**1301 WANTED—FIRST-CLASS** draughtsman (letterer); good salary paid. Send samples of work with application to DRAUGHTSMAN, ENGINEERING AND MINING JOURNAL.

**1302 WANTED—A SKILLED ASSAYER** of silver, lead and gold, one who has some knowledge of bookkeeping, for a silver mine in Montana. State qualifications and salary expected. MONTANA, ENGINEERING AND MINING JOURNAL.

**1303 SUPERINTENDENT WANTED.—A** large jobbing foundry, having a capacity of 40 tons per day, and running principally on architectural cast-iron work, desires to secure the services of an experienced superintendent; must thoroughly understand the practice and economical production of heavy and light castings by the most modern foundry practice; must understand the mixing of iron and be competent to figure on work; to the right man, who can take general charge, we can offer extraordinary inducements, and will, as soon as ability is demonstrated, give interest in the business. Address COLUMNS, ENGINEERING AND MINING JOURNAL.

**1304 WANTED—A THOROUGH, PRA-** ctical and energetic young man to take charge of the tap and die department. Must come well recommended. BLOWER, ENGINEERING AND MINING JOURNAL.

**1305 WANTED—PATTERNMAKER FA-** miliar with locomotive cylinder work. TAUNTON, ENGINEERING AND MINING JOURNAL.

**1306 WANTED—BY A LARGE CHEMI-** cal company, competent copper chemist, who has had practical experience in copper smelting works. Must be familiar with latest laboratory practice. Address COPPER, ENGINEERING AND MINING JOURNAL.

**Situations Wanted.**

Advertisements for SITUATIONS WANTED will be charged only 10 cents a line.

**CHEMIST AND MINING ENGINEER, WITH** several years' practical experience, desires position Young man and willing to go anywhere. Can give best reference. Address F. C. J., ENGINEERING AND MINING JOURNAL. No. 15,741, Dec. 30.

**AN ACTIVE AND ENERGETIC COAL** mines and coke works manager will be open for an engagement at New Year. Thirty-one years' practical experience in coal mines; nine years' superintendent of large and fiery mines in Pennsylvania. Has thorough knowledge of coking, coal prospecting, planning and all inside and outside details connected with the successful management of coal mines. Now employed as Mining Engineer by a large coal land corporation in one of the Southeastern States. Highest references from present and past employers. Address "LANARK," ENGINEERING AND MINING JOURNAL. No. 15,734, Dec. 30.

**MEMBER OF AMERICAN SOCIETY ME-** chanical Engineers, who has had 20 years' practical experience as follows: Machinist, chief draughtsman, erector of engines and machinery, engineering, estimating, contracting, office work and superintendent of large engine works—is available for responsive position. Address SUPERINTENDENT, ENGINEERING AND MINING JOURNAL, 531 Rookery, Chicago, Ill. No. 15,753, Dec. 30.

**A GENTLEMAN WITH A LARGE EXPERI-** ence in engineering and manufacturing, and highly skilled in designing, estimating and contracting, production and cost sheets, technical and general correspondence, management, etc., is free to consider a responsible engagement. Address G. W. SCOTT, Ravenswood, Ill. No. 15,746, Dec. 30.

**WANTED—SITUATION AS SUPERIN-** tendent or mine foreman, by mining engineer and surveyor. At present holding responsible position. Holds certificate of qualification as mine foreman for Pennsylvania. Address THOS. CROSS, P. O. Box 195, Plymouth, Luzerne County, Pa. No. 15,738, Dec. 30.

**WANTED—A SITUATION AS FOREMAN** of iron foundry. Best of references. Address ABILITY, ENGINEERING AND MINING JOURNAL. No. 15,745, Jan. 5.

**CHEMIST AND ASSAYER WITH WIDE EX-** perience in all kinds of chemical analysis desires position. Is a member of American Institute of Mining Engineers, and member of Chicago Academy of Sciences. References from last employer. Address COLUMBUS, ENGINEERING AND MINING JOURNAL. No. 15,724, Jan. 6.

**PRACTICAL METALLURGIST, NOW IN** Southwest, desires position. Seven years' experience in mining and smelting copper ores. Chemist. Address J. A., ENGINEERING AND MINING JOURNAL. No. 15,731, Jan. 6.

**YOUNG MAN OF 24, GRADUATE IN MIN-** ing, with three years' experience in railroad and general engineering work, at present county surveyor, desires position as assistant mining engineer. Address GEO. B. GILL, Searcy, Ark. No. 15,748, Jan. 13.

**A RENSSLAER GRADUATE, THREE** years' experience, desires a position. Has had experience in preliminary, location, construction and maintenance of way; also on masonry dams. Address M. E. F., ENGINEERING AND MINING JOURNAL. No. 15,747, Jan. 27.

**CHEMIST AND MINE ENGINEER, THREE** years with a Lake Superior iron company, wants situation as assayer, chemist or mine surveyor. Unmarried. Good recommendations. Will go anywhere. V. B. SHERROD, Decatur, Mich. No. 15,754, Jan. 20.

**BY A MACHINE DRAUGHTSMAN OF EX-** perience and proved ability; can show good record with reliable firms East and West; permanent position wanted. Address SQUARE, ENGINEERING AND MINING JOURNAL.

**RESPONSIBLE POSITION WANTED BY A** graduated chemist and engineer; superintendency or assistant superintendency in steel works or blast furnaces preferred; is a metallurgist and can burden furnace; is well up in modern engineering practice; thoroughly understands machinery and the economies of production; can design and build mills or furnace plants. Address "MODERN ENGINEERING," ENGINEERING AND MINING JOURNAL.

**AN ACTIVE AND ENERGETIC MINE** Superintendent, graduated Mining Engineer, with an extensive practice in Europe and the United States, will be open for an engagement shortly after New Year. Specialties: Mining, Milling and Chlorination of Gold Ores, and Mining and Concentration of Lead and Zinc Ores. Will accept a position as Superintendent or Manager of a mining company with good standing. Highest references. Address ENERGETIC, ENGINEERING AND MINING JOURNAL.

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An Engineer, Chemist or Draughtsman,  
NOTIFY  
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PROMPT. HONEST. EXPERIENCED.  
We will have men write you.  
**Contracts Open.**

**SEALED PROPOSALS FOR LIGHTING THE** City of Jackson, Miss., with Electricity. Mayor's office, Jackson, Miss. Notice is hereby given that sealed proposals will be received at the office of the City Clerk until January 2d, 1894, for lighting the streets, alleys, parks and public buildings of the City of Jackson with electricity, for a term of five years from March 1st, 1894, in accordance with the plans and specifications on file in said Clerk's office. Also proposals will be received from each bidder of the cost price at which the plant put up according to said specifications may be purchased by the city. The Board reserves the right to reject any and all bids. L. F. CHILES, Mayor.

The Most Successful Process for the Extraction of Gold.

**IMPROVED BARREL CHLORINATION.**

The undersigned has completed drawings and plans of the latest improvements in Barrel Chlorination, and is open to engagement for the testing of ores, the erection and operation of plants of any capacity. The most successful works in this country were managed by the undersigned.

Correspondence solicited.

JOHN E. ROTHWELL,  
ENGINEERING AND MINING JOURNAL, New York.

**WATER WORKS—Proposals will be received at** the Mayor's office in Cadiz, Harrison county, O., until January 2d, A. D. 1894, for plans and specifications, complete, of the best and most modern system of water-works, with estimated cost of complete construction, to be constructed and erected in said village (population, 1,716), if approved and accepted by Council of said village, at a cost not exceeding \$35,000.

The Council of said village hereby reserve the right to reject any and all proposals of plans and specifications, or any parts or parts of any plan and specification presented or proposed as aforesaid.

JAMES MOORE, Mayor.

**BRIDGE.—BUDAPEST, AUSTRO-HUN-** gary—A bridge of a total length of 312 meters and another of 332 meters will be executed on the Danube at Budapest. An international competition for plans and projects is opened for these two bridges. Without regarding to which bridge it refers a prize of \$6,080 will be awarded to the best project, and a prize of \$1,050 to the second best project. If the best project solved the question of connecting the two banks at the Eskuter with one opening, so that it answers the stipulations contained in the conditions, this project will receive a special premium of \$2,430, besides the allotted prize. The Hungarian minister of commerce reserves the right of buying any of the not rewarded projects for \$1,015. If one of the winners should be commissioned to execute the work upon the basis of his tender the prize allotted will not be paid. The projects provided with device and sealed letter containing the device are to be presented to the manager of the bureaux of the Hungarian royal ministry of commerce (Budapest, Lanchid, ulca) latest the 31 January, 1894, toward receipt. The terms to which the surroundings of the bridges and the plans and longitudinal section of every bridge are subjoined can be obtained at every consulate general of Austria-Hungary.

**MINISTRY OF PUBLIC WORKS, Cairo,** Egypt.—The Egyptian Government puts up to adjudication the construction and working of a tramway line of narrow gauge from Mansourah to Menzaleh and Matarieh, with its branch lines, on the conditions of the act of concession and the specification, copies of which will be forwarded to those who apply for them by letter addressed to the Minister of Public Works, Cairo, Egypt. Offers will be received at this Ministry up to February 1st, 1894. Persons tendering should indicate the width of the line, and all other dispositions relative to the type of permanent way and rolling stock, and the term for which they require the concession. This term may not exceed forty years. The Egyptian Government reserves to itself the right of selecting and accepting whichever offer it prefers, or of rejecting any offer, however advantageous it may appear to be.

**WATER-WORKS.—Proposals will be received** at the Mayor's office in Cadiz, Harrison County, O., until January 2d, 1894, for plans and specifications, complete, of the best and most modern system of water-works, with estimated cost of complete construction, to be constructed and erected in said village (population 1,716), if approved and accepted by Council of said village, at a cost not exceeding \$35,000. The Council of said village hereby reserve the right to reject any and all proposals of plans and specifications, or any part or parts of any plan and specification presented or proposed as aforesaid. JAMES MOORE, Mayor.

**WATER-WORKS.—Sealed bids will be received** by the City of Bolivar, Missouri, for constructing a complete system of water-works, until February 1st, 1894. Specifications may be obtained on application to the clerk of said city. K. M. DYSART, Mayor.

**CREMATORY.—Sealed bids will be received** until January 25th, 1894, at the office of the City Secretary of the City of Dallas, Tex., for the building of a crematory of seventy-five (75) cubic yards capacity, guaranteed to thoroughly cremate night soil and all kinds of garbage. Plans and specifications to accompany the bids for building the same. The city reserves the right to reject any or all bids. Address G. W. CRUTCHER, City Secretary, Dallas, Tex.

**SEWER CONSTRUCTION.—Sealed bids for** building a storm water sewer on 12th, 13th, Dale and 17th streets will be received by the City Clerk of Sioux City, Ia., until January 16th, 1894. There will be about 1,200 ft. of 3-ft. 4-in., 300 ft. of 4-ft. 6-in. and 3,300 ft. of 6-ft. brick sewer, and about 500 ft. of 12, 15 and 18-in. pipe sewer, about 50 brick inlets and 15 manholes. Plans can be seen and specifications and bidding blanks can be obtained at the office of the City Engineer. Two bids are asked; one conditional upon payment on monthly estimates in cash and one on payments on monthly estimates in "sewer bonds" running two, three, four and five years, bearing interest at the rate of 6 per cent. KNUDE SUNDE, Chairman Sewer Committee.

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FOR SALE—GOLD MINE.

Thirty feet vein, free milling, finely situated, good water power. Ore will mill ten dollars per ton.

Address T. A. DOLAN,  
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I have for sale some valuable Gold Mines, located in North Georgia. Some of the property has been pretty well developed. Ores analyzed, yields \$25 to \$580 per ton. Correspondence solicited.

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A fully developed GOLD MINE in Virginia is for sale, in part or whole, at one-fourth the sum for which a property of the same value could be purchased in a Western State, present controllers not having sufficient capital to put down a chlorination plant and operate it. There are eight to ten true fissure veins assaying \$10 to \$275 per ton. Mill of 10 stamps, engine, boiler, etc.; miners' wages, \$1 per diem; 274 acres of land, over half under cultivation; plenty of wood and water; good residence and all necessary outhouses. A rich magnetic iron ore vein, free from sulphur, crosses the property for three-quarters of a mile; five miles from railroad station. Mining can be done 12 months in the year. No snow blockades; no blizzards. Address

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IN GERMANY.

The works are in first-class order and have been in operation for centuries. The supply of ores is inexhaustible. Present production, about 1,500 tons of lead and 7,000 kilos of silver yearly; can easily be increased. High profits guaranteed.

The amount necessary for buying the property and providing working capital is one and a third million marks (\$320,000). Address

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Capital, £110,000 Sterling.

TO MINE OWNERS and others having Refractory Gold and Silver ores hitherto untreatable at a profit, the MacArthur-Forest Cyanide (Patent) Process of gold and silver extraction offers a solution of the difficulty.

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MOLLIE GIBSON CONSOLIDATED MINING AND MILLING COMPANY.

COLORADO SPRINGS, Colo., November 1st, 1893.

DIVIDEND NO. 40.

A dividend of five cents per share (\$50,000) has been declared, payable November 15th, 1893, to stockholders of record on November 8th. Transfer books close November 8th, and reopen November 16th, 1893.

PERCY HAGERMAN, Sec'y-Treas.

PHENIX MINING COMPANY

REORGANIZATION.

Holders of Reorganization Certificates issued by the State Trust Company may obtain the new stock to which they are entitled under the plan of reorganization on the presentation and surrender of their Reorganization Certificates at the office of the Phoenix Consolidated Gold Mining Company, Room 41, Astor Building, No. 10 Wall street, New York, on and after January 2d, 1894, between the hours of 10 A. M. and 2 P. M.

O. F. BROWNING,

Secretary of Reorganization Committee.

WANTED AT ONCE.

Copies of the Engineering and Mining Journal of January 11th, February 8th, May 3d and August 2d, 1890; January 3d, February 7th and May 9th, 1891; October 22d and 29th, and December 10th, 1892; July 29th, 1893.

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A Good Instrument for a German Engineer.

- 1 German Mining Theodolite, with extra level for short level work.
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- 1 Metric Sliding Leveling Rod.
- 1 Lantern for same (in case).
- 1 box with metre reel and 6 screws for spreizen-aufleitung of theodolite, and set plate for theodolite on tripod.

Manufactured by LINGKE, of Freiberg, Germany.

Address Theodolite,

ENGINEERING AND MINING JOURNAL

Any time you are in the market to buy STEEL RAILS,

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STAND PIPE FOR SALE.

OFFICE OF THE COMMISSIONERS OF THE District of Columbia, Washington, December 2d, 1893. Sale of a Stand-Pipe. A Stand-Pipe, as herein-after described, belonging to this municipality, has been abandoned after about fifteen years' use, because of a change in the water supply system with which it was connected, and will be sold as it stands to the most favorable bidder. Proposals to purchase it will be received until 2 o'clock on the 3d day of January, 1894, at this office. It is essential that the bidders state when they will remove the pipe. The stand-pipe is 52 ft. high and 30 ft. in diameter. It consists of 8 rings of wrought iron plates, 8 of which are practically 5 ft. between rivets in horizontal seams. The thickness of the plates, commencing at the base, is as follows: First 10 ft., 3/4 in.; 2d 10 ft., 3/4 in.; 3d 10 ft., 3/4 in.; 4th 10 ft., 3/4 in.; and last 12 ft., 1/2 in.; approximate weight, 110,000 lbs. The right to reject all bids or parts of bids is hereby reserved.

J. W. ROSS,

M. M. PARKER,

C. F. POWELL,

Commissioners D. C.

FOR SALE, CHEAP.

Fifteen miles, more or less, of Spiral Weld eight-inch pipe newly coated with maltha; weight, 7.88 pounds per lineal foot; in lengths 16 to 20 feet; warranted by manufacturer to stand a pressure of 500 pounds per square inch, and especially adapted for irrigation and water-works. Inquire of

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FOR SALE CHEAP.

- 3 Lidgerwood Hoists.
- 2 Raymond Crushers } Nearly new.
- 2 Raymond Pulverizers }
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- Boilers, Conveyors, Cars, Cages, etc.

At Republic, Mich.

Send for itemized list.

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AN AGENT AND PROMOTOR WITH unquestionable references and 25 years' business experience in Chicago is especially qualified to act as agent and to promote the interests of manufacturers desiring such services. Address G. D. GREGORY, Room 513, 218 La Salle street, Chicago, Ill.

Capital Wanted.

Fifty Thousand (50,000) Dollars, with which to erect and operate a large gold reduction works on a well developed gold property of unquestioned merit.

The very best security, including a handsome interest in the property, will be given the right party.

The property has been examined and tested thoroughly by a competent and experienced engineer, whose report and other information can be obtained by applying to

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**DIAMOND BIT ROCK DRILL**  
 FOR HAND AND OTHER POWER.  
 Brings out a Core. Write for Particulars.  
**WM. HASENZAHL, Mfr.,**  
 135 West Second Street, Cincinnati, Ohio.

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 MINING ENGINEERS.  
 Specialty Made of Copper Metallurgy.

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 HEAD OFFICE:  
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 Miners and Smelters of Copper-Nickel  
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**COPPER-NICKEL.**

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 Copper Smelting and Rolling Company  
 (THE BALTIMORE COPPER WORKS),  
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