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Headquarters of the Mining Industry.

Visitors to New York will find at the offices of The Engineering and Mining Journal, 253 Broadway, files of papers from the mining districts of this and other countries, books of reference and every convenience for correspondence. They can also have their letters addressed in care of The Engineering and Mining Journal, P. O. Box 1833, New York.

All are cordially invited to make use of these facilities.

The Coming Boom in New Zealand Mines.

There is every indication that the next mining boom in London will center round the New Zealand gold mines. The political uncertainty of South Africa has indefinitely suspended new mining ventures in that quarter of the world, and the absence of paying mines is making the British public rather tired of West Australia. The chance of a revival of an interest in American mines has apparently gone by for the time. Our London correspondent has made inquiries in various quarters, and the practically unanimous opinion of promoters is that New Zealand mines are to be brought prominently before the public during the next six months. The Exploration Company have already formed a subsidiary syndicate called the Consolidated Gold Fields of New Zealand, Limited, and their experts are busily engaged examining a number of properties. One firm which has been a very prominent promoter of West Australian mines has just formed a syndicate called the London and New Zealand Exploration Syndicate, the purpose of which is to float New Zealand mines in London. The success of the Hauraki Company, which has paid £80,000 in dividends during the 15 months of its existence on a capital of £40,000, is being held up as an example, and its name will become as famous as Bayley's Reward in the course of a few months. A number of mines in the same district have already been floated in London, and the public have responded to the appeals for capital in a way which is very pleasing to the promoter.

Settlement of MacArthur-Forrest Suit vs. Mercur Gold Mining Company.

This suit, which was commenced so long ago, and which has been interrupted and delayed by the various legal processes well known to the able advocates on both sides of the case, has at last been settled by compromise. It will be remembered we announced in the Journal two weeks ago that the MacArthur-Forrest Company had withdrawn their claim to the zinc-shaving patent in the suit pending in the Transvaal, but whether this influenced the sudden compromise with the Mercur we do not know. We learn from our correspondent in Salt Lake City, Utah, and from the Herald and Tribune of Salt Lake City, that the MacArthur-Forrest Company has agreed to accept so nominal a royalty for the future, and the arrears of royalty claimed were condoned for so small a sum that it was better for the Mercur people to come to this arrangement than to go on litigating at great expense and unsupported by other companies using the cyanide process, who were equally anxious to avoid payment of royalties, but at the same time too individually selfish to contribute to the cost of this expensive litigation.

For some time the Mercur Company recognized the validity of the patent and paid royalty upon it, which made their case, under rulings that have already taken place in similar suits, a difficult one, but in 1893, regarding the royalty as exorbitant and being advised by their counsel, Judge Dickson and Mr. Frank Pierce, that the patents were probably invalid on various grounds, they refused to pay any more royalty. We take it that the real facts in the case are that it was simply a question of economy and not of any doubt as to the ultimate decision in the suit.

It seems to have been abundantly proved in the evidence recently taken in the South African case that there can be no claim to priority in the use of dilute solution of cyanide for the extraction of gold from its ores, and the general impression in the West has been that the MacArthur-Forrest Company has been relying, in this country, principally upon its exclusive patent rights to use zinc-shavings, yet since this is abandoned in South Africa it can scarcely be held good here.

Le Neve Foster's Report Upon the British Mineral Industry.

It is with pleasure that we compliment Mr. Le Neve Foster on his first annual general report, which nominally is upon the mineral industry of the United Kingdom for the year 1894, but in reality covers very much more ground. The work should really be divided into two parts, the first of which we review in this issue of the Engineering and Mining Journal, viz., that relating entirely to the United Kingdom. The second part is taken up, as a first attempt on the part of the British Government statistician under recommendation of a Royal Commission, with a comparison of the British mining industry and that of other countries; this we shall review in our next issue.

The title of the book adopted by Mr. Foster is itself a compliment and acknowledgment to the work done in The Mineral Industry, Its

Statistics Technology and Trade, issued by the Scientific Publishing Company, and in referring to the sources of information depended upon for foreign production this work is specially commended in flattering terms, and its statistics of United States mineral productions are alone used.

With regard to the systematic manner of presenting the statistics nothing could be better. The diagrams and maps are excellent, and generally speaking the whole compilation is such an array of accurate facts and figures as has rarely been brought together in one volume. We are quite accustomed to very instructive Blue Books drawn up by Inspectors of different departments of mines and districts in Great Britain, but the information has not heretofore been put together as a harmonious whole. Mr. Foster has succeeded admirably in this his first report.

The information bearing upon accidents in mining is particularly interesting and instructive, but all of these special points are dealt with in the review, which will be found on another page.

Since the metric system has not yet been generally adopted in Great Britain, Mr. Foster is compelled, no doubt much against his will, to give his returns from coal, iron and other mines in what are called statute tons of 2,240 pounds each, but we are glad to observe that just so soon as he commences to deal with statistics from foreign countries, he immediately, and no doubt gladly, accepts the metric ton in their place. This system of measurement is much more rational, and we are not the least astonished to find so good a statistician adopt it.

Progress in West Kootenay, B. C.

Judged by the standard of the Rand, Westralia, or Cripple Creek, the district of West Kootenay, British Columbia, can hardly be regarded yet as one of the foremost producers of the precious metals. But if the almost incredible difficulties in the way of the development of the country, arising both from its large area and rugged nature, and from the fact that while it is politically a part of Canada, it is geographically tributary to the United States, be taken into account, the advance it has made since 1891 is most striking. West Kootenay is not a single ore belt, like Cripple Creek or the Rand, but a collection of mining camps of widely different characteristics scattered through the mountains which fringe the course of the Columbia River from the 49th to the 51st parallel.

In 1891 a little desultory mining was being carried on at the Hall mines on Toad Mountain, at Ainsworth, and at the Blue Bell mine on Kootenay Lake. Means of communication with the outside world there were none except during the summer months, and only a few sample shipments of ore had borne witness to the possibilities of the country.

Now there are no fewer than five short lines of railway in continuous operation connecting the different producing camps with the main waterways by which their output finds its way to the smelting and refining centers. And railway construction is not by any means at a standstill, but is being pushed forward in all directions to keep pace with the requirements of the mines.

In 1891 there was not a single producing mine in the country; now there are no fewer than 48 properties which are actually producing and shipping ore. The output from some of these during 1895 was very small, and the heaviest producer in the district, the Le Roi, at Trail Creek, only shipped 10,500 tons. The approximate value of the ore shipped during 1895 was \$1,870,000. The output was divided among the different camps as follows: Trail Creek Division, 21,025 tons of copper gold ore; Ainsworth Division, 2,279 tons of silver lead ore and concentrates and bullion; Nelson Division, 1,345 tons of copper, silver and gold ore; Slocum Division, 8,100 tons of silver lead ore and concentrates; the total value being in round numbers as above.

The total output of the district for the first two months of 1896 has been 5,516 tons of ore concentrates, bullion and matte, of which the approximate value was \$590,000. If this bears the same relation to the output of 1896 as the output of January and February did to that of 1895, the value of ore bullion and matte exported during 1896 should be \$3,350,000 in round numbers. But there are various circumstances which make this an underestimate. In the first place, it takes no account of the output of the Le Roi, the heaviest shipper in 1895, and which for the last two months has been shipping to a local smelter not yet blown in, to which it is under contract to deliver 37,500 tons of ore, or nearly twice as much as the total output of the Trail Creek mines during 1895. Second, it takes practically no account of the output of the Hall mines, on Toad Mountain, which are now running 100 tons of ore a day through their smelter at Nelson, and are only credited with a little over 100 tons of matte during January and February. Another important factor is that railways which have only come into operation lately will have a great effect in regulating the output. During 1895 there was a continual succession of aggravating stoppages from bad roads and want of storage room at the mines.

It has been estimated that if the mines at present opened in West Kootenay worked continuously this year the output would be worth \$10,000,000. Allowance being made, however, for the apparently inevitable

breakdowns from one cause or another, the output should not at the worst fall below \$5,000,000 and will probably reach \$7,500,000.

There are two possibilities which, if they occur, will altogether upset these calculations, the first, the influx of a large amount of Eastern or English capital, the second, the discovery of some new phenomenon like Trail Creek, which exported 2,300 tons in 1894 and over 21,000 tons in 1895. But these belong to the element of the unforeseen, which, while it makes half the charm of existence in a mining country, cannot be reckoned on in a sober estimate of its immediate future.

NEW PUBLICATIONS.

SOUND CURRENCY, 1895; A COMPENDIUM OF ACCURATE AND TIMELY INFORMATION ON CURRENCY QUESTIONS, INTENDED FOR WRITERS, SPEAKERS AND STUDENTS. New York; Published by the Reform Club Sound Currency Committee. Pages 503; illustrated. Price (in paper), \$1; cloth, \$1.25.

The New York Reform Club has done good service in the currency discussion by issuing from time to time pamphlets on the subject for popular circulation. The volume now referred to consists of a number of these pamphlets, issued during the past year, bound together in book form. It is a collection of information and argument which will supply the advocate of honest money with abundant material. The pamphlets are all by well-known writers, most of them by men whose names carry weight. Some of them are largely statistical, giving the facts and figures which bear directly on the question; others are argumentative, giving the reader the reasons why honest money is the best for all concerned and why "cheap money" is a delusion and a depreciated dollar would be an injury to all. Others are in a higher style, intended to catch the popular fancy, and to put the arguments and information into a shape where they can be quickly and easily grasped, even by those who are no students. The last-named class includes a number of cartoons, some of which are really graphic and telling. These pamphlets should have the widest possible reading, and sound-money men will help their cause by aiding in their circulation.

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 on another page of the Journal.

New York Stock Exchange; Handbook: The Manual of Statistics, 1896. New York; Charles H. Nicoll. Pages, 488. Price, \$3.

Annual Reports of the Inspector of Mines for Allegheny and Garret Counties, for the Years 1894 and 1895. Baltimore, Md.: State Printers. Pages, 39.

Iowa Geological Survey; Fourth Annual Report for the Year 1895. By Samuel Calvin, State Geologist. Des Moines, Iowa; published by the Survey. Pages, 31.

Indiana Geological Survey; Nineteenth Annual Report for the Year 1894. By S. S. Gorby, State Geologist. Indianapolis, Ind.; State Printers. Pages, 296; with map.

ABSTRACTS OF OFFICIAL REPORTS.

Atlantic Mining Company's Report.

The directors present the following report of operations during the year 1895:

The production of mineral was 6,239,000 lbs. which yielded about 77.6%, or 4,832,497 lbs. of refined copper for which there has been realized about 10.5% c. per pound.

The following is a summary of the year's business:

PRODUCTION.	
4,832,497 lbs. copper sold for.....	\$508,252.47
Add interest received.....	760.27
	<hr/>
	\$509,012.74
COSTS.	
Working expenses at mine, as per clerk's tables.....	\$336,131.06
Smelting, freight and all other expenses.....	62,282.21
	<hr/>
Showing a gross profit in 1895 of.....	\$110,599.47
Add amount credited real estate for stampage.....	2,687.00
	<hr/>
	\$113,286.47

The following expenditures have also been made during the year, as per detailed statements hereafter, viz.:

Construction account at mine.....	\$19,585.34
Construction account at new mill.....	91,587.24
Construction account on new railroad.....	6,933.04
	<hr/>
Excess of expenditure over receipts.....	\$4,819.15
The surplus from 1894 was.....	155,691.12
	<hr/>
Making the net surplus December 31st, 1895.....	\$150,871.97

as shown in the annexed statement of assets and liabilities.

SUMMARY OF RESULTS.

Ground broken in openings and slopes.....	20,037 fathoms
Rock stamped.....	321,458 tons
Product of mineral.....	6,239,000 lbs.
Product of refined copper.....	4,832,497 "
Yield of refined copper per cubic fathom of ground broken.....	241 "
Yield of rock treated, 14 1/2 lbs. per ton, or.....	0.73%
Gross value of product, per ton of rock treated.....	\$1.5352
Cost per ton of mining selecting and breaking, and all surface expenses, including taxes.....	.7525
Cost per ton of transportation to mill.....	.0418
Cost per ton of stamping and separating.....	.2229
Cost per ton of working expenses at mine.....	1.0153
Cost per ton of freight, smelting and marketing product, including New York office expenses.....	1.2834
Cost per ton of running expenses.....	1.2034
Total expenditure (including construction) per ton of rock treated.....	1.5605

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. Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

Acetylene Mystery.

Sir: In reference to what you write in your esteemed paper about makers of calcium carbide, we take the liberty to inform you that, at present, we are the only manufacturers of calcium carbide on the Continent. The Mannheim works in Baden have never manufactured this, but have only for sometime been occupied with the solution of acetylene.

ALUMINUM-INDUSTRIE-ACTIEN-GESELLSCHAFT.

NEUHAUSEN (SCHWEIZ), Feb. 24, 1896.

Roasting Galena Ores.

Sir: In a lecture delivered some months ago by Prof. Jas. Douglas, Jr., at the Society of Arts, London, the statement is made that "at the Germania Lead Works, Utah, galena ores are successfully roasted in a Brückner cylinder by reducing the rotation to one revolution in 40 minutes." I have heard also somewhere of revolving cylinder ore-roasters at the Arkansas Valley works, Leadville, which are worked with petroleum as fuel.

I should be very much obliged to any of your correspondents who could give me details of the work done by these furnaces, or of successful work done by any other mechanical furnace in roasting galena ores for smelting.

HENRY F. COLLINS.

BATHURST, N. S. W., Dec. 14th, 1895.

Efficiency of West Virginia Coal.

Sir: In the table of tests of West Virginia coals, by Mr. J. W. Paul, published in your issue of March 7th, 1896, there is a matter which requires some explanation. Coal No. 1, from the Pocahontas bed, McDowell County, gives 14,969.5 British thermal units by calorimetric test, and No. 6, from the Pocahontas bed, Mercer County, with less ash and water, gives only 13,695.5 B. T. U., or over 8% less. The proximate analyses and the heating powers of the two coals are as follows:

	H ₂ O.	Volatile.	Fixed C.	Ash.	B. T. U.
No. 1.....	55	18.50	78.85	2.10	14,969
No. 2.....	10	17.00	81.10	1.80	13,695

Taking 14,544 as the B. T. U. of carbon, the fixed carbon in No. 1 coal would give 14,544 × .7885 = 11,468 B. T. U. Subtracting this from the total value of the coal, 14,969, gives 3,501 B. T. U., which, divided by 18.50%, gives 18,924 B. T. U. per pound of the volatile matter. In like manner the fixed carbon of No. 2 would give 11,795 B. T. U., leaving 1,900 for the volatile matter, or, dividing by 17%, only 11,182 per pound, or only 59% of that of coal No. 1. Does the gaseous portion of coal No. 2 have only 59% of the heating value per pound of that of coal No. 1? If so, why, or is there a mistake in the sampling or in the calorimetric work?

The figures of commercial efficiency given in the last column of Mr. Paul's table, are of no value, for they assume that with all the coal a commercial result of just 61% of the theoretical will be obtained. The fact is that the relative efficiency obtained in boiler tests rapidly decreases as the percentage of volatile matter increases above 20%. If an evaporation of only 9.38 lbs. was obtained with the best coal in the test, it is not at all likely that anything near 7.78, the figure given by Mr. Paul, would be obtained from the lowest coal on the list.

WM. KENT.

NEW YORK, March 9th, 1896.

Regulation of Trade in Explosives.

Sir: Number XXVI. of the valuable series of "Notes on the Literature of Explosives," by Prof. C. E. Munroe, which has just appeared,* compliments me by giving a long extract from my address on "The Abuse of Explosives."† It also incorporates, almost completely, a report on "High and Low Explosives" made to the Secretary of the Treasury and published as Ex. Doc. No. 181, Fifty-third Congress, third session. This report is short, speaks only of importation of explosives and is hardly up to the standard of articles furnished in the Sunday edition of any good newspaper. Appendix A gives extracts from the importation laws of Austria, France, England, Sweden and Norway. Based on these laws we find Appendix B, a very crude proposition for "a bill to regulate the importation of gunpowder, nitro-glycerine and other explosive substances." The whole seems to be the gross return for the expenditure of an appropriation of \$5,000 "to enable the Secretary of the Treasury to investigate and report upon the importation, use, transportation and manufacture of high and low explosives with a view of securing by legislation greater security to life and property."

That the results of this investigation are so meager and valueless is probably not the fault of the investigator who, evidently having no previous knowledge of the subject would, doubtless, for the same compensation, have as willingly reported upon the use and abuse of flour, sugar, tobacco or the silver question. The blame lies with those appointing him, and it is a pity, in view of the importance of the matter, that the services of Gen. H. L. Abbot, Lieut. W. R. Quinan, Professor Munroe, or some other man of standing in this field were not secured. Any one of these gentlemen could, for the amount appropriated, furnish a report covering the entire field, and replete with valuable suggestions for legislation, differing perhaps from the proposed "bill," the value of which is evident from the following specimens:

"Sec. 7. No vehicle on which explosives are imported into the United States shall contain more than 4,000 lbs., including weight of enveloping packages, and shall not be transported at a faster gait than a walk. It shall carry a black flag, in dimensions at least 3 ft. square, displayed so as to be of easy view. An extra man to the driver shall accompany such vehicle, whose duty it shall be to keep off and warn all persons who are smoking from approaching said vehicle."

This section is copied almost verbatim from the Austrian regulations which, however, do not require the extra man if the load does not exceed 1,000 lbs.

"Sec. 8. All ships or boats conveying explosives to be imported into the United States shall carry flags of at least 3 ft. square, to be displayed at mast head in the former and at the stern in the latter, black in color when plying in fresh water, and red for all seagoing vessels, and no ship or boat shall carry more than 50,000 lbs. weight of explosives."

This is another Austrian regulation. Both are suited to the inland situation of Austria, to the conditions of its trade and to the customs of its people, but are ridiculous when bodily applied to business in this country. With such a law we should find our harbors infested with fresh-water pirates and salt-water auctioneers, but need have no fear of danger since it is well known that injurious explosions cannot occur while a red or black flag is displayed. By another provision (Sec. 11) gunpowder "imported for private use and not for sale . . . to the amount of 5 lbs. for each passenger shall not be subject to the restriction imposed by this act." If imported for sale it must be put up in special packages, since the would-be law giver evidently believes that the danger of an explosive lies in its venality and therefore provides that any anarchist arriving on these shores may bring with him, free of restriction, 5 lbs. of his favorite compound for private use. However, nothing more has come of these propositions than a dead bill in the last Congress, so no greater harm has been done than to waste the appropriation by giving some incompetent person a sinecure. In itself, the whole matter is hardly worth mention, but the moral is important.

It is certain that our laws and the views of our people are very lax as to the use and abuse of high explosives. The result of this tendency to "take it easy" will be that before long we shall have some desperate outrages, driving people into a frenzy of ignorant fear and causing hasty, ill-considered legislation exceedingly onerous and altogether inefficient. Whose fault will this be? Not the people's—how should they know what to do? Not even the legislators—to what source can the most intelligent Congressman turn to get such information concerning the legitimate explosive business in the United States as may enable him to frame a measure which will be effective, because in consonance with legitimate needs and with the spirit of our institutions? No repressive legislation can be really effective unless it is framed with a due regard to the needs, customs and even prejudices of the well disposed, so as to enlist their sympathy and aid in its enforcement.

My own paper, as quoted by Professor Munroe, gives my views as to the character of needed legislation and as to the means of securing it. The first step is to acquire correct and clear ideas as to the nature and requirements of legitimate work; to this end the manufacturers, transporters and users of explosives should be consulted, their opinions when collected, collated and digested and the final conclusions embodied in reports available to legislators. That reports of such character cannot be expected from governmental agencies, Ex. Doc. No. 181 is evidence, and yet to have any permanent force, such an investigation must be undertaken by a body of such influence that its statements, made after due research and deliberation, shall have decisive weight. Fortunately we have such a body—the Institute of Mining Engineers. The Institute numbers among its members a large proportion of the extensive manufacturers and users of explosives and not a few men who possess a trained knowledge of practical legislation. It can therefore without difficulty select a thoroughly representative committee, to investigate and report upon this subject. To such a committee, with its personal influence, all sources of information should be freely open and views be communicated without the restraint inseparable from a government commission with its necessary publicity. No formal hearings need take place; each member of the committee could collect information in those quarters where his personal influence would have most weight the sessions of the committee for consultation and formal action being reserved for the periods of the regular meetings of the Institute to which reports of progress and conclusions should be presented, from time to time, for endorsement or rejection. These reports when accepted should be distributed like the other papers of the Institute, and as each State contains many members who are centers of local influence, this can be made effective in the deliberations of the legislatures. The whole question may seem to some to be not particularly pressing, but a little consideration will show that it is important and that it deserves the serious attention of the Institute and the co-operation of the press, particularly of the *Engineering and Mining Journal*.

THOMAS M. CHATARD.

Suez Canal Traffic.—The Suez Canal traffic continues to improve. Last year both the vessels and tonnage showed an increase over 1894; 3,434 steamers of 8,448,246 tons passing through the canal, as against 3,352 and 8,059,105 respectively in the preceding year. The receipts, naturally, were also higher, being 78,158,582 francs, compared with 73,850,458 francs. Great Britain, of course, again heads the list of vessels, and the preponderance of her traffic may be illustrated by the following figures for last December: English, 158; French, 23; German, 23; Dutch, 14; Italian, 16; Austrian, 5; Spanish, 3; Russian, 3; Norwegian, 2; Turkish, 1, and Portuguese, 1. The year's statistics show, in a remarkable degree, the tendency to build larger vessels, for a comparison of the figures of 1885 and 1895 indicate that, although last year there was a falling-off in the number of vessels from 3,624 to 3,434, the tonnage increased from 6,335,752 to 8,448,246.

Coal, Iron and Steel in Belgium.—The statistics of the production of coal, iron and steel in Belgium in 1895 have been published in the *Brussels Moniteur*. The output of coal was 20,414,849 tons, as compared with 20,534,501 tons for the previous year. The stocks at the end of the year amounted to 657,596 tons, as compared with 707,945 tons for the corresponding date of the previous year. The number of collieries at work was 121, as compared with 122.

The total production of pig iron in 1895 was 829,135 tons, as compared with 818,597 tons for the previous year.

The output of finished iron in Belgium for the year 1895 amounted to 453,380 tons, compared with 453,290 tons in the previous year. The quantities of plates produced were 101,479 tons in 1895 and 118,596 tons in 1894. Other descriptions are not specified.

In 1895 the steel works of Belgium produced 455,550 tons of steel ingots, against 405,661 tons in 1894. Of finished steel the output was 392,332 tons in 1895 and 341,318 tons in 1894.

* Proc. U. S. Naval Inst., 1895. Vol. 21, pp 789-833.
† Bull. No. 8, Chem. Soc., Washington, 1893.

THE MINERAL PRODUCTION OF ITALY.

The "Revista del Servizio Minerario," recently issued, gives statements of the mineral production of Italy in the year 1894. The output of minerals from the Italian mines for the year was as follows, the quantities being in metric tons :

Iron ore.....Tons	187,728	Coal and lignite.....Tons	271,294
Manganiferous iron ore....."	5,810	Sulphur, raw....."	13,850
Manganese ore....."	760	Sulphur, melted....."	331,931
Copper ore....."	92,886	Rock salt....."	19,167
Zinc ore....."	131,777	Spring salt....."	11,326
Lead ore....."	29,822	Asphalt and bitumen....."	6,493
Gold ore....."	7,748	Petroleum, crude....."	2,854
Silver ore....."	1,193	Gaseous hydro carbon.....Cub. m.	12,000
Antimony ore....."	1,304	Alunite.....Tons	6,666
Quicksilver ore....."	15,022	Boracic acid....."	2,745
Iron pyrites....."	22,638	Graphite....."	1,570

The total value of the minerals at the mines is given as 52,042,605 lire (\$10,408,521). Nearly half this amount—25,267,955 lire, or \$5,053,591—was furnished by the sulphur mined. The average value of the coal mined was 7 lire (\$1.40) per ton. The gold ore was of low grade, being rated only at 85 lire, or \$17 per ton.

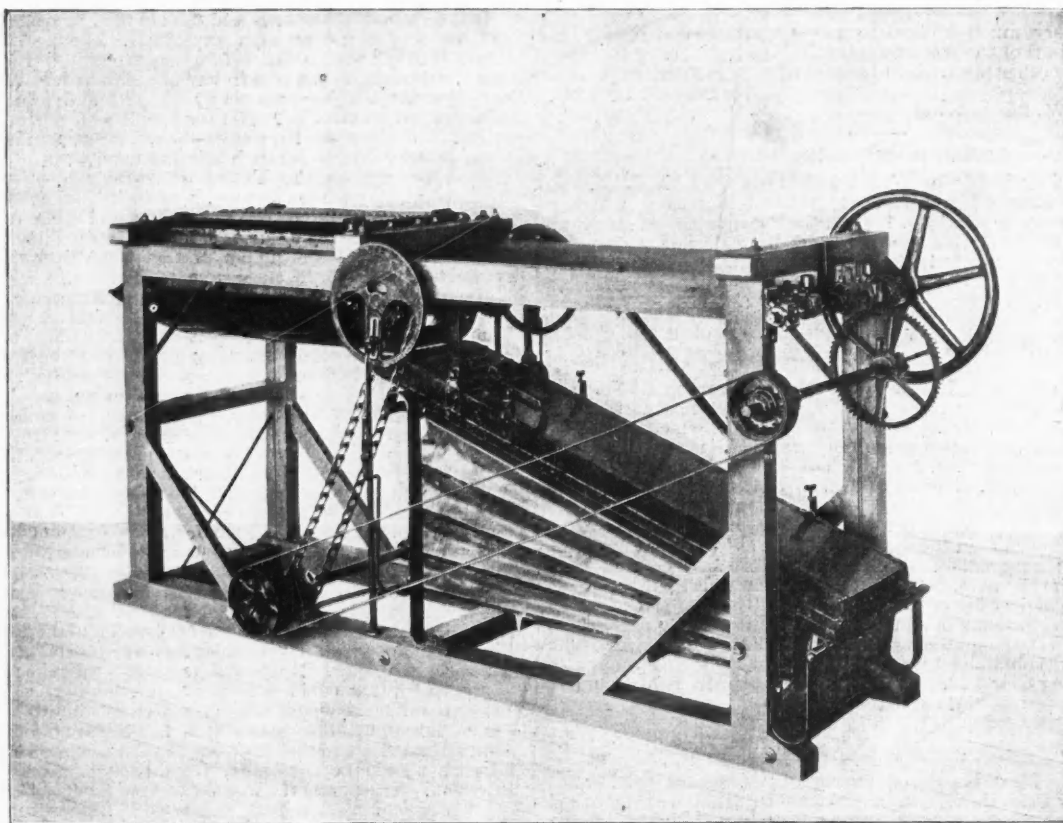
WOODS' DRY PLACER MINER.

The features of this machine are not quite the same as in other dry gold concentrators or amalgamators and has an endorsement which certainly entitles it to careful investigation. These are claimed to be:

First—That it is not essential to a close saving that the material to be treated should be absolutely dry, but only that it should be free from such excessive moisture as would cause it to coagulate after leaving the disintegrator or to adhere to the riffles or other parts of the machine.

Second—That unlike other processes, including hydraulicking or sluicing, it will effect a separation of the gold from heavy material such as black sand, which always contains a large amount of metallic iron.

The method employed is that the ground is conveyed by scrapers to a platform placed over a hopper at the lower end of a charging elevator, and is dumped upon a grizzly or screen. This separates the large boulders or pieces of barren rock, while the material containing values passes through into the hopper. The grizzly lies level above the hopper, and any boulders that may be left upon it are readily removed by the man in charge after the manner customary in placer mines. From the hopper the material passes to the elevator or conveyor, which is of the double chain (or



THE WOODS' DRY PLACER MINER.

Included in the total values, but not given in the table, are mineral waters valued at 409,829 lire, or \$81,965, their amount being estimated at 21,730 tons.

The total number of men employed in and about the mines was 51,994. The average value per man employed was 1,001 lire, or \$200; but no statistics are given as to the time worked. The largest number, 30,339 in all, were at work in the sulphur mines. The lead and zinc mines employed 10,173 persons; the coal mines 2,347, the iron mines 2,178, and the copper mines 2,003. No other industry employed over 1,000 men. In the production of gaseous hydro-carbon only one man was engaged.

The metallurgical products for the year 1894 were as follows in metric tons, except where otherwise noted :

Pig iron.....Tons	10,329	Quicksilver.....Tons	258
Iron castings....."	10,060	Biquettes, mineral....."	506,534
Wrought iron....."	141,729	" wood, peat, etc....."	21,370
Steel....."	54,614	Sulphur, refined....."	75,639
Rolled plates....."	5,700	Sulphur, powdered....."	90,561
Copper and copper alloys....."	7,448	Sea salt....."	402,515
Zinc....."	280	Asphalt and bitumen....."	7,820
Lead....."	19,615	Petroleum, refined....."	1,640
Silver.....Kilos	58,626	Gas, lighting.....Cub. m.	148,982,953
Gold....."	349	Gas products, coke, tar, ammonia, etc.....Tons	433,309
Antimony.....Tons	351		

The total value of the metallurgical products was 165,211,633 lire (\$33,042,327), and the number of men employed was 22,558. Of these, nearly one-half, 11,084 in all, were engaged in the iron and steel manufactures. There were 2,943 men employed in the manufacture of salt and 1,455 in the preparation of sulphur. The gas industry required 3,590 men.

The average value of the zinc produced is given at 1,100 lire (about \$220) per ton. Silver is rated at 110 lire (\$220) per kilogram, and gold at 3,605 lire (\$721) per kilo. Refined sulphur had an average value of 81 lire (\$16.20) per ton. The average value of the products was 7,324 lire (\$1,465) per man employed. The data given, however, do not state the average working time.

link belt) and pan type, and is carried up and falls into the feed hopper of the disintegrating or pulverizing cylinder of the machine proper. The disintegrator or pulverizer consists of a cylindrical chamber containing two horizontal shafts, arranged side by side and parallel to each other, each shaft carrying a number of beaters, the blades of which are set at an angle something like the blades of a propeller. The shafts carrying these beaters revolve in opposite directions, so that the material is not only pulverized by the impact of the blades but is also carried forward continuously toward the table of the machine.

The disintegrator thus feeds the material in a constant and uniform stream to the table on which separation is effected. This table is inclined and forms the upper part of a bellows, the whole being suspended on flat steel springs, allowing a shaking or panning movement which is imparted by means of side rods with eccentrics upon a shaft, the rods being so shaped as to permit ready access to the sides of the table for cleaning up. The table consists of a plate of perforated metal forming the top or upper frame of the bellows and upon it is placed a layer of carpet or cloth of such texture as will allow air to pass through without permitting any particles of pulverized material to drop into the interior of the bellows.

Copper riffles are placed at intervals upon the diaphragm of cloth or carpet, and extending across the table. These are secured by means of side boards, provided with clamping screws, so that they can be readily removed for cleaning up. The table is enclosed with a sheet steel sliding cover leaving about six inches space above its surface.

The material leaves the disintegrator at passing to the table, over the entire width of which it is distributed equally by the shaking or panning movement. It is thus borne downward towards the tail-end of the machine, assisted by pulsating blasts of air from the bellows. The vibrations of the table cause the larger and lighter particles, or gangue, to find place at the top of the stream of material, while the blasts of air from the bellows force the fine sand and dust up and out of the machine, allowing the fine gold to gravitate downward and settle on the cloth behind the riffles. The gold is thus saved while the light, coarse gangue rolls down the incline over the riffles and is discharged as tailings. A leather flap valve is placed across the table at the upper end, so that while allow-

ing the material to pass from the disintegrator to the table it prevents the dust from coming out at the feed end of the machine.

The bellows is worked by means of connecting rods and disc cranks the latter having slotted holes to receive the crank pins, so that the stroke of the bellows may be adjusted, regulating the blast according to the fineness of the gold. The tailings pass from the machine to an elevator or conveyor similar to that employed at the feed end, and are thus carried out of the way, either to a car or directly to the dump. A clean-up should be made at least once a day and may be accomplished by stopping the machine, removing the dust cover and carefully taking out the riffles. The concentrates, that have accumulated behind the riffles are collected by the use of a common hair brush. Commencing at the top they are brushed down the incline into a pan or other receptacle placed to receive them. Having thus carefully collected the concentrates, they can be panned or cleaned in the usual way.

While the machine is in operation the steel slide covering the table is secured by padlock, so that the valuable concentrates cannot be tampered with.

The dimensions, etc., are as follows: Ground space occupied by machine, exclusive of conveyors: Length 14 ft.; width, 5 ft.; height, 6 ft. Shipping weight, 4,200 lbs. Length of machine over all, including conveyors, about 40 ft.; weight, 7,500 lbs. capacity, from 8 to 12 tons per hour. It is manufactured by Fraser & Chalmers.

FIRST ANNUAL REPORT OF THE MINERAL INDUSTRY IN GREAT BRITAIN.

This work, covering the year 1894, commences with an introduction which very fairly outlines its contents and name. In the first place the laws which regulate the mineral workings of the United Kingdom cover mines, quarries and brine wells. Mr. Le Neve Foster, who has had charge of this important work, proceeds to define mines as all workings below ground by artificial light. The question whether certain workings do or do not constitute a mine is therefore decided by the kind of excavation made and not by the nature of the mineral wrought, as it is in some countries; thus what would be ordinarily accepted as a mine in some countries, though worked on the open-cast system, is no mine under the British mining laws, and, again, an excavation for building stone or for fire clay would come under that definition which would scarcely convey a correct impression elsewhere. The work done by Mr. Foster and his sub-inspectors of mines is apparently most conscientiously performed, and the arrangement of the present report under review is well divided as follows: Part I., persons employed; Part II., minerals raised; Part III., accidents; Part IV., prosecutions; Part V., general matters.

Part I. Persons Employed.—During the year the total number of persons employed was 739,097, of whom 589,689 worked below ground, and 149,408 above ground. These figures show an increase in mining activity over the preceding year, there being 18,711 more men employed below ground, and an increase of 1,724 men above ground, while there was a decrease of 85 women employed above ground, showing that even in a time of increased demand for labor the custom of employing the weaker sex is apparently dying out. As is properly remarked by Mr. Foster, the true criterion of the importance of a mine is the number of employees underground, as one colliery may sell its produce without further treatment, or only with that of screening, while another may have to employ hundreds of persons at coke ovens, elaborate washing sheds, briquette factories, etc. As an example, take two of the largest coal producing counties, Durham representing coking coal, and Glamorganshire steam coal. In the former we find that the surface workers make up 23% of the total number employed, and in the latter county those above ground only account for 14%.

When the question of accidents comes to be considered in connection with these statistics it is very important to have this feature fairly brought out, as the risk run by those above ground is very different from that of the underground workers. We would even go further when referring to this subject and say that the proportionate rate is greater in Glamorganshire than it is in Durham, but this fact is not referred to in Mr. Foster's report.

The colored map showing approximately the number of persons employed underground is clear and instructive, covering England, Scotland, Wales and Ireland. Some of the counties have a happy or unhappy immunity from mining, but a greater number are included with a more or less dark tinge than we would have expected.

The tables in the report are as instructive as the maps and diagrams. For instance, the first table shows that 93.8% of the people engaged in mining were connected with the coal industry; 2.1% in iron mines, and 4.1% at the other mines. Table II. classifies the number of persons employed in coal mines according to the separate coal-fields, separating the workers into underground, above ground, and female. Moreover, the Yorkshire coal-field which covers rather more than that county properly, gives occupation to nearly 23% of the total number; after this comes the Northern coal-field, which includes Durham and Northumberland with nearly 20%, and the South Wales coal field follows closely behind with 18%.

Part II. Minerals Raised.—This part starts with statistical diagrams which are very expressive; first, of the persons employed in and about mines; second, value of minerals from mines, openworks and brine wells; third, comparative output of coal from the different coal-fields; fourth, comparative value of minerals other than coal and iron ore; fifth, comparative output of iron ore from different districts; sixth, comparative values of the iron ore produced in the various districts.

In Table V. there is a comparison made on proper principles (taking the value of the product at the mine, quarry, etc.), of the respective tonnages and values between the production of 1893 and 1894. Of course, both in tonnage and value coal is far ahead of any other product, reaching a value in 1894 of £62,730,179, and curiously enough the next product in value is building stone, which amounts to £7,695,716.

Table VI. gives an estimated yield of metals, showing that the estimated yield of copper in Great Britain for 1894 was only 446½ tons from native ore; that gold amounted to 4,235 Troy ounces; iron of course heading the list in weight with 4,347,472 tons; lead, 29,687 tons, and silver, 275,696 Troy ounces. Tin shows up better than copper, 8,327 tons being the estimated yield, so that apparently the Cornish supply is not yet at an end. The increase in the coal production, amounting to 23,951,730 tons over

that of 1893, strikes one at first sight as extraordinary, as there was no special activity in business during the year 1894, but it is in reality owing to the fact that the production of 1893 was abnormally low on account of the great strike. The tonnage recorded above exceeds by 2,798,309 tons the highest output ever before made, viz., that of 1891.

The mineral resources of the United Kingdom are certainly perseveringly worked, and it is interesting to note the list presented in this report. Alum clay in County Antrim, Ireland; alum shale in Yorkshire; arsenic in Cornwall and Devon; arsenical pyrites from the same counties; barytes in Northumberland, Shropshire and parts of Ireland. In Northumberland this is found in its most valuable form, viz., witherite, or carbonate of barium, the other product being sulphate of barium. Bog iron ore from Ireland, used for purifying gas; clay of every description including the finest of fire, pottery and china clays. It would be superfluous to refer to coal if it were not that a portion of this coal is found in oolite formation in Scotland, while the rest may be said to be derived from true carboniferous epoch, though it is claimed that some of the coal in Scotland is of still earlier date, being found in the calciferous sandstone at the base of the carboniferous rock. The seams worked vary from 11 to 12 inches to 30 ft. in thickness, but the "10 yard coal" of Staffordshire must be regarded as quite exceptional. In Scotland seams of Cannel coal only six inches in thickness are being worked.

Table VII. is very interesting as giving the approximate price per ton at the mine, which in England varies from 5s. 5d. to 8s. 8d., the total taken by counties and tons giving an average of nearly 6s. 7d. or \$1.64, which is just about double the average cost of coal in the United States. In Wales the average worked out in the same way is higher, being 7s. 6-22d.

Scotland does not come out quite so well, the value at the mine being \$1.50, while the small amount produced in Ireland fetches approximately per ton at the mine \$2.17, which ought to be all the greater inducement for more energetic development in Ireland.

That copper mining is an industry rapidly decreasing in importance is evident from the diagram in the report. In 1860 the production of copper ore and copper precipitate amounted to upward of 236,000 tons, valued at £1,500,000, whereas in 1894 the output was only 5,994 tons, valued at £16,222. The main sources of supply are from Cornwall and Devonshire, but there is a certain amount of copper precipitate saved by pumping up the water charged with copper from the old mines in Anglesey. Fluorspar and gold are both inconsiderable in value but still make some return, the former being found in Derbyshire and the latter is extracted from quartz veins in North Wales. Gypsum is widely distributed and occurs in workable seams in the counties of Cumberland, Derby, Nottingham, Stafford, Westmoreland and Sussex. In the first five it occurs in rocks of Triassic age, while that in Sussex is considered to belong to the Purbeck beds.

Iron Ore.—The production of this naturally occupies considerable attention in the report, and may be summarized as follows: The principal iron-producing districts at the present time are Cleveland, yielding over 5,000,000 tons annually, and Cumberland, with an output of about 2,000,000 tons. The Cleveland ore is an earthy carbonate bedded about 10 ft. thick in the Middle Lias, whilst the red hematite of the northern district is found in large irregular masses in the carboniferous limestone. The latter is far more valuable ton for ton than the former, as the average of the Cleveland ore is about 30% metallic iron, while the Cumberland hematite will at least average 55%, with many large pockets running as high as 60%. The consequence is that, though very much smaller in quantity, the output of Cumberland and Lancaster is worth considerably more than that of the Cleveland district.

To show the close attention paid to any possible economy in those coal mines that carry nodules of iron pyrites such as are called nigger heads in certain districts of this country, these, after being picked out, are used for the production of sulphuric acid. Iron pyrites ore containing no other value is also worked on a small scale in Wales and Ireland for the same purpose.

Lead Ore.—We find that the Isle of Man is the most productive mine, showing an output of 4,800 tons of dressed ore, by which is meant nearly pure galena. The principal mine, Foxdale, is in granite and contains enough silver to enhance its value. The quantity of lead ore produced in Great Britain is now less than one-half of the output 30 years ago, and the total value less than one-fourth of what it was at that time, the value at the mines in 1894 only amounting to £262,995, the tonnage being 40,599, dressed ore; amount of silver obtainable from the lead, 275,696 oz.; amount of lead obtainable, 29,687 tons.

Lignite is only worked in a small way in Devonshire; manganese also in the same county. Ochre and other metallic paint substances are occasionally recovered, but can scarcely be considered an industry. Oil shale on the other hand has been of more or less importance for the last 20 years in Scotland. Petroleum has been found, but not in paying quantities.

Phosphate of lime is produced but is imported at too low a price to allow the native production to continue.

The production of salt cuts a large figure, being chiefly produced from brine, principally in Cheshire, and also in Durham, Lancashire, Staffordshire, Worcestershire and Yorkshire. Rock salt is worked also to a small extent; in some cases the brine flows through pipes to the alkali works, and is converted directly into soda by the Solvay process.

Wales produces slate, and good building stone and is available in all parts of the country.

Strontium Sulphate.—This is produced commercially in Gloucestershire and Somersetshire and is found in the red marl.

Tin Ore.—With the exception of small quantities in Devonshire, all the tin ore is obtained from Cornwall. The ore occurs both in the granite and the overlying slate. No alluvial deposits are worked now. Tungsten sometimes accompanies the tin ore. Uranium is obtained from a mine in East Cornwall.

Zinc Ore.—Considering how cheaply it is produced elsewhere it makes more showing than might be expected, amounting to 21,821 tons for the year 1894, representing zinc obtainable by smelting, 8,130 tons, and a value at the mine of £67,311. This, however, shows a considerable falling off both in tonnage and value from the preceding year, the amount of ore being 23,754 tons; zinc obtainable by smelting, 9,284 tons, and the value, £81,270 for 1893.

(To be concluded.)

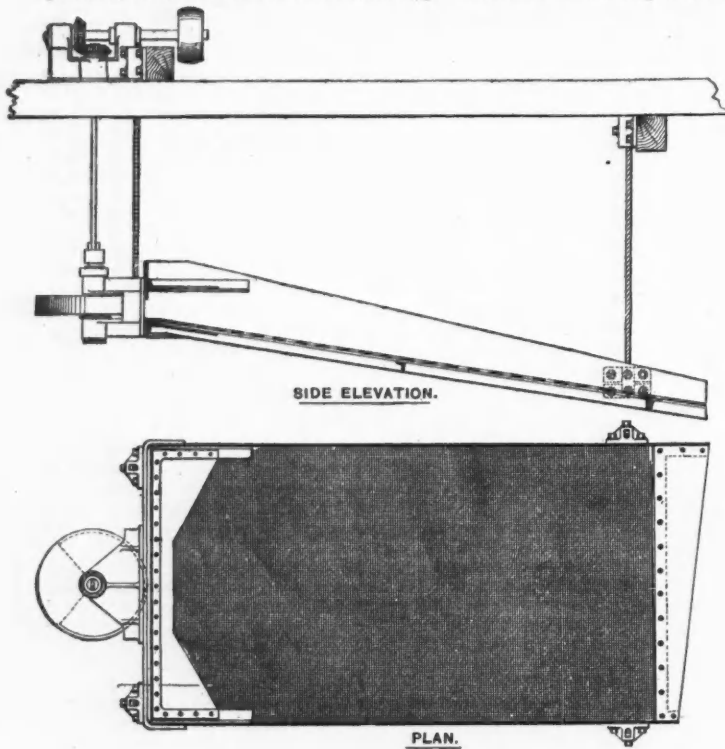
THE "VIBROMOTOR" SCREEN.

The ordinary screens for sorting coal and other minerals, which are operated by cams or cranks, are unpleasant to work with, because their vibration is communicated to every object near by, and they are also expensive to maintain. The "vibromotor" screen, shown in the accompanying engravings, has none of these drawbacks, as it is suspended by steel ropes and receives its oscillation from an unbalanced revolving weight attached to it. Thus advantage is taken of a mechanical principle which is in all other cases a source of trouble to engineers. The illustrations explain the general construction. It will be seen that at the upper end of the screen there is a frame in which runs an unbalanced flywheel which is driven by a jointed rod from the general shafting. As the oscillations set up in the screen are gentle, the life of the screen is prolonged. It is probable that the same principle might be applied to bumping tables with success, as at present much of the gold is jerked out by the sudden bumps. This screen is made by the Hardy Patent Pick Company, of Sheffield, England.

SIR HENRY BESSEMER ON NICKEL STEEL.

Sir Henry writes to the *Journal* of the Iron and Steel Institute of Great Britain as follows:

I have taken a deep interest in the paper read by Mr. Henry Wiggin at the Birmingham meeting of the institute, in August last, on "Nickel Steel, and its Advantages over Ordinary Steel," and as I was unable to be present on that occasion, I desire to place on record some facts that may have an historical interest in relation to alloys of steel and nickel, and, if not trespassing too much on the pages of the *Journal*, I will, as briefly as possible, trace back to their earliest inception the ideas and experiments



THE VIBROMOTOR SCREEN.

which led up to what I believe to be the earliest record of the proposed use of nickel in the production of cast steel for guns and other castings.

In the year 1842 I had succeeded in producing "bronze powder," and in these investigations I succeeded, to my own satisfaction, except in one case. A pure white bronze, called by courtesy silver bronze, was in demand. It was a soft alloy of tin, and with my machinery this soft metal could not possibly be made into powder, and I was obliged to have recourse to the harder alloys of copper, nickel and zinc, known as Tutenege and German silver; but none of the then known alloys of these metals were white enough to take the place of the tin alloys. I therefore endeavored to improve their color by lessening the quantity of copper, and in part substituting cadmium, wolfram metal, or tungsten and arsenic, because nickel in every case rendered the alloy too hard, if used in sufficient quantity to ensure the required degree of whiteness, and at the same time the nickel so increased the tenacity of the alloy as greatly to increase the time and cost of its lamination and reduction to powder.

I was engaged for several months in making these alloys, and while doing so my attention was directed to some recently published account of bronze celts just discovered, and out of mere curiosity I cast a small celt or ax of the Roman pattern, in an alloy according to the analysis given; but the metal was not hard enough to make what, at the present day, would be considered a good cutting instrument, and by increasing its hardness by a further addition of tin, the fine edge splintered away in cutting stone or other hard material. Taking advantage of the knowledge I had just acquired in the use of nickel in "mild" copper alloys that could be rolled, I thought I would try the effect of it on the much harder alloys used for these cutting implements. This addition of nickel not only increased the hardness of the alloy, but rendered it less liable to chip at the edge; still, with this improvement in quality, I doubted greatly the use of such tools by sculptors, more especially in dealing with granite

sculptures such as still exist in Egypt. With these vague notions floating in my mind, I came to a firm belief that those marvelous hieroglyphics and inscriptions must have been cut with steel tools. I had never heard at that time of iron mines or iron making in Egypt, but, notwithstanding this fact, I clung tenaciously to the belief that steel tools must have been employed, and finally came to the conclusion that the Egyptians had made use of meteoric iron, probably without fusion, by simply heating it in a charcoal furnace until it had acquired sufficient carbon by cementation, and then forging it at once into chisels, etc. Indeed, we have found proofs of an analogous system of working in Cumberland, by the forging of arrowheads from pieces of kidney hematite ore without fusion.

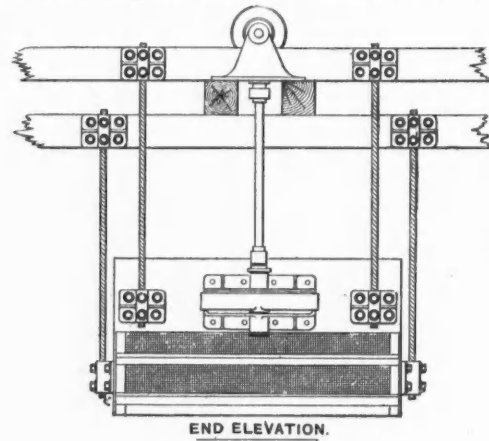
This idea of meteoric iron tools may seem very ridiculous to those who work in iron on so large a scale at the present day, but it is not possible that 5,000 years ago those streams of meteorites through which we pass in August and November were in a less exhausted state than at present, and might in those days have poured down on Egypt a much more copious supply of that natural alloy than we receive at the present day? So that, after all, Thotmus the Second, whose obelisk adorns the Thames Embankment, might have been, for aught we know, one of the early manufacturers of nickel steel.

I now pass over a period of some 16 years, and find myself deeply engaged in studying the different phases of my new steel process, and its adaptation to the manufacture of ordnance; and then having, for the first time in history, the means of rapidly and cheaply obtaining large quantities of fluid malleable iron, I sought to modify the properties of other metals by alloying them with it, and also modifying the properties of iron itself by alloying it with other metals, and thus adding alloys of malleable iron and steel to our list of foundry metals.

Without touching further on these various alloys, I will merely mention the fact that, rightly or wrongly, my old idea of the production of steel from meteorites had so forcibly impressed itself on my mind that I determined to artificially produce meteoric iron and employ it for the manufacture of ordnance and for other castings.

In order to facilitate the production of such alloys with accuracy on the small scale in crucibles, the converted iron was shotted by pouring it into water, and was then more easily weighed up into charges with different alloying metals. In this way I made an ingot of meteoric iron by fusing in a powerful air furnace 194 oz. of malleable iron shot with 6 oz. of nickel—that is, 3%; it produced a metal of great strength and toughness when cold. This was in 1862, and just prior to my laying down the furnace charges of the Workington Iron Company for the production of non-phosphoric Bessemer pig, and I was consequently obliged to use the very impure hematite iron previously produced by fluxing the furnace with tap cinder. With such impure iron to work upon, my meteoric iron would not forge at steel heat, notwithstanding its extreme toughness when cold.

When Mr. James Riley read his most valuable and interesting paper on



nickel steel in 1889, I preferred to remain absolutely silent as to what I had done, rather than put forward any claim of priority of invention on my mere *ipse dixit*, for at that time I was unaware that I possessed any record of what I had done, and thus it would forever have remained unpublished but for an accidental circumstance which furnished me with the most absolute proof.

Some three or four years ago I had occasion to search for the date and amount of a check I had given to a person some eighteen or twenty years previously, and in an old dusty box in a lumber room I found what I was searching for among old checks, pass-books, etc. In this same box I came upon seven old pocket memorandum books, one dating as far back as 1852, which had been used by me to jot down different schemes which I intended to patent, and to record trials of apparatus, and to give particulars as to the composition of alloys or like memoranda in the melting house. Here I came upon the proposal to make meteoric iron guns, dated December 28th, 1858, and also having reference to alloys of malleable iron and steel with nickel for other castings; and among the jottings in the melting house I found a record of the first ingot of malleable iron alloyed with 3% of nickel. These memoranda furnish absolute proof of my having at this early date proposed to employ this meteoric compound for the production of ordnance. And in confirmation of the foregoing, I have had three pages of this old memorandum book photographed.

It will be well remembered that Mr. James Riley read a most valuable and interesting paper on nickel steel in 1889, and nothing that I may say in these pages can in the slightest degree lessen its value or diminish the world's indebtedness to him for it; and it is only fair that I should add that neither the French patentee, Mr. Marbeau, nor Mr. J. C. Hall, nor Mr. Henry Wiggin, could possibly have known anything whatever of the prior investigations and experiment I had made with alloys of nickel and iron.

THE AURIFEROUS GRAVELS OF THE UPPER COLUMBIA RIVER.

Written for the Engineering and Mining Journal by Frank L. Nason.

The region of the Upper Columbia River, B. C., is known as the "Big Bend." Properly speaking, this not very exactly defined region comprises the territory lying north of the Canadian Pacific Railway between the stations of Golden and Revelstoke, thus including the northern end of the Selkirk Mountains, the western slope of the Rockies, and the eastern slope of the Gold Range. The dividing line between the mining districts of East and West Kootenay also nearly equally divides the Big Bend, so that one half lies in East Kootenay, the other in West.

Little as is known of this region, extending over 100 miles north from the C. P. R. and for 75 along the road, this little knowledge is confined almost exclusively to The Big Bend of West Kootenay. Remnants of the old "Pilgrims" trails are now found around the entire bend of the Columbia River, so it is to be supposed that the early prospectors ("Pilgrims," locally so-called) found little to encourage them in the eastern district. This surmise, however, lacking positive knowledge, cannot pass unchallenged for the following reasons:

Ingress to this region was almost wholly prohibited from the east, owing to the great arid plains east of the Rocky Mountains. Ingress was, therefore, almost wholly confined to the western arm of the Columbia. There, too, as the gold excitement died out, or rather waned, in California, prospectors drifted northward through the great river valleys of the Frazer, Columbia, etc. A casual glance at a map of North America will show the directions prospectors would naturally have taken. It thus follows that the eastern valley would receive much less attention than the western.

From the head waters of Shuswap Lake, through what is known as the Seymour Pass and over the Smith Creek glacier, about 20 miles north, were the principal gates of entry to the Columbia valley from the west. There are now traces of the village of La Porte, 45 miles north of Revelstoke and three miles south of Death Rapids, on the Columbia. From this point north to the Canoe River there are numerous traces of the early prospectors. Pilgrim trees, with names and dates, old trails, ruined cabins, and, by the side of streams, great piles of boulders, decayed sluices; these are enough to damp the ardor of an inexperienced engineer or geologist. A little cold calculating, however, removes the first chill of distrust.

Hydraulic mining has now taken the place of the pan and rocker. A gravel yielding from 6c. to 12c. a yard is good pay and from 15c. to 25c. a bonanza; while in the days of the Pilgrim, with his base of supplies over 100 miles distant and through a pathless forest, gravel less than a dollar a pan was hardly to be thought of. Yet from several streams in the Big Bend, from two to three hundred thousand dollars have been taken. The yield, however, was principally from rich pockets and from rich shallow bars. When these were exhausted, there were no means, even if there had been the disposition, to settle down to exact and prosaic calculation, of low grade gravels, water supply and dumps room. These men were looking for rich strikes. They found none in the Big Bend. Consequently they migrated, miner fashion, to other fields. "The Big Bend was no good. They had been there." And down to the time of the building of the C. P. R. there was nothing known of the Big Bend but old miners' gossip.

Such is the briefest outline of this story of placer gold in Big Bend. To-day there is a good bit of attention being attracted toward it, but Trail Creek, the Slocan, and other famous places around the Arrow Lake, the Cariboo and Yukon fields overshadow all else in the province.

The auriferous gravels in and near the Columbia River are about as follows: Bars covered by high water, riparian gravels on bedrock above low water, riparian gravels on bedrock, which is always covered by water, and benches or terraces. Between Revelstoke and Canoe River the greater number of the bars, whether lying in midstream or on one side of the river, show gold more or less fine. Some of the bars have in the past yielded considerable gold, but to-day what little work is done on them is done by Chinamen. From these absolutely no information can be obtained. To the question, "How much, John?" there is the invariable reply, a shrug of the shoulders: "Some day two bitter, some day four bitter, some day dollar, some day noting."

From pannings made by the writer it is very evident that the portion of the bars which are uncovered by the water are, at least, no bonanzas. These bars can neither be sluiced nor hydraulicked, this is evident; whether dredging would pay is doubtful. No accurate tests have ever been made of the gold contents of the gravels.

There are, however, innumerable bars which could be worked by dredging if experiments should demonstrate their value. There are, however, many elements in this problem which would require careful consideration before such an enterprise was entered upon. Not the least would be the immense amount of sediment which this river constantly handles, especially during high water, and which sediment would of necessity be dropped when the bars were being excavated. The riparian gravels distributed along the river are worked much more regularly, but by Chinamen principally. The principal workings are confined to shallow diggings, none of them reaching a greater depth than 4 to 6 ft. None of the diggings observed reached bedrock. Though nearly every pan showed a "color," the gravel does not appear to be very rich. At one place near Revelstoke Chinamen have plumed a small steam a distance of about two miles. The gravel was worked intermittently for several years. The place is now abandoned.

The riparian gravels as a rule lie a few feet, 6 to 10, above high water. In places, however, a bench or terrace rises at the angle of repose, from the river's edge to as high as 200 ft. In other places, bedrock reaching from 10 to 15 ft. above high water is covered by gravel 30 to 40 ft. deep. Riparian gravels (those lying at the water's edge) need to be very rich to be worked, either by hand labor or by bringing water at a distance and under "head." If ever worked successfully on a large scale it would probably be in connection with bar dredging.

Many of these gravels are reported to yield 25c. a yard. While the writer has some fine gold from many of these places, he can neither affirm nor deny the above statement from personal knowledge.

The bench or terrace gravels reach back from the river sometimes on each side of the river, sometimes from alternate sides. These benches

rise from the river banks in successive terraces to the height of above 300 ft. from the river level. In places there are from three to five terraces. The first or river terrace is usually from 50 to 100 ft. Then a level stretch of from 100 to 2,000 ft. or more, then a steep rise of 50 or 100 ft. and so on to the last terrace which may be one mile or more from the river.

Figures cannot be given more accurately than the above unless one particular locality is described. These terraces are not continuous. They are separated on the same side of the river from each other by long spurs of bed rock in place which reach down from the mountains on either side of the river, thus separating one large gravel deposit from the other.

The gold contents of these gravels are unknown to the writer in detail. Gold in small quantities has been found and still can be found, even near the river, though the gold content is certainly small except in places. Before any idea could be given of the prospective value of the terraces careful testing would have to be resorted to.

From the nature and situation of the banks this would be a comparatively easy task. First, the steep faces along the river are well exposed. Back on the level stretch pits could be sunk in places to 20 ft. or more in depth without being troubled with water. Second, the successive terraces could be tested in the same way as the river face, as they are steep and dry, though water in abundance for testing can be obtained. Third, these terraces are often cut to river level by mountain brooks and creeks. In case these tests were satisfactory, water under sufficient head could be obtained for hydraulic mining, and in abundance by fluming, ditching and piping, at the outside, a distance of four miles, but in the majority of cases no more than one mile.

As has been already stated, from the fact that these gravels are not rich, and that hydraulic mining properties, on account of expense of working, have been little sought for in this country, where there is little ready money, little or nothing is definitely known of them.

Ninety-five per cent. of the boulders would pass through a flume. In places there are comparatively large beds of clay, but "cement" is almost wholly wanting. The above description applies wholly to the terraces and gravels which have been principally built up by the Columbia River itself.

The Columbia, however, has many tributary streams flowing into it both from the Selkirks and from the Gold Range (this on the west; the east streams flow from the Rocky Mountains and from the Selkirks). These streams, in many cases, have terraces or benches of their own. They are, as a rule, much more limited in extent, even where the streams are of large size, than those of the Columbia. The longest streams are rarely more than 15 miles in length, while many flow directly down the steep faces of the mountain, being fed directly by a melting glacier.

These latter streams, flowing through cañon-like gorges, have no terraces. The debris brought down by them form either large deltas in the river or the material is wholly swept away by the Columbia. These streams form natural sluices and have been the favorite hunting ground for "snipers" or "pocket hunters." From Pot Hole Creek, a stream less than one mile in length, \$40,000 is said to have been found in one season.

Along the larger streams, such as Carnes Creek, Dordine Creek, Gold Stream, Smith Creek, Gordon Creek, etc., the terrace formations are very extensive and all are without exception auriferous. On French, McCullough, Camp and Smith creeks, and Gold Stream as well, enough work has been done to establish the fact that in many places the gravels are rich enough to hydraulic.

As would naturally be expected in rapid streams, the gravel is, for the greater part, rather coarse, yet it is not so coarse but what the greater part of it will sluice readily. The boulders consist of quartzite, granite, coarse feldspar, porphyry, gray dolomite, white dolomite and marble, occurring in quantities in the order named. The residual black sands consist of garnet, ilmenite, magnetite, cyanite, topaz, galena and pyrite. These minerals have been determined by blow-pipe or other tests. There may be and probably are other minerals, but the above constitute the bulk of the "black sands." The galena often occurs in boulders weighing upward of 20 lbs. It is highly argentiferous as a rule. Whether the pyrite carries gold has not yet been determined. The gold which occurs in the gravel follows the general rule, *i. e.*, "If the boulders are coarse, well worn, the gold will be found approximately under the same conditions." Large nuggets are not often found. Those weighing \$10 to \$15 are very rare. The bulk of this gold will weigh from 3c. up to 10c. or 25c. About 3% will weigh from 50c. to \$2. Rusty gold is the exception rather than the rule. Platinum has never been observed by the writer, though native copper is occasionally met with.

The gold found is worth from \$18.20 to \$18.60 per ounce. Whether flour gold exists in the gravel is hard to determine. The streams are fed either by glaciers or melting snows, and consequently are so cold that mercury acts very sluggishly. In fact it is a question whether one would not use amalgamation in the sluices at a loss of mercury greater than the saving of gold.

In some of the larger streams wing dams have been put in for the purpose of deflecting the stream from rich gravel bars. These have been put in by men with no capital and with little or no experience as miners. The results have not been encouraging in one way. But it should be remembered that for only a few weeks late in the fall and in the early spring can this be done, and days' wages with no capital is hardly a fair criterion of what engineering skill backed by capital could do. Many streams could, in places, and at comparatively small cost, be turned bodily, leaving the main bed dry. This is practicable since the country is not subject to great deluges of rain. Rain in the valleys is usually snow on the mountain tops, which snow melts slowly on sunny days. Again, the country is densely forested, and this prevents a rapid rush of water to drainage channels, occurrences which often work such havoc in more arid treeless countries.

In working benches or terraces one has to reckon with the forest. The terraces are, almost without exception, covered with a dense growth of cedar, spruce, hemlock, fir and white pine. There are other trees, but these make up 95% of the forest. It will cost about \$80 to \$125 to fell and burn the timber. Even then you have yet to reckon with the stumps. As would naturally be expected, there is usually ample dump room for washed gravel.

Water can be obtained under almost any head desirable, but freedom

from clay and cement make moderate heads ample for all needs. Ditches and flumes for from one to three miles will usually bring an ample water supply.

There are as yet no wagon roads to the Big Bend. Packing or push boats up the Columbia are at present the only means of getting in supplies. Boating on the Columbia is hazardous both to life and property, and is available for only one to two hot months in the early spring and late fall. For placer mining the season will, with proper care, open about May and close anywhere from November 1st to December 1st. The seasons are sometimes shorter.

To recapitulate briefly: There are great gravel beds both along the Upper Columbia and its tributary streams.

Nearly all of them will show gold. Many of the benches along the tributary streams have yielded large sums of money and under adverse circumstances.

From personal knowledge, the writer has satisfied himself that many banks have very favorable conditions for hydraulic mining on a large scale. Although somewhat difficult of access and laboring under the disadvantages of short seasons, these difficulties are no greater than have been met and overcome in the United States and with poorer gravels.

There has never been any exploration made by a competent engineer of this country.

With fair capital, backed by conservative engineers, a great measure of success ought to be attained in the Big Bend hydraulic mining its gold placers.

LIDGERWOOD CABLEWAYS FOR THE PANAMA CANAL.

The Lidgerwood Manufacturing Company, through their engineer Spencer Miller, has closed a contract with the Compagnie Nouvelle Du Canal De Panama at Paris, for seven Lidgerwood cableways to be used on the Panama Canal. This company is one which has recently been formed to complete the great Panama Canal, and the seven cableways will be used exclusively for earth excavating. They will be equipped with all the latest improvements including the patent aerial dump which is such an important feature of these machines, the apparatus throughout being similar in con-



CABLEWAYS FOR THE PANAMA CANAL.

struction to the 20 Lidgerwood cableways used on the Chicago Main Drainage Canal, except that the Panama cableways will have fixed towers and anchorages. The spans will range from 250 to 300 ft.

This order was not placed until after a most careful and extended investigation had been made of the various apparatus available for canal excavation purposes. Engineers were sent by the Compagnie Nouvelle Du Canal De Panama from Paris to examine the Lidgerwood Cableways and other excavating machinery in use at Chicago on the canal there building. The result of their investigation was a most flattering report in favor of the Lidgerwood Cableways, and the negotiations then begun have resulted in the large order secured by Mr. Miller.

This is one of the largest single orders for cableways of any description ever received by any concern in this country from abroad and points to a world-wide appreciation of the merits of the Lidgerwood Cableway that fully justifies the claims advanced by the manufacturers that it is the most perfect, economical and efficient apparatus of its kind ever devised.

Oil-Burning Locomotives.—The use of liquid fuel has been so extended on the Great Eastern Railway (England) that a large storage plant has been erected at Stratford. Twenty-five locomotives are now fitted with oil burners under the Holden system, and 12 stationary boilers and three furnaces at the shops burn the same kind of fuel. The oil arrives at Stratford in bulk, old locomotive tenders being employed in transporting it at present. The storage tanks are 13 in number and are placed on low ground not very far from the main line. The oil flows to them by gravity. A peculiarity of the tanks is their rectangular shape. Nine of them hold 3,000 gals. each and the remaining four 2,500 gals. each.

PIG IRON PRODUCTION IN GERMANY.

The production of pig iron in Germany, which is now third in rank among the iron-making nations of the world, continues to show a steady increase, with fewer fluctuations than in either the United States or Great Britain. For the year 1895 the output of the blast furnaces is reported by *Stahl und Eisen*, from the official returns of the furnace owners at 5,788,795 metric tons, which compares with 5,559,322 tons in 1894; 4,953,148 tons in 1893; 4,937,461 tons in 1892, and 4,641,217 tons in 1891. The output in 1895 is the largest ever reported, and the gain has been absorbed in the trade; no increase in unsold stocks being reported. The production represents the consumption very nearly, the balance of exports and imports being small. Thus in 1895 the exports of pig iron were 220,103 tons and the imports 199,556 tons, leaving a net balance exported of 20,545 tons; in 1894 the net exports were 20,532 tons, almost exactly the same.

The following table shows the total production in metric tons, classed under the usual heads:

	1894.		1895.	
	Tons.	Per ct.	Tons.	Per ct.
Forge iron.....	1,323,850	28.9	1,524,334	26.3
Bessemer pig.....	458,094	8.0	441,495	7.7
Thomas pig.....	2,702,754	47.2	2,898,476	50.1
Foundry iron.....	874,624	15.9	921,493	15.9
Total.....	5,559,322	100.0	5,788,798	100.0

It will be seen that the increase was in foundry iron, which formed the same proportion of the total in both years; and in Thomas pig, which was just over one-half of the total in 1895, against 47.2% in 1894. Forge iron showed hardly any change in amount, while in Bessemer pig there was a small decrease. In all, 57.8% of the total in 1895 and 55.2% in 1894 was made up of iron intended for the manufacture of steel. This shows the strong hold which the Thomas-Gilchrist process has in the German iron trade, where it is not only growing with the trade, but is gradually replacing the Bessemer.

The figures given above include spiegeleisen, which is given in the forge iron. In 1894 the total spiegeleisen made was 189,291 tons; for 1895 we have not the figures separately. They do not include the small amount of charcoal iron still made in Silesia, which was about 9,000 tons in 1894, nor the quantity, also small, of "cinder pig," made from blast furnace

cinder and scrap, which was 10,007 tons in the same year. Neither of these items have been reported for 1895.

The consumption of pig iron in Germany for five years past, assuming that the stocks have not materially changed, has been as follows, in metric tons:

	Production.	Net Exp or Imp.	Consumption.
1891.....	4,641,217	Imp. 79,025	4,720,242
1892.....	4,937,461	Imp. 37,936	4,975,417
1893.....	4,953,148	Imp. 55,545	5,008,693
1894.....	5,559,322	Exp. 20,532	5,538,800
1895.....	5,788,798	Exp. 20,545	5,768,251

Germany is not a large buyer or seller of raw iron. The exports, which have grown largely during the past five years are of steel and of finished and manufactured products, such as rails and machinery of various kinds.

More Coal in South Africa.—The latest mineral development in the Cape Colony, writes a correspondent of the *South African Telegraph*, is likely to astunish outsiders. Away in the Calvinia district, as the crow flies from Cape Town, about 200 miles, active development work has been steadily going on for fully eight months past under the guidance of Mr. C. H. Ball, a mechanical engineer, and by boring to a depth of 338 ft. has struck coal, while at 36 ft., following up the surface indications, he got plumbago in a large body. The syndicate is locally known as Lauriesfontein, Limited, and their property comprises fully 10,000 morgen, with the option of taking up four other adjoining farms, and all on very favorable terms. Alum is plentiful on the properties, as well as nitrate of potash. The distance to Lambert's Bay is only nine hours' sailing from Cape Town.

CHINESE RAILROADING.

Mr. Sheridan P. Read, U. S. Consul at Tien-Tsin, reports the history of the first railway in China, the engineer of which is a member of the American Society of Civil Engineers.

Seventeen years ago the only semblance of a railway in the whole Chinese Empire was an iron tramway, about 10 miles long, at the Kaiping coal mines, 80 miles from Tien-Tsin. Small cars loaded with coal were pushed over this tramway by coolies, who received 10 cents in Mexican silver for 12 to 14 hours' work per day. About this time the works were placed under the charge of Mr. Claude W. Kinder, M. Inst. C. E. and M. Am. Soc. C. E., an energetic young English engineer, who at once ventured to propose many changes tending to increase the efficiency of the plant and to decrease expenses. The Chinese directors of the mines did not regard his efforts with favor, and the Peking Government promptly vetoed his attempts at progressive measures. But despite the Peking authorities and native superstitions, Mr. Kinder determined to have a locomotive, if he had to build it himself, and he did build it. Four small driving wheels were ordered from the United States; a disabled stationary engine furnished the boiler, and a broken down winding engine the cylinders. With few tools and little outside help these parts were fitted together, and the "Rocket" was at last put upon the track with great yellow dragons emblazoned upon its sides. It was the first locomotive in China, and was a startling object to the Chinese, who expected all manner of dire consequences as the result of the innovation. The Peking authorities were horrified, and at once ordered the Rocket dragon to be summarily suppressed. But the Chinese mine directors permitted it to be used in short trips inside the yard, at first, and its travels were gradually extended without producing the war, pestilence and famine expected. At last imperial permission was granted for its free use.

This was the beginning of railways in China, and the builder of the first locomotive is now chief engineer and superintendent of the Imperial Railways of China. The line as at present finished begins at Tien-Tsin, it then passes 27 miles to Tongku, six miles from the mouth of the Peiho, at the Gulf of Pechihli. From Tongku the line swings northeast to Shang-Hai-Kuan, the terminus of the present operated road, and 177 miles from Tien-Tsin. Surveys have been made for an extension of 200 miles beyond Shang-Hai-Kuan, and about 10 miles have been built. When finished the railway is to reach Kirin, the center of Manchuria, and a branch is to be built to the head of the Gulf of Liaotung, where there is a good harbor. Active work on this line was interrupted by the late Chinese-Japanese war.

The greater part of this railway runs through a flat, alluvial country, subject to heavy floods during the rainy season. The sharpest curve has a radius of 1,000 ft., and there is only one of these, made necessary to avoid two cemeteries. The most of the curves have not less than 3,000 ft. radius, and the maximum gradient is 0.75%. The country traversed is strictly agricultural, with no large towns and the people are very poor. The Kaiping coal mines are the only mining industry in operation, though deposits of coal, iron, gold and silver only wait intelligent development. All trains are "mixed" freight and passenger, with four trains each way daily from Tien-Tsin to Tongku, and one train daily from the latter point to the terminus. The average speed is 15 miles per hour; and while the road has paid its running expenses, it yields no interest on its first cost of construction and equipment.

METHODS OF CONSTRUCTION.

The building was done after English methods and ideas of permanency, without regard to first cost or work required of it. No wooden structures find place upon it, stone, brick, concrete and steel being the materials used. The road is standard gage, with from 12 to 15 in. of stone ballast, and is laid with steel 60-lb. Sandberg rails. These rails were rolled at Barrow, England, and were delivered at Takee for less than \$21 per ton. The wooden ties are 8 ft. long by 6 in. wide by 9 in. thick, and are spaced 28 in. between centers. These ties came from Japan, Oregon and Vladivostock, and cost about 72c. each in Mexican silver. Owing to the enormous rainfall of 146 in. in a rainy season of four months only, the culverts on the line have unusually large openings. The soil is an alluvial deposit from 20 to 60 ft. deep. The masonry on the line is first-class cut-stone laid in English Portland cement, which latter costs about 75c. less per barrel than it does in the United States. All foundations are carried to the solid rock, caissons, sunk by the pneumatic process, being used for the deeper ones. The length of bridge spans varies from 20 to 200 ft., though the majority of the bridges are short and made up of plate girders.

The Lau-ho bridge is the most important engineering work. This bridge has two roadway spans of 30 ft. each, ten spans of 100 ft. each, and five spans of 200 ft. each, the total length between the faces of abutments being 2,170 ft. The 200 ft. spans are pin-connected and were designed by Sir Benjamin Baker on American types—with English details. Mr. Read criticises the result as curious and incongruous, especially in its peculiar lateral system.

The company builds all its own girder work up to 100-ft. spans. The main shops are at Tang-Shau, where cars and locomotives are repaired and all passenger and freight cars are built. All cars have four-wheel trucks, with iron truck frames, made by the company; the framing of the cars is teak wood, and the sides and tops are made of Oregon pine. With the exception of one American engine, built by the Grant Locomotive Works, the locomotives are all English or Scotch, of the mogul type. American cast-iron car-wheels have been tried, but the steel-tired European wheels are preferred. All cars are equipped with Janney couplers, the one American detail in the rolling stock.

The wages paid are as follows, all payments being at the rate of Mexican silver: Common laborers, \$4 per month; firemen, \$5 to \$6; engineers, \$14 to \$45. The two highest paid native engineers now on the road receive \$41 and \$46 per month, while an English engineman receives \$200 per month, as a maximum. The section hand receives \$4 per month; foreman, \$6; a native clerk, \$80, if he can speak and write both Chinese and English. The cost of timber is very great, and wooden trestles are out of the question. All station houses are built of brick, plastered inside, for the same reason, and station platforms are made of stone or concrete filled in with earth and cinders.

PECULIAR BEHAVIOR OF CHARCOAL IN THE BLAST FURNACE AT RADNOR FORGES, QUE.

Written for the Engineering and Mining Journal by J. T. Donald.

In October last the Canada Iron Furnace Company sent the writer a sample of what they termed partly consumed charcoal containing a large percentage of siliceous matter, and which they stated "had been thrown out at the cinder notch of the furnace in large quantities unconsumed, and showing fibers or threads of a yellow color and similar to mineral wool." It was further stated that "the coal which was made from oak and apparently bass-wood and elm seems unfit for use in furnace work." A very superficial examination was sufficient to show that this charcoal was very peculiar indeed. Its unusual weight at once challenged attention, and a closer inspection showed in the specimen a framework in the form of a fibrous mass not unlike a piece of harsh-fibred asbestos. Analysis showed that this fibrous matter amounted to no less than 41.16% of the coal.

The question now was to account for this large percentage of mineral matter. The only explanation I could offer was to suggest that it might be the result of charring wood that had been partially fossilized, for it is well known that such silicified wood is not uncommon. At the same time this suggestion did not satisfy me. It did not, I thought, cover the fibrous or rod-like structure of the mineral matter, for I had never seen a similar structure in silicified wood.

I therefore decided to send portions of my sample to Professor Penhallow, of McGill, and Mr. W. F. Ferrier, of the Canadian Geological Survey. These gentlemen are authorities in their own departments, the former as a botanist and the latter as a mineralogist and lithologist, and it appeared to me that the question of the origin of the siliceous matter of this coal was one of botany or mineralogy and not of chemistry.

Professor Penhallow, having examined the specimens, reported that "it seems difficult to think that these rods are the result of natural processes of growth." Mr. Ferrier said he thought the siliceous matter had not been present in the original charcoal, but that it was slag that the coal had absorbed in the furnace. Then, next, word came from the furnace at Radnor that similar fibrous charcoal had again been ejected from the slag notch and this while charcoal from a totally different locality was being used in the furnace.

The evidence was thus strongly against the view that the siliceous matter was part of the original coal and in favor of Mr. Ferrier's suggestion. The question was thus again, as it were, thrown back into the sphere of chemistry and it appeared probable that an analysis of the fibrous matter would settle it. After much care and labor a quantity of fiber, sufficient for analysis and free from the ash naturally present in the charcoal was obtained.

The difficulty in securing a satisfactory sample lay in the fact that the alkali of the true ash caused the fibers to fuse, forming little glassy globules. It was desirable to avoid these in order that the analysis might show the composition of the fiber itself. The analysis of the fiber is stated in column 2. Column 1 is the partial analysis of a sample of Radnor slag made by me in January, 1891.

	1.	2.
Alumina.....	13.52%	18.15%
Ferrous oxide.....	1.44%	.51%
Manganous oxide.....	3.48%	Traces.
Lime.....	22.89%	35.44%
Magnesia.....	.74%	1.47%
Sulphuric anhydride.....	1.32%	Traces.
Silica.....	54.00%	42.18%
Alkalis, phosphoric anhydride, etc., by diff.....	2.11%	2.25%

It is thus very evident that the fibrous matter of this charcoal is simply absorbed slag. Two questions of interest then arise. They are, first, what were the conditions in the furnace that caused charcoal in large quantities to absorb and retain the liquid slag? and, second, how does it happen that only on two occasions has the production of this slag-saturated coal been observed?

The following particulars regarding the furnace are data that must be taken into consideration in any theory put forth to explain the very peculiar behavior of the charcoal under consideration: Four 3½ tuyeres are used. The average pressure of blast is about 5½ lbs.; the average temperature of blast, 900° F. The quantity of air, as a rule, is 2,638 cu. ft., but at times it has run to as high as 2,827 cu. ft. to the minute; cubical contents of furnace from stack-line down is 1,264 cu. ft.

THE NORTH STAR POWER PLANT.

One of the most interesting examples of power development made in this country is the plant recently constructed for the North Star Company at Grass Valley, Cal., a brief description of which will be of interest.

The water supply is taken from the South Yuba Canal and carried to the power station through a line of 20-in. pipe and delivered to the wheel under an effective head of 750 ft. A Pelton Wheel, 18 ft. 6 in. diameter, of 300 H. P. capacity, running under head above named, at 110 revolutions, is mounted on a 10-in. steel shaft connecting direct with a pair of compound compressors having a piston speed of 400 ft. per minute. The air thus furnished is transmitted a distance of one mile through a 6-in. pipe, carrying a pressure of 90 lbs., and runs a pump and set of hoisting works. Another pipe transmits air to the mill four miles distant, which is also operated by the same means.

Most economical results are obtained by a system of reheating, making pneumatic transmission this distance compare favorably with electricity.

The wheel weighs 12,000 lbs. and has a peripheral speed of 6,000 ft. per minute. It is of an original and novel design, having a steel rim and spokes like a cycle wheel, the power being carried from the rim to the hub by means of truss rods. It is made of this large diameter to give proper speed to the compressors under the high head in this case available.

An ingenious automatic device controls the amount of water applied to the wheel, according to the power required at any given time, maintaining a uniform speed as well as a uniform pressure in the receiver, stopping and starting the wheel as the pressure increases or falls below the stand-

ard. By this means the greatest possible economy of water is obtained as well as safety and uniformity of operation.

Reliable and exhaustive tests on this wheel have shown the extraordinary efficiency of 92% at full load and 90% at one-half load, which is unquestionably a much better result than has ever before been realized in actual work. The novelty of this application, as well as the results obtained, will attract wide attention, and affords another illustration of the remarkable efficiency of the Pelton wheel, as well as the facility with which it can be adapted to all varying conditions of head, power and speed.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported for the Engineering and Mining Journal.

DUTY ON METAL FOILS.—Zinc foils and a foil of which copper is the component material of chief value. Both were assessed at 35% under paragraph 177. The one was claimed to be dutiable under paragraph 175 as zinc in sheets not further advanced, and the other as copper in sheets under paragraph 161. The protest was overruled.—Lehman, Schwartz & Co. vs. Collector of the Port of New York: Board of United States General Appraisers.

DUTY ON METALLIC PAINTS.—Metal red, alizarine colors and alizarine lakes and ultramarine blue. All of them were assessed at 25% under paragraph 48. The metal red was claimed to be dutiable as vermilion red at 6c. per pound, under paragraph 45; the alizarine colors to be free, under paragraph 368, and the ultramarine blue to be dutiable at 3c. per pound, under paragraph 45. The assessment on metal red was affirmed; as to the alizarine colors and alizarine lakes and ultramarine blue, the protest was sustained.—R. F. Downing & Co. vs. Collector of the Port of New York: Board of United States General Appraisers.

NEGLIGENCE OF VICE-PRINCIPAL IN MINING OPERATIONS.—The Court, in considering the question of responsibility of a company for the acts of its representatives, said: There are decisions which hold the master liable for any acts done by the vice-principal, whether they were such as relate generally to the duties which the master owes to his servants, or whether the acts be merely on a level with those of a fellow-servant; but the better rule, as we extract it from the best reasoned cases, is that for the acts of the vice-principal, done within the scope of his employment, and such as properly devolve upon the master in his general duty to his servants, the master is liable; while for all such acts as relate to the common employment, and are on a level with the acts of the fellow-employee, except such acts as are done by the vice-principal against the reasonable objection of the injured servant—the master is not responsible.

In other words, the test of liability is the character of the act, rather than the relative rank of the servants.—Deep Mining and Drainage Company vs. Fitzgerald (43 Pacific Reporter, 210), Supreme Court of Colorado.

WHAT CONSTITUTES A MINING PARTNERSHIP.—A contract providing that the first party should have a certain undivided interest in all ores extracted from certain mines, and should bear a proportionate share of the expenses of extracting the same, the other parties to have the remaining interest in the ores, and to bear the balance of the expense, and also that the first party should furnish a mill for concentrating the ore, the expense of concentrating and rental of the mill to be divided among the parties, renders them partners in the extraction of the ores. And a subsequent verbal agreement that the first party should receive a certain price for each ton of ore concentrated, to be paid from the proceeds of the ore, he to pay the rental of the mill, repairs and improvements, does not prevent the parties from being partners. After the formation of a mining partnership, an agreement that one of the parties shall ship the ore after concentration, receive the proceeds, and pay out the money under the direction of another partner, who was to manage the mine, does not affect their relations as partners.—Ashenfelter vs. Williams (43 Pacific Reporter, 664), Court of Appeals, Colorado.

Tellurium in New South Wales.—Tellurium has been discovered at Bingara, famous for its dimantiferous deposits, and other parts of the northern districts of New South Wales, though at present only in such minute quantities as would not repay the cost of working. It has also been found at Captain's Flat, in association with bismuth.

Waste Coal Utilized.—While English and American engineers are vigorously agitating the matter of utilizing the enormous accumulations of culm or slack in their respective coal regions, either by directly burning the stuff under steam boilers with suitably designed grates and other furnace accessories, or by gasifying it and using the product for driving gas engines on a large scale, German engineers are quietly working in much the same field and with equally, if not more, satisfactory results. In the vicinity of Bitterfeld, for example, in the Elbe district, there are almost immeasurable surface deposits of bituminous coal, so low in heating value that the simple cost of transportation would become prohibitory to its use at any much removed place. Right at Bitterfeld, however, the coal has been shown to be the cheapest fuel to be had in Germany, and accordingly the Elektrochemische Werke were installed there a little over a year ago by the Allgemeine Elektrizitäts-Gesellschaft, of Berlin, the largest European electrical company. The Elektrochemische Werke have a 2,000 H. P. plant; they produce mainly chlorine and caustic potash on the process of Dr. Rathenau, the just-mentioned bituminous coal being used exclusively in their operations, and with such good results that an extension of the plant to 3,000 H. P. capacity is now under way. The works are the first in Germany to electrically produce also calcium carbide, sodium and other refractory metals on a large scale. Right in the line of electro-chemical work, it is interesting to note that a number of other similar installations have been erected, or are under consideration, by the Allgemeine Company—one at Rheinfelden, where the river Rhine is called upon for 28,000 H. P.; another in Italy and in

Switzerland, and still another in Russia. England and the United States also are being looked to by the great Berlin Company as promising fields for their enterprise.

Permeability of Metals for the X Rays.—Fourteen common metals or alloys have been examined as regards their permeability for the X rays. The results obtained are shown on the photographs submitted to the Academy.

The metals examined have been rolled out to the thickness of 0.2 mm., and cut up into rectangular slips 35 mm. in length and 7 in width, and attached side by side, and in a parallel position, on one and the same cardboard. In addition a slip of platinum, of $\frac{1}{1000}$ mm. in thickness, is superimposed as a check, intersecting the other slips transversely.

The sensitive photographic plate was protected against light by a double layer of black paper. The system of metal slips was laid against this paper during the exposure. The time of exposure was 45 minutes, and the length of the sparks of the exciting coil was 7 c. m.

The metals thus compared were the following: Lead, zinc, copper, zinc amalgam, tin, steel, gold, silver, aluminum and platinum.

The experiment showed that at the thickness of 0.2 mm., platinum alone is perfectly opaque. Aluminum, as is already known, is very transparent.

The other metals above named are appreciably transparent.

Platinum itself, at the thickness of $\frac{1}{1000}$ mm., is easily permeated, since the check band threw a slight shade upon the paper. This shade was seen traversing all those projected by the other metals, which shows their transparency.

Mercury deserves a special place. At the thickness of 0.1 mm. it appears as opaque as platinum. In order to obtain a plate of mercury of this thickness a trough hollowed in wood was employed, 0.1 mm. in depth, closed with a plate of varnished glass. It remains to be seen if—at the thickness, e. g., of $\frac{1}{1000}$ mm.—mercury in turn will appear transparent like platinum.—*Comptes Rendus*, cxxii., p. 237.

PATENTS RELATING TO MINING AND METALLURGY.

United States.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Scientific Publishing Company upon receipt of 25 cents.

WEEK ENDING MARCH 10TH, 1896.

- 555,920. **COAL OR ORE WASHER.** Rudolph Boericke, Philadelphia, Pa., Assignor to Stein & Boericke, Limited. Combination of a separator-hull, a circular inclined gutter or chute upon the exterior hull-wall, an open top in the hull, a concentric inlet-tube for the material projecting into the hull, a bushing in the hull adjustable longitudinally thereof, an outlet in the hull-bottom, a transverse inlet above the outlet, conveyors for the material located above the hull and conveyors for the inclined gutter and the lower outlet of the hull.
- 555,951. **ROASTING, SMELTING AND CONVERTING PLANT.** Hiram W. Hixon, Anaconda, Mont. Roasting-hearths constructed with longitudinal passageways or conduits, trucks moving in the conduits and constructed of triangular frames provided at their upper ends with removable or detachable caps or blocks which project above the ways or conduits, shafts mounted in the upper ends of the trucks transversely of the hearths and carrying the shovels or plows, a pendent arm from the shaft, and an operating chain or cable engaging the trucks and having a movable connection with the arm, the chain being provided with projections, at points beyond and on each side of the movable connection.
- 555,961. **FURNACE FOR SMELTING ORES.** Emil E. Lungwitz, Brooklyn, N. Y. A stack closed to the atmosphere, means for maintaining within the stack a pressure higher than that at which the volatilizable metal or metals contained in the ore to be smelted would boil at the temperature of the furnace, a close casing surrounding the stack and forming with its exterior walls an air-tight chamber, and means for exerting and maintaining in the chamber a pressure substantially equal to the pressure maintained within the stack.
- 556,073. **MINE TRAP DOOR.** David C. Thomas, Gloucester, O. Combination with a door frame and jointly connected door hinged therein, a trackway beneath the doors, fulcrumed levers extending beneath one of the track rails and an operating bar supported on the inner ends of the levers, the operating bar adapted to partially overlap the rail, bell cranks fulcrumed on the outer side of the track rail and having their lower arms bearing on levers, connecting bars between the bell-cranks, a weight carried on one of the bell crank arms and a jointed connection between one of the bell-cranks and one of the doors.
- 556,092. **PROCESS OF EXTRACTING NOBLE METALS FROM ORES.** Oscar Frölich, Berlin, Germany, Assignor to Siemens & Halske, same place. The process of extracting precious metals from a lye containing also inferior metals, said lye containing substantially five grains of each of the metals to the pint, which consists in subjecting the lye to the action of an electric current of substantially 12 amperes for each two square yards of cathode-surface, whereby the gold is separated by electrolysis.
- 556,187. **ORE PULVERIZER.** Henry P. Holland, Oakland, Cal. Combination of a top having a series of projections extending downward into the reduction channel and converging toward the bottom thereof as they approach the delivery end, with a series of drums extending into the channel directly beneath the projections thereof and provided with pockets adapted to receive particles of ore, and driving mechanism to rotate the drums to precipitate the ore against the projections of the top sections.
- 556,188. **ORE FEEDER.** Henry P. Holland, Oakland, Cal. Combination with a rotary shovel provided with scoop-shaped blades adapted to extend into the mouth of a hopper or chute, of a mechanism to rotate the shovel, a shaft connecting the shovel and driving mechanism and pivotally mounted in the frame of the feeder, and suitable guides for the shaft adapted to be advanced and retracted to insert the rotary shovel into the mouth of the hopper or chute.
- 556,193. **SHEET METAL ROLLING MILL.** Joseph Matthews, Wyandotte, Mich., Assignor of one-half to Alonzo G. Sherman, Cleveland, O. Combination with the rear set of rolls, curved plate and movable roll in rear thereof, of a pivoted guide-plate having a roller at its inner end and a downwardly-dependent curved portion and a coiled spring.

Great Britain.

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

WEEK ENDING FEBRUARY 29TH, 1896.

- 2,998 of 1895. S. O. Cowper-Coles, London. Making sheets and wires of copper and other metals direct by electrolysis, by using as a cathode an endless sheet or wire which travels through the electrolyte.
- 4,577 of 1895. W. Akroyd and W. Best, Leeds. A method of electrically lighting a miner's safety lamp without opening it.
- 19,710 of 1895. R. Llewellyn, Pontypool. A lamp for testing the amount of fire damp present in a mine.
- 24,833 of 1895. L. Paltsan, Paris, and F. Clerici, Milan. A form of agitator for cyanide vats.

PERSONAL.

MR. J. W. FLEMING, territorial mine inspector of New Mexico, is making a tour of inspection of the mines of his territory.

MR. H. W. TANGERMAN has been appointed Superintendent of the Hale & Norcross Mining Company at Virginia City, Nev.

MR. A. J. MORSE, recently professor of chemistry at the State School of Mines, Rapid City, So. Dak., is now in charge of the laboratory of the cyanide works at Florence, Colo.

MR. C. W. MERRILL, recently connected as metallurgist with the Standard Consolidated Mining Company, of Bodie, Cal., and the Harquahala Gold Mining Company of Arizona, is now in New York on his way to the South on professional business.

MESSERS. E. E. OLCOTT, PERCY L. FEARN and ROBERT PEELE have associated themselves under the firm name of Olcott, Fearn & Peele as consulting, mining and metallurgical engineers. They have established an office at No. 18 Broadway, New York.

MR. ENRIQUE TOUCEDA, a graduate of the Rensselaer Polytechnic Institute, who has had charge of the chemical laboratory of the Walter A. Wood Mowing and Reaping Machine Works at Hoosick Falls, N. Y., for the past year, has accepted the position of chemist for the Troy Steel Works, Troy, N. Y.

MR. LOUIS B. WALKER, late assistant superintendent of the Old Dominion Copper Mining and Smelting Company, has been appointed manager of the New Jersey Metal Refining Works at Elizabethtown, N. J. He was lately connected with the Mountain Mines Company, of Shasta County, California.

OBITUARY.

WALTER C. HADLEY, a well-known mining engineer of the Southwest, died in Albuquerque, N. Mex., last month of hemorrhage of the lungs.

ULISES BONILLA, a Peruvian mining engineer, died in Lima, Peru, on January 22d, aged 32 years. He visited professionally several mining districts of his country and was lately director of the School for Mine Foremen at Huancavelica.

WESLEY CHAMBERS, one of the pioneer oil men of Pennsylvania, died at Oil City, Pa., on March 18th, aged 67. He went to California in 1849. Returning to Pennsylvania some years later he settled in the oil country in 1860, and was one of the largest and best producers in the region.

JACOB P. SCHOLL died at Bethlehem, Pa., on March 15th, aged 81 years. Dr. Scholl was the pioneer developer of the Bangor slate regions. In 1864 he prospected in that region and a quarry was opened at Uttsville. It was the first in the Bangor region. Dr. Scholl was also interested in the Hyatt School Slate Company, and was actively concerned in the incorporation of the Bethlehem Iron Company.

NORMAN A. RIDEOUT, aged 35 years, son of N. D. Rideout, of San Francisco, was killed at the Perschacker Mine, Magalia, Cal., March 8th. He was overseeing the building of a station at the bottom of the shaft, when he was struck by a large rock which fell from the roof of the station. He was knocked senseless and died soon after. Mr. Rideout was formerly Mayor of Marysville, Cal., and was well known in mining circles.

ADDISON L. GRIFFIN, the general agent in the United States of the Carnegie Steel Company, died suddenly on the North German Lloyd steamship *Fulda*, on March 9th, when on the way home from Genoa. He was one of the best-known men in the steel and iron industry in this country. He was born in Binghamton, N. Y., about 60 years ago. Early in life he went into the railroad business. He lived at Great Bend, Pa., for a number of years, and at Scranton. He was connected with the Union Steel Company, of Chicago, and was president of the Keystone Bridge Company when it was absorbed by the Carnegie Company in 1892. Since that time he had been general agent in this country for the company.

JOHN ALLEN DOUBLEDAY died in Colorado Springs, Colo., on March 16th, aged 32 years, as per telegraphic advices from our special correspondent in that city. He was a member of the well-known mining stock brokerage firm of Doubleday, Rope & Co., and a brother of the late William George Doubleday, founder of the firm, whose death occurred last November. Mr. Doubleday was one of the foremost residents of Colorado Springs and was prominent in mining stock circles. An Englishman by birth, he sought the salubrious climate of the Springs for his health and later took a prominent part in the organization of the Mining Stock Association, of which he was a valued member. He had been in poor health for some time past, and his death, although not entirely unexpected, will sincerely grieve his many friends. Respected by his business relations, popular and well liked socially, he leaves a vacancy hard to fill.

SOCIETIES AND TECHNICAL SCHOOLS.

SOUTH DAKOTA SCHOOL OF MINES.—F. Clewes Smith, professor of geology and metallurgy, is delivering a course of lectures upon mineralogy. The attendance at the State School of Mines is now larger than at any time in the history of the institution, a fact due both to increased activity in Black Hills mining and the efficient corps of instructors.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—This society was incorporated at Albany, N. Y., this week. The principal office is in New York City, and the directors are Louis Duncan and Charles S. Bradley, of Baltimore, Md.; W. Anthony, of Dunellen, N. J.; F. B. Crocker, M. I. Pupin, J. J. Carty, W. D. Weaver, W. B. Vansize, C. T. Hutchinson, of New York City; James Hamblet, of Brooklyn, N. Y.; A. S. Hibbard and B. J. Arnold, of Chicago, Ill.; W. F. C. Hasson, of San Francisco, Cal.; H. J. Ryan, of Ithaca, N. Y.; Charles Hewitt, A. E. Kennelly and Carl Hering, of Philadelphia; W. J. Hammer, of Elmore, N. J.; C. F. Scott, of Pittsburg, Pa.; G. A. Hamilton and R. W. Pope, of Elizabeth, N. J.

NOVA SCOTIA MINING SOCIETY.—The annual meeting of this society was held in Halifax last week. There was a large attendance and the meeting was very successful. Among the papers read were "Air Compressors," by R. H. Brown, C. Fergie and H. S. Poole; "Coal Deposits of Grand Lake, N. B.," by R. G. Leckie; "The Calorific Value of Nova Scotia Fuels," by F. H. Mason; "How an Abandoned Mine Was Made to Pay," by W. L. Libbey.

Regarding the case of the Attorney-General versus Reynolds, a committee consisting of Arthur Drysdale, Q. C., W. Libbey and C. F. Andrews, was appointed which reported as follows: Your committee has examined the record in this suit and the judgments of the courts therein, including the final judgment on appeal, and after such examination they unhesitatingly report that the said judgment affected only the particular property and the particular parties before the court in that case. Your committee further report that there is not the slightest foundation for the assertion that the judgment in this case affects any other titles to mining property in Nova Scotia. The case turned on questions of fact peculiar to the case itself and applicable to none other, and any statement that the judgment in question involves or affects the mining titles of or granted in the province must be made in entire ignorance of the record and decision.

FOUNDRYMEN'S ASSOCIATION.—At the March meeting in Philadelphia the Executive Committee reported in substance as follows: "We find very little improvement in business up to this date. There is not the healthy feeling that we had anticipated at the opening of the new year. We find people are buying from hand to mouth rather than put in a stock of material which would last several months. While there are a number of foundries that are quite busy, the majority of them seem to want work to fill up their shops. With the mild weather that must come we hope there will be a decided improvement, so that the first half of the year will show a good average business. Our report is rather discouraging, but when compared with the corresponding period of last year we think the present period shows considerably more activity and demand."

"We want to call especial attention to the fact that the proposed national convention of foundrymen will be held in Philadelphia, May 12th, 13th and 14th. The object of the convention is to bring the foundrymen of this country together to discuss their interests and to urge the formation of associations similar to our own in every section, to bring about a more friendly feeling than at present exists. We believe that in the end such a course would tend to more satisfactory prices and a better knowledge of the cost of production of castings. At the convention a number of important papers will be presented on subjects of national importance, and as this will be the first general convention of foundrymen ever held in the United States we think it cannot fail to bring about good results. We should like to have the assistance of every foundryman in the country to help us make the convention a success."

Mr. F. C. Brooksbank read a paper on "The Sand Blast for Cleaning Castings," which was discussed by several members. Mr. P. H. Bentz then made an address on "The Money Question."

AMERICAN CHEMICAL SOCIETY, NEW YORK SECTION.—At the regular meeting of the New York section of the American Chemical Society, held March 6th, the following papers were read: "The Cassel-Hinman Gold and Bromine Process," by P. C. McIlhenny. "The Specific Gravity of Glue Solutions," by E. R. Hewitt. "Investigations in the Chemistry of Nutrition," by Dr. W. O. Atwater.

Mr. McIlhenny reviewed the chlorination and cyanide processes as the most successful yet employed for the treatment of low-grade and telluride ores, but both processes had disadvantages which could be largely overcome by the use of bromine, if its greater cost could be balanced by its recovery from the spent solutions. The advantages of bromine are: (a) Greater solubility in water; 3-2% as compared with 0.76% for chlorine. (b) Lesser oxidizing power, whereby iron pyrites will not be so strongly acted upon as by chlorine. (c) Greater solvent power for

gold. The bromine is recovered by addition of sulphuric acid and an oxidizing agent followed by distillation by use of live steam. Very little acid is required, and the bromine free liquid is in the best possible condition for precipitating the gold, which is effected in a precipitating tank by the addition of sulphide of iron in fine powders. The process is carried out in the following series of operations: (1) Crushing the ore. (2) Drying. (3) Sifting through sieves of 20 to 30 meshes per square inch. (4) Roasting in a specially constructed oven whereby loss from volatilization is reduced to a minimum in the case of tellurides. (5) Bromine treatment. (6) Transfer to distillation tank, where the acid and oxidizing agent are added, and the bromine distilled off by steam.

It is desirable to roast until all the sulphur is removed, but ores low in sulphur have been treated, using weak solutions of bromine, from which 80% of the bromine has been recovered. A silicious telluride ore, containing \$28 to \$30 in gold, with nothing else of value, has been treated at the rate of 50 tons daily since January 1st, at a cost of \$1.75 per ton.

Mr. Hewitt concludes from his work on the "Specific Gravity of Glue Solutions," that there is a series of definite chemical combinations between glue and water. He finds the specific gravity of solutions independent of the quality of the glue, and that the hydrometer cannot be used in solutions containing over 65% glue.

Dr. Atwater described the experiments made and in progress at the Middletown Experiment Station to determine the fuel value of different foods by means of the bomb calorimeter, as modified for his work; also the "respiratory calorimeter," which has been constructed for studying heat radiation, energy of food consumed, etc., in the living subject. The "respiratory calorimeter" is practically a small room built of sheet copper, just large enough for a man to stand up and lie down in, and in which it is expected to keep him by the week, recording the temperature, chemical composition and quantity of all food and air supplied to him, and of the respired air and waste products removed.

Dr. Dudley, the president of the society at large, was present, and in a brief address pointed out the immense field yet to be explored in regard to pig iron and steel, urging those with the time and opportunity to take up the various problems connected with the more obscure and as yet unproved combinations of iron with nitrogen, and others of the less common elements.

INDUSTRIAL NOTES.

The Tyler Valve Company has been incorporated at Corning, N. Y., to manufacture valves and fittings.

The Coleman-Shields Company's mill, at Niles, O., resumed work in all departments last week after a short shutdown for repairs.

Reading, Pa.—The anthracite blast furnace at Temple, Pa., went into operation on March 16th, after an idleness of five weeks.

The lessees of the Bear Spring (Tenn.) Furnace are putting in a new hearth, and will have the furnace ready for blast in a short time.

The Wellman Steel Company, of Thurlow, Pa., denies the statement that its plant is to be equipped and to be started in the near future.

The Park & Lacey Company, of San Francisco, Cal., reports the sale of one Ropp straight line furnace to the Mt. Morgan mine, of Queensland.

The Union Iron and Steel Company, of Youngs town, O., has put one of its big mills in operation in all departments for the first time in nine months.

The Frank Kneeland Machine Company has secured an order for a 22-in. merchant mill from the Illinois Steel Company to be placed in its Bay View (Wis.) works.

The Lebanon Manufacturing Company, of Lebanon, Pa., has closed a contract with the Philadelphia & Reading Railroad Company for 500 hopper gondola cars.

The Elliott-Washington Steel Company, of New Castle, Pa., has received an order for 150 tons of steel, which is to be used in the manufacture of bicycle pedals.

The 1,500 employees of the Oliver Iron & Steel Company, South Tenth street mill, Pittsburg, Pa., have been notified of a 10% reduction in their wages, to take effect at once.

The interests of H. J. Williams and Geo. Sleeth in the Superior Steel Company, at Carnegie, Pa., have been purchased by J. S. Seaman, Jr., of the firm of Seaman, Sleeth & Black.

The new double furnace of the Cleveland Cliffs Iron Company at Ishpeming, Mich., has gone into blast. The furnace is one of the largest in the country using charcoal.

Bids will be received until March 27th by D. A. William, chairman county commissioners of Shawnee County, Kansas, for the building of a concrete metal bridge over the Kansas River at Topeka.

The county commissioners at Tarboro, N. C., will receive bids for the construction of an iron and steel

bridge 590 ft. long across the Tar River at that place, after plans and specifications now ready.

The Woodstock Iron Works, of Anniston, Ala., has completed the repairs upon its coke furnace, enlarging its capacity to 160 tons daily. A new hot-air stove and a new blowing engine have also been installed.

The King Bridge Company, of Cleveland, O., has obtained the contract for the construction and superstructure of a 198-ft. drawspan over the Rouge River at Springwells, Mich. The contract price is stated to be \$19,300.

The Berlin Iron Bridge Company, of East Berlin, Conn., well-known engineers, architects and builders of iron and steel bridges, etc., have just issued a handsome calendar. This will be sent to any one making application for it.

The Thomas Furnace, at Niles, O., under the management of W. Aubrey Thomas, on March 2d made more iron than at any other day in the history of the furnace, the output reaching 275 tons. These works are making almost that amount daily.

The Greensburg Nut and Bolt Works, which has been idle for several years, will probably be put in operation within a short time. R. B. Shumaker, of Homestead, Pa., is negotiating for the purchase of the plant. The works are owned by a syndicate of capitalists of Canal Dover, O.

The Soho Furnace of the Pittsburg (Pa.) Iron and Steel Manufacturing Company, which was put out of blast in December for relining, will be repaired as soon as an order from the Court can be secured. The company, which is now in the hands of a receiver, will expend about \$20,000 in relining the furnace, adding new coolers, etc.

A good idea may be gathered of the extent to which transmission of power by electricity is gaining ground in this country by the statement that in the long distance plants installed by the General Electric Company, during 1895, over 1,200 miles of copper wire, for transmission purposes alone, were used, amounting practically to 1,200,000 lbs. of copper.

No. A Furnace of the Maryland Steel Company, Sparrow's Point, Md., did good work recently on foreign ore, the burden being one-third Mokta, one-third Tafna, one-sixth Porman and one-sixth Seriphos ore, the yield being 55% in pig. The best day's work was 321 tons, the best week being 2,019 tons. The fuel consumption was 2,038 lbs. of coke per 2,240 lbs. of iron.

Notice is given of the incorporation as a joint stock company of the well-known firm of G. W. & C. B. Colton & Co., of New York city, to carry on the business of engraving and printing maps, atlases, geographical works and apparatus. Capital, \$15,000, and directors, G. Woolworth Colton and C. B. Colton, of Brooklyn; C. L. Colton, of Englewood, N. J., and A. R. Ohman, of New York City.

The Carbon Limestone Company, with quarries near New Castle, Pa., which has been shipping from 150 to 175 cars of stone per day, is about to extend its railroad lines. The extension will go about two miles back of the quarries now in use, and will touch rich strata of the stone lying in that direction. Most of the stone is sent to Pittsburg, but large quantities of it goes to New Castle, Youngstown, O., and other points.

The laboratory force of Messrs. Baker & Co., at Newark, N. J., in which platinum is worked, has been enlarged in order that the increased demand for fluorescing platinum salts may be promptly met. Messrs. Baker & Co. state that since the excitement caused by the discovery of Prof. Roentgen they have sold more of the salts of platinum which fluoresce under the impact of the new rays than ever before in the history of the business.

R. Hoe & Co., of New York City, manufacturers of printing presses, have placed an order with the Berlin Iron Bridge Company, of East Berlin, Conn., for an all-steel building for storage purposes. This building is 40 ft. wide and 60 ft. long, three stories high and is absolutely fireproof. To avoid condensation of moisture, the roofs and sides are lined with the Berlin Company's patent anti-condensation fireproof lining on the under side of the corrugated iron covering. The floors are concrete supported by corrugated iron arches resting on I beams. A traveling crane is attached to the trusses, having a capacity of three tons, and so arranged that it takes the material to be raised in the building from the lower floor, and raises it to any part of the building on any of the floors.

The Stilwell-Bierce & Smith-Vaile Company has taken the contract for the complete water power plant to be installed by The Lachine Rapid Hydraulic & Land Company, Limited, of Montreal, Ca. It is located at the famous Lachine Rapids on the St. Lawrence River, about five miles above Montreal. The initial development will amount to 10,000 H. P. The work of construction has already begun, and the company expects to be prepared to furnish power before the close of this year. They have contracted with The Stilwell-Bierce & Smith-Vaile Company of Dayton, O., for 66 large size Victor turbines of the latest pattern and all the connecting machinery needed for transmitting the power of these turbines to the electric generators. This is

one of the largest orders for turbines ever placed at one time, and will certainly add to the enviable reputation already enjoyed by the Victor turbine.

The Solar Iron Works of William Clark's Sons & Co., Pittsburg, Pa., was closed by the Sheriff on March 17th, on executions resulting from the decision of the Supreme Court at Philadelphia, on March 16th, in the case of Elizabeth D. Clark, administrator of the estate of E. L. Clark, her husband, against Jane Clark, her mother-in-law. The mill was closed on the writ issued for \$175,000 by the bondsmen of Jane Clark. In addition to this execution for \$175,000, a judgment was entered later by Frank L. Clark, as trustee for creditors, to the amount of \$60,678. The schedule of debts is as follows: W. P. Snyder & Co., \$19,982; Naylor & Co., \$4,097; H. Stewart & Co., \$4,419; Carnegie Steel Company, \$26,614; Dreifus, Block & Co., \$1,662; First Pool Coal Company, \$4,000. These executions were to protect Jane Clark's creditors and sureties. Following them closely, an execution for \$453,757 and costs was issued by the attorneys for Elizabeth D. Clark. The costs amount to nearly \$4,000, not including attorneys' fees. The Supreme Court ordered the defendant to pay the plaintiff \$453,757. The Court sustains the two contracts made by E. E. Clark and his mother, the defendant, the second of which gives E. L. Clark an interest of 41%. When the partnership was dissolved by E. L. Clark's death, the defendant took possession as purchaser at a valuation of \$500,000.

TRADE CATALOGUES.

The Goulds Manufacturing Company, of Seneca, N. Y., has just issued a special catalogue devoted to spray pumps and kindred lines. All the best results of former years, together with some new styles, are fully described. The catalogue also contains much information of value to agriculturists, and any one who is interested in spray pumps, nozzles, agitators, etc., should write for a copy.

We have received the latest supplementary catalogue of standard engineering and mining instruments manufactured by George N. Saegmuller, successor to Fauth & Co., of Washington, D. C. The catalogue is handsomely illustrated and the descriptive matter will be of interest to the profession, as new modifications in the construction of instruments for special lines are fully treated. Anyone requiring mining transits or kindred instruments would do well to write for the booklet.

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.

NEW OIL WELLS.—The Oil City Derrick's report for February notes the completion, in New York, Pennsylvania and West Virginia fields, during the month, of 514 new wells, with a total production of 7,470 bbls. daily; there were 599 new wells in progress at the end of the month. In the Buckeye field in Ohio 355 wells, with a production of 6,704 bbls., were completed, and 317 new wells were in progress. The Southeastern Ohio field shows 41 new wells, with 359 bbls. production, and 22 new wells drilling. In the Indiana field 90 wells, with 1,875 bbls. production, were completed, and there were 80 wells under the drill on February 29th.

OIL EXPORTS.—Exports of mineral oils from the United States in February are reported by the Bureau of Statistics, Treasury Department, as follows: Crude oil, 7,413,237 gals.; naphthas, 403,632 gals.; illuminating, 49,162, 249 gals.; lubricating and paraffin, 3,987,130 gals.; residuum, 840 gals.; totals, 57,907,088 gals.; a decrease of 2,678,621 gals. as compared with February of last year. For the eight months of the current fiscal year from July 1st to February 29th, the total exports were 586,420,860 gals.; showing a decrease of 44,786,129 gals., or 7.3%, as compared with the corresponding period of last year.

ALABAMA.

COAL AND COKE PRODUCTION.—Mine Inspector Hillhouse has completed his annual report on the coal and coke production in Alabama for 1896, which shows the total output of coal to have been 5,648,461 tons as compared with 4,361,312 tons for 1894, an increase of 1,287,149 tons. The total number of miners employed was 9,286. Production and employment are divided as follows by counties: Jefferson County, 4,900 miners, including 1,500 convicts, 3,710,331 tons of coal mined and 1,301,881 tons of coke, Walker County, 2,150 miners, 935,791 tons of coal and 3,290

tons of coke. Bibb County, 1,085 miners, 613,762 tons of coal and 33,885 tons of coke. Tuskalooosa County, 677 miners, 208,177 tons of coal and 40,840 tons of coke. Blount County, 95 miners and 62,400 tons of coal. Shelby county, 233 miners and 52,755 tons of coal. St. Clair County, 120 miners and 30,806 tons of coal. Winston County, 20 miners and 4,500 tons of coal. There are a number of mines that employ less than twenty miners and make no report. Mr. Hillhouse estimates that these turn out 25,000 tons annually. The State's total coke production was 1,384,846 tons as compared with 924,002 tons for 1894, an increase of 460,844 tons. The output of both coal and coke is the largest in the history of Alabama.

ST. CLAIR COUNTY.

NEW RAILROADS.—The people of Anniston are making a strong effort to secure a direct line of railway from Anniston to the coal fields of St. Clair County. The organization of a construction company has been decided upon and Mayor Hight has been instructed to appoint a committee to secure subscriptions for building the road. It was decided to place the shares at \$10 each, and 5% of this amount to be paid monthly. As soon as stock to the amount of \$25,000 has been subscribed, the construction company will be organized and the work of grading commenced.

WALKER COUNTY.

LOST CREEK COAL & COKE COMPANY.—The Tupelo Coal Company, of Tupelo, Miss., has leased the property of the Lost Creek Coal & Coke Company, at Carbon Hill, and will develop it on an extensive plan. The new company is represented by L. E. High, a prominent coal man of Tupelo. R. V. Goss, formerly president of the Carbon Hill Coal Company, will attend to the shipping department. David McKinley, formerly mine boss of the McDonald Coal Company, has been retained as secretary. The property embraces two openings, one shaft and drift, and another drift that can be worked with some improvements.

SHEFFIELD, IRON, STEEL & COAL COMPANY.—Battery No. 2, of the coke oven plant at Jasper, owned by this company, has been thoroughly renovated, and will be fired in a short time. It is the intention of this company to put in a coal washer and crusher in the spring.

ALASKA.

ALASKA-TREADWELL GOLD MINING COMPANY.—The clean-up for February was as follows: Period since last return, 31 days; bullion shipment, \$41,600; ore milled, 18,012 tons; sulphurets treated, 265 tons; of bullion there came from sulphurets, \$12,728; gross expenses for period have been \$23,055.

ARKANSAS.

MARION COUNTY.

(From an Occasional Correspondent.)

BOARD OF TRADE AND MINING BUREAU OF MARION COUNTY.—Mr. A. S. Layton, of Yellville, is president, and the board is doing good work.

LIONHILL ZINC MINES.—The Arkansas Mining Company and the Chicago and Little Rock Mining Company continue successful mining operations, keeping the large mill steadily employed. They sold 50 tons of concentrated jack in sacks, last week, to the Mineral Point (Wis.) Reduction Company, delivered at Buffalo City boat landing, and the price was only \$2 below "top market" quotations on the same date at Joplin, Mo.

MORNING STAR MINING COMPANY.—This company is building 16 barges. Some were sold last week to the Mineral Point (Wis.) Reduction Company. Mining work is progressing.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

GOVER.—This mine is on the mother lode, two miles north of Amador City. The development work on the 1,200-ft. level shows the ledge to be 40 ft. wide, with crosscuts going toward the foot and hanging walls, penetrating and cutting both ways fine bodies of ore. The mill has started up, running on good grade ore from the 900-ft. level. The owner of this mine has bonded the North Gover for \$25,000. The ledge dips toward this mine, and is now within 75 ft. of the boundary line.

BUTTE COUNTY.

MAGALIA.—Exploiting the Magalia mine, near Oroville, has proven more expensive than was anticipated. In order to reach the channel where the gold is, a shaft 500 ft. in depth is necessary, and the material through which this must be cut is a lava bed. When the miners got down some 300 ft. they struck a subterranean stream, which will necessitate new pumps being put in, when the work will proceed again.

STOW.—This mine, on the South Fork of the Feather River, near Forbestown, has been doing some extensive development work. The crosscut run on the lead in the new tunnel has just passed through an 83-ft. ledge of pay ore. A 100-stamp mill is to be erected at the river.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

GWIN.—This mine is on the mother lode, three miles west of Mokelumne Hill. The work of reopening the old workings in the 1,400-ft. level has been a success. The drilling shows good prospects, and work will be pushed as rapidly as possible.

About \$150,000 will be spent in development on this property. This mine was a large producer in early days.

ORO CAMINO GOLD MINING COMPANY.—This company has been incorporated by prominent Oakland and San Francisco men. Capital, \$100,000. The company owns claims in the Pine Peak district, and will soon commence development work.

EL DORADO COUNTY.

(From Our Special Correspondent.)

TWO CHANNEL.—This mine, at Kennedy Flat, is producing some high-grade gravel. The 10-stamp mill is running steadily.

CHURCH.—This mine, three miles south of El Dorado, is one of the deepest mines in the county. A 200 H. P. electric plant and 30 additional stamps are being put in.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

TYRO.—This mine on the West Lode, $1\frac{1}{2}$ miles south of Coulterville, is running the 10-stamp mill steadily on good ore; 30 men are employed.

NAPA COUNTY.

AETNA CONSOLIDATED QUICKSILVER MINING COMPANY.—The annual meeting of this company was held in Boston, Mass. last week, and the following were elected directors: Jacob Pfaff, President; Robert B. Brigham, Charles Pfaff, Edward H. Mason, Andrew Nickerson and John G. Wright, of Boston; James R. Simpson, of Lawrence; Simon Rothschild, of New York, and W. B. Buckminster (vice-president), of Boston. The report for 1895 is as follows: Sales quicksilver, \$72,891; on hand, since sold, \$42,350; total expenses, \$83,631; net profits, \$31,609; dividends, \$29,000; balance, profit and loss, \$11,609; profit and loss, January 1st, 1896, \$43,235; repairs to works, \$1,766; depreciation, \$4,553. The assets of the company are: Cash, \$22; plant, \$501,712; quicksilver, \$42,350; supplies, \$7,005, a total of \$551,000. The liabilities are: Capital stock, \$500,000; Haas Bros., \$5,566; unpaid drafts, \$3,288; profit and loss, \$43,235. The result of the operation shows tons smelted, 16,490; flasks produced, 3,300; pounds produced, 252,450; drifts and tunnels run, 4,138 ft.; winzes sunk, 383 ft.

The company owns at Lidell 350 acres land and 573 acres mining claims; also works valued at \$37,470. General Manager Buckminster says in view of the depression in business during 1895 the results accomplished have been very satisfactory, and we commence the year in better shape and with brighter prospects. The dead work on the long tunnel, No. 9, which was run about 4,000 ft. to catch the ore chute coming down from No. 7 level, has been completed, and a raise carried through to No. 7 level, and drifts run at No. 3 and No. 9 levels, showing a good ore body extending from No. 7 level to No. 9. Other and extensive prospecting work has been carried on and will be continued with fair prospects. Furnaces No. 1 and No. 2 are working well and giving good per cent. returns, but it is the intention to replace them at an early day, out of the earnings, with a complete modern plant. But a small part of the claims have as yet been prospected. The stopes in the new ore body were not opened until after the close of the year, so the results will show in next year's work.

NAPA CONSOLIDATED QUICKSILVER MINING COMPANY.—At the annual meeting of this company, held in Boston, Mass., last week, the following directors were elected: Jacob Pfaff, president; Robert B. Brigham, Charles Pfaff, Edward H. Mason and Andrew Nickerson, of Boston; James R. Simpson, of Lawrence; Kalman Haas and Simon Rothschild, of New York, and W. B. Buckminster, (vice-president), Boston. The annual report shows for the year 1895: Sales quicksilver, \$118,862; on hand, since sold, \$69,125; total expenses, duplicate furnace and reduction plant, \$112,265; net earnings, \$75,21; dividends, \$80,000; profit and loss, January 1st, 1896, \$44,671; profit and loss, January 1st, 1896, \$40,243; construction and repairs charged to expense, \$19,274; depreciation buildings, \$5,629. The assets of the company are: Cash, \$1,036; plant, \$700,000; quicksilver, \$69,125; supplies, \$10,111. The liabilities are: Capital stock, \$700,000; unpaid drafts, \$4,483; Haas Bros., \$34,280; unpaid dividends, \$505; unpaid bills, \$750; profit and loss, \$40,243; total, \$780,272. During the year 17,650 tons of ore were smelted, producing 5,400 flasks or 413,100 lbs. of quicksilver. The company owns at Oat Hill 1,560 acres land and 340 acres of mining claims; also works valued at \$72,170. General Manager Buckminster says: "Although the past year has been one of unusual depression, we are happy to say that the operations of the company have been fairly remunerative, and we enter upon the coming year in good condition." The work of prospecting and development has been carried on vigorously and good results obtained, showing a number of strong ore bodies and putting the property in a better physical condition than ever. The different stopes are opened out, showing ore in sight for a long period. We have duplicated the reduction plant by the erection of the new furnace and works, and are ready to largely increase our output should it be deemed advisable. We have yet a large acreage of mining claims unprospected, upon which work will continue to be done as in the past, thus keeping far ahead of the requirements of the furnaces. The company owns a large amount of timber land, and it will continue to be their policy to purchase more from time to time, as opportunity offers. It has to-day a complete and modern plant. No construction account is maintained, and all ex-

penditures for such purposes, as well as purchase of additional land, are charged directly to expense account.

NEVADA COUNTY.

(From Our Special Correspondent.)

BLACK HAWK.—At this mine near Union Hill, east of Grass Valley, a strike has been reported at a depth of 80 ft. A tunnel which is in several hundred feet is being driven ahead to cut the ledge. When the chute was cut by the incline shaft it was 4 ft. between walls and is the same character as the pay chute in the Maryland mine now being worked near by.

CENTRAL HORSE.—This mine is located on Washington Ridge, about 9 miles from Nevada City. Discovery was made at the mine, when a ledge 200 ft. wide was uncovered. It is a contact vein between granite and slate. The foot walls show porphyry and diorite. The vein matter averages about \$5 in free gold and the same in sulphurets.

PLACER COUNTY.

(From Our Special Correspondent.)

DRUMMOND.—This property, which comprises 390 acres of timber land, through which the ledge courses, is located above Forest Hill, between the north and south forks of Shirt Tail Canon. Denver capitalists have purchased the property, and will start up work at once. This mine has produced some good ore. There are two veins about 400 ft. apart. The mine is well equipped with machinery.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

DOCTOR.—At this mine, located in the Fremont Peak District, the shaft is down 35 ft. on a 3 ft. vein carrying free gold.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

DUTCH.—This mine, about one mile southeast of Jamestown, has increased the number of stamps to 10. Large quantities of low grade ore are in sight.

COLORADO.

BOULDER COUNTY.

(From Our Special Correspondent.)

ACME.—A very rich strike is reported in the Acme, on Boulder Creek. The vein is large and thoroughly mineralized. Arrangements are being made to operate on a large scale.

BIRMINGHAM.—Work is to be resumed at once by a responsible company. A large body of ore was revealed some time ago, and the tunnel will be run in on the vein. C. C. Eddy will have charge of operations.

BUCKEYE.—This property reports the strike of a very rich streak of ore this week, and the working force has been considerably increased in consequence.

BUENA.—A streak 4 in. wide of rich ore has been disclosed. This mine is operated by Clemmons Bros.

CELESTIAL.—This property has been leased and bonded to Judge Rogers, of Denver, and will be started up at once under the management of Captain Sipple.

DIME.—Tunnels Nos. 1 and 2 are being driven on the vein. The ore has improved in value of late.

FOUR MILE.—This prospect developed into a producer this week by the strike of a big body of fair grade ore. The property is owned by McMasters & McCormick.

GOLD NUGGET.—The manager of this property has gone to St. Louis to purchase a new mill for treating the large amount of low-grade ores.

GRAND CENTRAL.—This property has a large vein of milling ore and a small streak of very rich ore. Several good-sized nuggets were taken out this week.

LEE HILL LEASING COMPANY.—Incorporated this week; capital stock, \$25,000. W. K. Morris, R. N. Pearson and H. L. Morris, incorporators.

MILWAUKEE.—The ore streak has enlarged to 10 in. and shipments are being made regularly.

MORNING STAR.—Clemmons & Co. have secured a new lease on the Morning Star, the contemplated sale having fallen through.

NEWMARKET.—The shaft is down 200 ft. and in good ore. Drifting on the body will begin shortly. Running to the west is a 12-in. streak of fine smelting ore, which will be shipped to Denver.

PRESIDENT.—Hinsel & Co. have paid the \$5,000 bond on the President, and are shipping regularly a fine grade of smelting ore. The shaft is down 125 ft.

QUEEN BESS.—A force of men has been put on at this point, and work has been actively inaugurated for the summer season.

RICHMOND.—Some fine ore is being mined from a streak recently uncovered. The ore is a telluride. The company has just completed extensive improvements, having put in new machinery and erected several necessary buildings.

STRAITS OF ALGIERS.—This company has been organized to operate in Boulder County. Capital, \$93,000. The incorporators are J. J. A. Miller, A. Johnson, Peter Johnson, A. Ostram, A. Pearson, Nelo Pearson and J. A. Sandholz.

SUNNY VIEW.—A good strike has been made in

the shaft, which is down 60 ft. Drifting was immediately begun and shipments will begin soon.

WEDGE.—A half interest in this claim has been purchased by Mr. Frank Little, and operations will be pushed to their full extent under the new management.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

CHICAGO BELLE.—Omaha business men have organized for working this group of claims, some of which show good returns from grass roots. A big hoisting plant is to be installed, and most of the claims will be worked through one shaft to good advantage.

LILY.—Sinking of the shaft continues, and recently a large sized streak of milling dirt began opening out. The property is owned by a syndicate of Chicago business men.

NEWTON.—Both the first and third levels in this Idaho Springs mine are being driven eastward, and in the first the lessees will soon cut the ore chute, now being worked at the second level. The formation is a porphyry and the last shipment of smelting ore ran \$250 a ton, the streak being from 6 to 8 in. wide.

SENATOR.—The Leadville company working this group of 24 claims is confining itself to doing development work. One adit is in 1,900 ft., another 1,800 ft. and a third 400 ft. On one winze has been sunk, opening up 3 ft. of pay ore, and one of the adits is being driven to get under this large pocket. The force of workmen has recently been increased.

TRACTION.—The shaft on this property has been sunk to a depth of 400 ft. and levels are being driven from the bottom in both directions. A 13-in. streak of iron-copper is showing and lessees now working the mine expect to be reimbursed for their large amount of money paid out in development.

EL PASO COUNTY—CRIPPLE CREEK DISTRICT.

(From Our Special Correspondent.)

BLUE JAY MINING COMPANY.—This company, whose stock on the Denver market had such a remarkable rise and fall, owns the Blue Jay and Whippoorwill fractional claims, between 4 and 5 acres on Bull Hill, from which two car lots have been sold, the Little Giant on Raven Hill and some outside claims.

CHIEF.—This mine, on Raven Hill, which, in connection with the Director mine, is owned by Messrs. Cove & Robinson, employs 14 men. The shaft has been sunk 180 ft., and shortly a level will be started. A raise is also being made to connect the second and third levels. The owners feel confident that shipments will be made daily from this property in a short time.

DOCTOR.—The workings are principally confined at present to the 250-ft. level and 25 tons of ore are sent daily to the Pueblo smelters. The tunnel is being extended into the hill, the present length being 400 ft. in a northeasterly direction in order to connect with the chief workings at a depth of 650 ft. The present force numbers 47.

GROTTO.—This property, on Gold Hill, is being worked under lease and bond. A steam hoist has recently been erected and the shaft is being sunk below the 160 ft. The bottom of the shaft is largely a damp iron-stained clay. The lessees feel very confident.

HERCULES GOLD MINING COMPANY.—The Crank No. 1 and No. 2 owned by this company, of Colorado Springs, and bonded to Mr. Harry Leonard, etc., for \$75,000 until June 1st, 1897, and containing nearly 10 acres patented, has just been transferred to a Mr. John F. Brady, of Chicago, for \$150,000, it is stated. Mr. Brady has given instructions to his agent to at once commence to sink a shaft 200 ft., which will be immediately done. The properties are well located on the south slope of Raven Hill, between the Moose on the east, and the Elkton, Raven, etc., on the west. Not much work has been done on the claims.

IRON CLAD MINING COMPANY.—The Iron Clad, on Iron Clad Hill, and owned by this company, but worked under lease by Messrs. Hall & Murphy, made this week what is considered a very important strike. The shaft has been sunk 154 ft., and a drift north at that point exposed some very rich specimens of gold ore. The vein is a large one, fully 20 ft. wide, but principally low grade, the ore heretofore shipped from the upper level yielding from 1 to 2 oz. The rich ore is now scattered through the vein, and not confined to a regular pay-streak.

LONGFELLOW.—This mine, on Bull Hill, is being steadily worked on lease. The Clemmons lease ships about 30 tons of from 3 to 4-oz. ore to the Gillette chlorination plant weekly. Eight men are employed.

LUCKY BILL.—This is a fractional claim, located on Womack Hill, directly east of town. A shaft is down 200 ft., is equipped with a steam hoist, and is being actively worked. Recently a small nest of rich ore was found which netted \$16 per lb. Another small shipment was made which sampled 362 oz. per ton. This property is owned by Denver people and is a close corporation.

OPHELIA.—This tunnel, about one-half mile south of the town of Cripple Creek, on the main rock, has already pierced the hill 260 ft. Two machine drills are at work all the time.

SHERIFF.—This property, on Raven, north of the Moose 2,000 ft., and said to be on the same vein, is shipping regularly to the mills the low-grade ore

from the 100-ft. level and above. The vein at the 100-ft. level is 8 ft. wide.

UNION GOLD MINING COMPANY.—This company's properties on Bull Hill are all doing well. The company employs more than 100 miners. The Pike's Peak shaft has been sunk 350 ft. There are four shafts on this vein, thus securing good ventilation. The Orpha May shaft has been sunk 300 ft. and the lower workings show rich ore. The Lucky Guss vein has recently been opened at the 170-ft. level from the Orpha May shaft.

VINDICATOR.—This mine, on Bull Hill, employs 40 men. The shaft has been sunk 200 ft., and the output is about two cars of ore per week, the fines sampling 4 oz. and the rest of the shipment 3 oz. per ton. On the dump there are large quantities of \$8 and \$10 ore.

GILPIN COUNTY.

(From Our Special Correspondent.)

CHAMPION.—Work at this mine has been re-started by Denver parties, who intend sinking the shaft 100 ft. deeper. The vein is supposed to be a westerly extension of the Eureka, but its appearance is very different, the contained mineral being mostly zinc, blende and galena, instead of pyrite. The vein as at present seen in the bottom is said to be narrow and pinched.

CROWN POINT & VIRGINIA.—It is said that good ore has been met with west of the main shaft of this mine, the shoot mostly worked hitherto being east of the shaft. An extension of the Gilpin County Tramway into this mine is projected, which, it is hoped, would divert its ore shipments to Black Hawk.

GETTYSBURG.—Chicago parties are sinking here on a strong vein, with about 2 ft. of low-grade mill dirt. A few days ago a promising high-grade streak, about 6 in. wide, was met with. The present depth is about 200 ft., and no drifting will be done until the shaft has been sunk to a depth of 250 ft.

GILPIN COUNTY TRAMWAY.—A vigorous attempt is being made to raise a sum of \$85,000, to provide means for extending the line to most of the producing mines of the camp. Of late years the traffic seems to have fallen off considerably, owing partly to the stoppage of many of the mines served by it, but in part also to the high rates charged, which in many cases can be successfully competed with by the teamsters.

GREAT MAMMOTH.—A small steam hoist is being placed on this claim, which has been taken up on lease and bond by Denver parties. Not much work appears to have been done on the vein, which is supposed by some to be an extension of the south branch of the Mammoth vein.

HOLLAND.—A shaft is being sunk to a depth of 100 ft. on this claim, in Russell Gulch, hitherto practically undeveloped. The vein is about 3 ft. wide, with 18 in. of good-looking mineral.

LOTUS.—This mine, in Russell Gulch, is owned and worked by Messrs. Sternberger, of Philadelphia. The ore is heavy in sulphides, mainly pyrite and fahlerz, assaying \$10 and upward per ton. The values are, however, imperfectly saved in the stamp mills, and notwithstanding that the main shaft is down 400 or 500 ft. the mineral is still too friable to concentrate well, so that the only method of treatment available is cobbing out the richer portions of the ore and shipping it to the smelters. In the shaft, however, which is still being sunk, the mineral seems to be becoming less decomposed, and hopes are entertained that with increased depth concentration milling may enable the ore which has now to be thrown over the dump to be profitably worked. This mine adjoins the Niagara, recently sold in Pittsburg.

MAMMOTH.—A contract is being let to sink the shaft 50 ft. deeper—the present depth being 700 ft. The vein in the bottom drifts continues wide and very heavily mineralized, but assays show it to be extremely poor.

ORANOAKE.—A small steam plant is being placed on this claim, situated due west of Nevada.

SARATOGA.—It seems probable that some months will yet elapse before this mine will be able to resume shipments to any great extent. The Cornish pump recently erected has easily drained the mine to the bottom, but it is now found that most of the levels are badly caved.

SPUR DAISY.—This mine has been taken up on lease by a Denver company. A few years ago the ore shipped gave high returns at the Black Hawk mills, until it was closed down owing to a dispute over the title.

WILLIS GULCH CONCENTRATOR.—This mill was built some months ago by Messrs. Ingram Bros., of Idaho Springs, primarily to treat the dump of the Saratoga mine, which is very heavy in pyrites, but also to compete for custom ore. No provision being made for recrusching the jig waste, the loss in treatment was considerable. On account of this defect, and its out of the way situation, the mill seems not to have been very successful, and is at present closed down.

LAKE COUNTY.

(From Our Special Correspondent.)

BIG JOHNNY.—A tunnel is being run to cut the ore chute encountered some weeks ago. It is not expected to have to go in over 150 ft. The ore body opened up some time ago ran \$37 to \$119 to the ton in gold.

BLACK PRINCE.—The new lessees, who are Denver and Eastern capitalists, are putting in place a fine plant of machinery preparatory to doing a great deal of exploration and further open up the ore bodies already encountered.

COLUMBIA.—The lessees have found the water well lowered, and after prospecting a few weeks are now in good ore, from which they will soon begin to ship.

LEADVILLE ORE OUTPUT.—Despite the fact that the Wolfstone property has cut down its shipments the production of iron from other properties has increased and 1,600 tons of ore, all kinds, are now being shipped daily from the mines of the camp. Among the new shippers are: Sixth Street, 100 tons manganese iron; Turbot, 60 tons iron; Mikado, 25 tons; Mahala, 125 tons; Yankee Doodle, 10 tons, and Vinnie 40 tons.

LOST CANON CONSOLIDATED DEEP TUNNEL GOLD MINING COMPANY.—Articles of incorporation have been filed. The incorporators are Claude Tyrone, E. W. Stephens and G. W. Gardiner. Capital stock, \$3,000,000.

MACON MINING COMPANY.—This company, which was recently organized, owns the Elgin claims, now under lease to Denver people. All litigation has been settled, and the lessees have begun new exploration work.

NISI PRIUS LEASING COMPANY.—Important work is being carried on. The company has been doing steady pumping on the Crown Point, and now finds the entire group of mines well drained. At a depth of 600 ft. in the Crown Point is where operations are being carried on. A body of high-grade ore has been broken into, and 10 tons a day are being shipped.

PENROSE.—The drifts are being pushed in all directions, opening up the ore bodies. The north drift has now reached the Gazelle ground. Here a new and good body of both iron and carbonate and a fine lead body is being developed. Over 300 tons of this stuff has been shipped.

RARUS GOLD MINING COMPANY.—Articles of incorporation were filed this week. The capital stock may equal, but must not exceed, \$100,000. The incorporators are D. H. Dongan, A. Van Camp, S. F. Long, R. H. Miller and N. Rollins.

REX GOLD MINING COMPANY.—J. J. Brown, who has done what development work there is on the Rex property, has filed suit against the company on a number of promissory notes which he holds. His claim is for \$36,405, for which he asks judgment.

SMITH-MOFFAT COMBINATION.—The output of this group for February is as follows: Grey Eagle and Pocahontas, 2,068 tons iron, 435 tons carbonate; Wolfstone, 1,789 tons sulphide; Maid of Erin, 105 tons sulphide, 1,800 tons carbonate; Bon Air, 442 tons of carbonate; Starr Lease, 952 tons of carbonate, 229 tons iron. As predicted last week in the *Engineering and Mining Journal*, there is a great falling off in the tonnage of the Wolfstone due to the fact that the high-grade ore is about all gone while the low grade, cannot be shipped at a profit at the present price of silver.

YANKEE DOODLE.—This property, owned in the East, has been leased to Herrick & Lynch. The shaft is in good iron and shipments have commenced.

OURAY COUNTY.

(From Our Special Correspondent.)

BADGER MILL.—This mill shipped during the week four cars of concentrates, taken from second grade Bachelor ore, which averages 180 oz. silver and from \$3 to \$5 gold per ton.

GOLD LION.—A good strike in gold ore was made in this property last week by Blacketer & Felsner. The vein is 1 ft. thick and averages 6 oz. gold per ton. Shipments will commence at once.

MINERAL FARM.—Messrs. I. J. Lucas and J. H. McCoy, owners of this property, will start a force of 30 men to work in a few weeks. An examination of the pipe line has been made and the necessary repairs are now being made. This property has produced over \$150,000.

IDAHO.

MINERAL OUTPUT IN 1895.—Superintendent F. F. Church, of the Boise assay office, has just completed and forwarded to the director of the mint his official report showing the mineral output of Idaho in 1895. The total is \$10,110,485, an increase of \$316,405 over 1894. The gold output was \$2,594,666, an increase of \$285,881 over the previous year; silver, \$5,214,498, an increase of \$334,643; lead, \$2,301,321, a decrease of \$304,129. The decrease in the lead output is due to the shutting down of the Shoshone County mines last summer. The lead output of that county last year was 64,000,000 lbs., against 75,000,000 lbs. the year before.

ADA COUNTY.

BLACK HORNET.—A good strike is reported to have been made in this mine. Work was recently started up again on the property, with a view of furnishing ore to fill a 2,000-ton contract recently made with D. M. Steen for his quartz mill. This work has disclosed a body of high-grade ore over the tunnel level, near the point where the tunnel intersected the vein. The ore body is 5 ft. thick, and is said to be richer than any ever taken from the mine.

ALTURAS COUNTY.

RED CLOUD.—This mine has been closed down, on orders from the East, until water can be had in the spring to supply power to run the machinery. Immediately on the resumption of work regular ore shipments will begin.

OWYHEE COUNTY.

DE LAMAR MINING COMPANY, LIMITED.—The following is the return for February: Crushed during the month, 3,700 tons; bullion produced in the mill, \$55,225; estimated value of ore shipped to smelters, \$7,000; miscellaneous revenue, \$565; total produce \$62,790; total expenses, \$37,330. Profit for the month of February, \$25,460.

SHOSHONE COUNTY.

STANDARD.—The powder house of this mine, near Burke, in the Cœur d'Alene district, blew up last week. It contained nearly a ton of giant powder. The explosion was terrific. The compressor, 100 yds. from the mine, was badly wrecked.

MICHIGAN.

COPPER.

Kearsarge Mining Company.—At the annual meeting of this company, held in Boston last week, Charles Van Brunt, A. S. Bigelow, Thomas Nelson, Leonard Lewisohn and Wm. E. Parnall were re-elected directors. Out of a total of 40,000 shares 32,031 shares were voted. But three stockholders were present. The old by-laws of the company were repealed and new by-laws adopted which make no change except simplifying same. It was also voted to extend the corporate existence of the company 30 years from September 17th, 1896.

MINNESOTA.

(From Our Special Correspondent.)

DULUTH ORE DOCKS.—The last of the substructure for the Duluth, Missabe & Northern Railroad's second ore dock at Duluth has been completed and the dock itself is fast approaching a finish. It is to be built only one-half its length this season, or 1,152 ft. This year, with two docks, the road will be able to accommodate 18 of the largest lake craft at one time and will be able to ship a vast quantity of ore. The overhead approach to the new dock is 1,306 ft. long, and in it are used 1,100,000 ft. of timber. In the dock proper are 4,000,000 ft. of timber and 3,980 piles, while in the approach are 642 piles additional. The new dock is 58 ft. high and will have, when fully completed, 384 pockets, with a storage capacity of nearly 80,000 tons. The old dock has a capacity for 65,000 tons. The dock will be ready for business May 1st. At Two Harbors the No. 5 dock of the Duluth & Iron Range road is not progressing so fast, but will be ready in June. The 80-pocket dock extension of the Duluth & Winnipeg Railroad is almost done, and will be ready soon after the opening of navigation.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

Biwabik Bessemer Company.—Stripping at the Biwabik mine will be resumed very soon, offices of the Drake & Stratton Company, of Pittsburg, being already on the ground for the purpose.

BURT.—The Lake Superior Iron Company has closed operations at this mine.

Lackawanna Iron Company.—The district court has granted the petition of this company that its existence be dissolved.

Mesabi Improvement Company.—Articles have been filed for this company at Duluth, the incorporators being H. L. Hartley, W. W. Billson and A. H. Crassweller. The object of the company is to deal in range lands and make explorations.

NORTH CINCINNATI.—At this mine work will begin next week in preparation for the summer's business.

OLIVER MINING COMPANY.—This, the Carnegie operation of the Mesabi, announces that it will mine from 500,000 tons upward this year, beginning at the opening of navigation on the Lone Jack mine.

IRON—VERMILION RANGE.

(From Our Special Correspondent.)

MINNESOTA IRON COMPANY.—This company has at its Soudan mines the largest stockpile in its history, nearly 400,000 tons. Of this about one-half is ore that has been in stock for some years, but which was beginning to be shipped, just at the close of navigation last fall. The rest has been hoisted this winter. Stockpiling goes on as rapidly as ever, and the company will have fully 450,000 tons at the opening of navigation. It is likely that a considerable decrease in the working force underground will be made soon after the opening.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Joplin Ore Market.—Last week the price of spelter was higher and firmer. There was a smaller output from the mines for the week ending March 14th, on account of the cold weather and snow storm. The price of zinc ore was about the same as the week before, \$23 being the top price, with an average of \$21 per ton. There was left in the ore bins over 900 tons of zinc ore unsold. The price of lead ore was less than the week before. Lead ore sold at \$16.75 per 1,000 lbs. with 50c. added for hauling. There was very little lead ore left in the different camps. The turn-in from the different camps is as follows: Joplin zinc, 1,181,200 lbs.; lead, 121,410 lbs.;

value, \$15,130. Webb City zinc, 292,190 lbs.; lead, 30,920 lbs.; value, \$3,559; Carterville zinc, 1,533,830 lbs.; lead, 361,840 lbs.; value, \$22,549; Galena, Kan., zinc, 1,950,000 lbs.; lead, 400,000 lbs.; value, \$24,350; Aurora, zinc, 230,000 lbs.; silicate, 230,000 lbs.; lead, 6,500 lbs.; value \$4,373; Mount Vernon zinc, 124,760 lbs.; value, \$1,320; Springfield zinc, 2,700 lbs.; value, \$297; Oronogo zinc, 55,440 lbs.; lead, 6,280 lbs.; value, \$276. Totals for the district: Zinc, 5,404,580 lbs.; lead, 925,920 lbs.; value, \$71,854. The price paid for silicate of zinc was \$11.

ATTIC MINING COMPANY.—This company's mine is located on the Blair & Robinson land, half way between Joplin and Webb City. The company is drifting at 126 ft. on 12 x 16 ft. face of zinc ore in soft timbering ground. It concentrates its ore on the Prairie Belle plant adjoining, and is producing 11 tons of zinc ore each shift. At present it is running double shifts, while the Prairie Belle Company is sinking its shaft deeper, and last week sold 90 tons of zinc ore, and on March 11th had over 100 tons of zinc ore in the bin unsold.

DAVE STALEY & Co.—This firm is operating four lots on the Grounds & Irwin lease and was the first company to build a first class concentrating plant on the lease. The plant concentrates 300 tubs of dirt and produces 8 tons of zinc ore each shift and has made as high as 13 tons of zinc ore in a single shift. They are hoisting ore from two shafts, one 112 ft. and the other 125 ft. each drift carrying a 12-ft. face of zinc ore in soft ground with just enough water to run the plant. They get the top price for their ore.

MAGNET.—This plant is located on the Eleventh Hour lease, in Carterville. The Magnet plant was built over five years ago and has been in operation almost continuously. For over three years it paid the stockholders more than \$1,500 per week in dividends. They are now drifting at 185 ft. on a 50 ft. face of zinc ore in hard ground and are producing 8 tons of zinc ore every shift. They have only one lot 200 ft. square.

MONTANA.

DEER LODGE COUNTY.

MONTANA MINING COMPANY, LIMITED.—The total output for February was 5,880 tons of ore, which contained 2,330 oz. gold and 16,140 oz. of silver. The estimated value of the same is \$57,000. Expenditures were: Working expenses on revenue account, \$30,500; outlay on developments, \$11,000; extraneous expenses, \$500; permanent improvements and machinery, \$100; a total of \$42,100; leaving a net result of \$14,900.

SILVER BOW COUNTY.

BUTTE & BOSTON MINING COMPANY.—Advices from Boston state that the request of a majority of the bondholders, Messrs. E. Rollins Morse, Samuel Carr, Gordon Abbott, William A. Gaston and Thomas Nelson have consented to act as a committee for a reorganization of the affairs of this company. Holders of first and consolidated mortgage bonds, and stockholders and creditors are asked to deposit their claims and securities with the Old Colony Trust Company before March 31st in support of such reorganization, the right being reserved to all depositors to withdraw their securities if the plan of reorganization is not to them satisfactory when announced by the committee. The committee says that the recent attachments against the property and default of the March 1st coupons and sinking fund payments, followed by the appointment of receivers for the property, render necessary prompt action for the protection of the property and the rights of bondholders, shareholders and creditors. Mr. E. Rollins Morse is chairman of the committee and Mr. Thomas Nelson secretary.

NEVADA.

LYON COUNTY.

SILVER CITY MINERS' UNION.—At a regular semi-annual election of officers of this Union the following officers were elected: President, T. C. Wogan; Vice-president, George W. Page; recording secretary, Seth W. Longabaugh; financial secretary, F. C. Armstrong; conductor, C. H. Clint; Warden, G. W. Bennett; financial committee, T. C. Wogan, D. Armstrong, George Page; trustees, A. Dickson, W. G. Boyce, S. Longabaugh, C. H. Clint, J. Quinn; library directors, W. G. Boyce, T. C. Wogan, A. Dickson.

STOREY COUNTY—BRUNSWICK LODGE.

Following are extracts from the latest weekly official letters of the superintendents: Brunswick Exploration Company.—Shaft No. 1—Sinking was resumed on February 28th, and the shaft has since been sunk 12 ft. on the incline through porphyry, clay and quartz; total depth, 312 ft., 200 level. From the end of the south drift from east crosscut No. 1 have started west crosscut No. 4 and advanced it 18 ft. through porphyry and quartz. Shaft No. 2, 150-ft. level—The south drift from east crosscut No. 1, 45 ft. from the station, has been extended 21 ft. through porphyry and stringers of quartz; total length, 27 ft. Gould & Curry Company's tunnel—The main north drift has been extended 30 ft. through porphyry, clay and quartz; total length, 580 ft.

OCCIDENTAL CONSOLIDATED.—The Edwards shaft started at a point on the surface of the Edwards location, near the south line, is now down 40 ft.; formation, hard porphyry. 650 level—The main northwest crosscut, at a point 210 ft. north of the waste station, has been extended through hard por-

phyry to a total length of 405 ft. 750 level—The west crosscut in the north drift, at a point 310 ft. north of the main winze, has been extended to a total length of 219 ft. and continues in hard porphyry. During the week we have set up and now have in successful operation a complete drilling plant, consisting of a crude oil engine and an air compressor, which furnishes power to run a drill. The plant is located in the mine near No. 1 upraise on the 550 level, and the air is conveyed in pipes to the face of the west crosscut on the 750 level, where the drill is set up. By the aid of this drill the work will be greatly facilitated, and they will reach the point beneath the ore body discovered on the 650 level much sooner than by hand drilling.

STOREY COUNTY—COMSTOCK LODGE.

HALE & NORCROSS MINING COMPANY.—At the annual meeting of this company held in San Francisco, on March 11th, the "opposition faction" wrested the control from the old management. The total vote was 107,000 shares out of 112,000 shares of the capital stock. The vote was as follows: Opposition, 55.915% shares; old managers, 51,152½ shares. The result in detail was: For the opposition, stock, 48,278% shares; proxies, 7,637 shares. For the old managers, stock, 11,113% shares; proxies, 40,038% shares. The opposition was entitled to four out of seven directors, but the old managers, who were entitled to three, gracefully withdrew, says the San Francisco Report, and permitted the opposition to have the whole seven, who were elected, as follows: Jeremiah Lynch, Arthur W. Moore, Edward C. Barry, Abe Krause, Thomas McDonald, G. C. Sneider and John L. Bradbury. The new board organized by electing Jeremiah Lynch, president; Arthur W. Moore, vice-president; R. U. Collins, secretary. H. W. Tangerman was appointed superintendent. The president's salary was reduced from \$125 to \$100 per month; a salary of \$50 per month, which had been paid the vice-president, done away with; the salary of the secretary reduced from \$200 to \$125 per month, and the new superintendent will also perform the duties of foreman at a salary of \$175 per month, against a total of \$375 per month for both offices heretofore. The office of the company has been removed to the San Francisco Stock and Exchange Board building, on Pine street, where quarters will be occupied at a rental of \$50 per month, against \$177, which has been paid for the old offices. These reductions will effect a saving to the company of \$177 per month, but it is expected to cut down expenses at the mine, so that there will be a total saving all around of \$1,500 per month.

Following are extracts from the latest weekly official letters from the mine superintendents.

HALE & NORCROSS.—On the 975-ft. level, the ore streak on the eighth floor becoming too poor to extract, we have stopped work on the floor. No. 2 Upraise—On the seventh, eighth and ninth floors, working south, the grade of the ore streak has depreciated very considerably during the past few days, and will not now pay to save. On the ninth floor, working north, the ore streak is narrow but of good quality. On the tenth floor, working south, the ore streak is about the same as at date of last report. No. 3 Upraise—We have been working on the seventh floor and have made connection on this floor with the stopes from No. 1 upraise. The ore streak continues in the roof and north end of raise, but of lower grade than heretofore. No. 4 Upraise—Have been working north and south on second floor. The ore streak is of good quality. Have done the necessary retimbering and repairing during the week. Extracted during the week from our openings, 40 cars of ore, assaying, per mine car sample, gold, \$21.23; silver, 25½ oz. per ton.

OPHIR.—On the 1,000 ft. level the west crosscut from the north drift, at a point 480 ft. from the shaft station, is in a total distance of 56 ft. in a porphyry formation carrying clay separations. The south drift from the shaft station on this level has made connection with the north drift from the Consolidated Virginia shaft. In the old Central Tunnel workings of the Ophir, in the openings 56 ft. above the tunnel level, northwest from the old Mexican shaft, they have been upraising for some ore streaks, and have extracted 6 tons of ore assaying about \$25 per ton.

NORTH CAROLINA.

CABARRUS COUNTY.

(From Our Special Correspondent.)

JAKE HARTSELL GOLD MINE.—This property has been operated by H. J. Russell, of Chicago; A. G. Guin, a Colorado mining man, and J. Stewart Knight, of Philadelphia. It is reported that they were making fair returns but have abandoned the enterprise on account of misunderstandings between themselves.

MARTIN BOST.—This mine is being worked by a Mr. Fearn who makes his headquarters in Concord, the county seat. He represents English capital.

MITCHELL COUNTY.

(From Our Special Correspondent.)

MICA.—There is some activity in mica mining throughout the country and shipments are a little heavier than usual. Mr. John Davis is working a property near Burnsville with good results.

MONTGOMERY COUNTY.

(From Our Special Correspondent.)

COTTON GOLD MINE.—Some time ago the local papers contained an account of a rich find at the Cotton gold mine at Pan-Top, in this county. It is a quartz vein and is being operated by

Captain George Horn, for an English company. They have struck some rich ore and at present are engaged in developing it. Some of the ore shows nuggets weighing several pennyweights right in the white quartz. A box of the ore has been sent to London and has created some interest in the district.

RANDOLPH COUNTY.

(From our Special Correspondent.)

BARNS CREEK.—This placer property is getting ready for operation under the direction of H. G. Kopplemyre, of Glenbrook, late of Chicago and Colorado. He has erected a dam and flume of 500 ft. long in order to carry the water from the bed of the creek, and will work the bed out as well as the adjoining gravel beds.

CAGLE MINE.—The managers are ready to put in operation their 10-stamp mill on a large deposit of low-grade ore opened on the property.

ROWAN COUNTY.

(From Our Special Correspondent.)

DUNNS MOUNTAIN.—The old 10-stamp mill from the Dunns Mountain Mine has been sold to Capt. B. Tamblin for the mines at Villa Rica, Ga., and is being removed to that place. Several Western mining men have been prospecting in the county the past week and express themselves as pleased with the outlook.

STANLY COUNTY.

(From Our Special Correspondent.)

PARKER.—At this mine in the 120-ft. level drift they have cut two quartz veins that show well in sulphurets which are now being assayed for gold.

HAILE GOLD MINE.—The U. S. Assay Office in Charlotte has just received the monthly return from the Haile mine, a gold brick valued at \$8,000.

PENNSYLVANIA.

CRESCENT COAL COMPANY.—A number of suits were entered last week at Wilkes-Barre against the Crescent Coal Company. It appears that the company is in financial difficulties, and that when the men went for the pay for February recently they found they had all been reduced 30c. a day. They were promised the balance in a few days. The money was not forthcoming, hence the suits.

DICKSON.—The miners employed in the China vein of the Dickson mine, at the North End, went on strike last Saturday on account of alleged exorbitant dockage imposed upon them. There are 75 men employed and all refuse to return to work.

EMPIRE COLLIERY.—A cave-in occurred last week near the Red Ash breaker, causing some alarm among mine officials. It is over the No. 2 plane of this mine, and if it spreads may become serious and throw at least 200 men out of employment. The cave-in, as it appears on the surface, extends over half an acre.

SOUTH DAKOTA.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

BULLION.—The 10 days' run on the Bullion ores at the Custom mill resulted in a clean-up of \$1,200, an average of about \$3.50 per ton from rock placed in the mill at a cost of but 30c. The face in the open cut from which the ores are taken is 25 ft. wide, and the men break enough rock to keep 20 stamps in operation.

KEYSTONE.—This camp is already experiencing the need of greater milling capacity. The Keystone, Holy Terior, Bullion, Bismarck, Egyptian, Ida-Florence and Big Hit mines are working regularly, chiefly in development, while the entire milling capacity is but 50 stamps.

NEAL PROPERTY.—As recently announced in this correspondence, a mill test has been made upon this property at the new mill erected by Minneapolis parties. The results are stated to have been gratifying, the amount of fine gold recovered being greater than anticipated. The ores carry both a rich concentrate and bismuth in commercial quantities. The pyrites as saved by Woodbury belt concentrators, average from 5% to 7%, worth \$75 to \$300 per ton, and the bismuth amounts to 65 lbs. per ton crushed. The new camp of Bismuth is situated 2½ miles southeast of Keystone on Iron Creek. Its ledges are wide, and have the same general character as those at Keystone, of which they are believed to be extensions.

SUNNYSIDE.—A carload of ore from this property was shipped last week to Kansas City, the object being to determine by a practical test the values carried in pyrites and chalcopyrites, which are believed to be considerable. A mill test is also in progress at the J. R. Mill.

UTAH.

SALT LAKE COUNTY.

BINGHAM COPPER COMPANY.—This company, with general offices at Salt Lake City, has closed a deal with Eastern parties for the purchase of the Nast Mining and Milling Company's entire holdings at Bingham, consisting of six claims named the Nast, Benton, Gold Leaf, Red Cross, Mayberry and Smuggler, and all improvements, buildings, etc., on the properties. The Nast Mining and Milling Company's mines have already produced over \$300,000 and paid over \$100,000 in dividends to date. A shipment of 110 tons of high-grade ore from this property was made last week from the upper workings, and the management has already placed a large force of first-class miners in both the lower and up-

per portions of the mine, and it is expected that large shipments of high-grade ore will commence immediately.

WINNAMUCK.—Last week this mine began the shipment of 100 tons of ore a day. About a month ago Colonel Sowles acquired possession of the property. For 1,200 ft. a tunnel had been driven into it and through a body of lime. Colonel Sowles, with John Logan as his superintendent, resumed driving the tunnel, which soon broke into an ore body that is now 15 ft. between walls. The vein is one of the strongest that has been opened in Bingham, says the Salt Lake *Daily Tribune*, while the value of the ore is sufficient to return a fair profit to the owners.

LATE NEWS.

Mr. M. A. Green of Altoona, Pa., has been appointed sales agent for the Lidgerwood Manufacturing Company, builders of hoisting engines.

The Taylor & Brunton Sampling Company, will at once build a large sampling mill at Victor in Cripple Creek district which will be the largest, most complete in the West and automatic throughout.

Some time ago the Altoona (Pa.) Iron Company reduced the wages of puddlers from \$3 a ton to \$2.75 without posting a notice. When pay day came the men were dissatisfied with their wages, and one of them entered suit against the company to recover the amount of money which he claimed was due him. Alderman Stevens decided that the suit was well founded and ordered the company to pay over the amount due him. Nearly all the other employees of the company will sue for the recovery of money which they say was illegally kept from them.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 20.

Statement of shipments of anthracite coal (approximated) in tons of 2,240 lbs. for the week ending March 14th, 1896, compared with the corresponding period last year.

	1896.		1895.
	Week.	Year.	Year.
Pennsylvania Railroad.....	70,321	718,351	776,053

PRODUCTION OF BITUMINOUS COAL, in tons of 2,000 lbs. for week ending March 14th, and for years from January 1st, 1896 and 1895:

	1896.		1895.
	Week.	Year.	Year.
Shipped East and North:			
Allegheny, Pa.....	53,631	540,803	493,897
Barclay, Pa.....	721	10,538	.....
Beech Creek, Pa.....	71,819	711,033	585,313
Broad Top, Pa.....	11,566	109,717	110,493
Clearfield, Pa.....	101,174	1,039,449	995,014
Cumberland, Md.....	76,370	627,036	562,691
Kanawha, W. Va.....	166,330	860,199	783,815
Phila. & Erie.....	786	11,342	20,283
Pocahontas Flat Top.....	180,992	663,420	652,856
Totals.....	463,389	4,455,617	4,024,377

* Week ending March 7th.
† " " February 29th.

	1896.		1895.
	Week.	Year.	Year.
Shipped West:			
Monongahela, Pa.....	18,205	201,569	193,782
Pittsburg, Pa.....	36,793	419,634	414,871
Westmoreland, Pa.....	51,916	414,065	517,713
Totals.....	106,864	1,033,668	1,156,366
Grand totals.....	570,253	5,489,285	5,180,743

Production of coke on line of Pennsylvania Railroad for the week ending March 14th, 1896, and year from January 1st, 1896, in tons of 2,000 lbs.: Week, 76,841 tons; year, 995,873; to corresponding date in 1895, 1,231,873 tons.

Anthracite.

Not in many years past has the anthracite coal market been so lacking in features of interest as it is at present. For the past few weeks nothing could be reported but great quietude and no weakness. The companies say that new business is very light but that prices are remarkably well maintained. The latter fact can be due only to the restriction in the output, which prevents accumulations and thus removes an element of danger to the stability of the trade. Some deliveries on old orders are still being made, but for new business the circular obtains, namely, \$3.60 for stove; \$3.35 for egg and chestnut and \$3.10 for broken, net on board. For the steam sizes we quote good free burning pea at \$2.25 on board; buckwheat No. 1, \$1.70@1.80; No. 2, \$1.25@1.30, also on board.

Some prominent retail dealers of this city and Brooklyn state that their customers continue to buy from hand to mouth but that better prices are easier to obtain than they were early in February. Not much activity is looked for before the end of May.

Bituminous.

Considerable activity is reported in the soft coal market due to the desire to get coal shipped before April 1st, when the new railroad rates go into effect. Producers have been receiving orders comparatively freely, though shippers have not to the same extent as it was wished to keep vessel rates from going up too rapidly. The continued meeting of the leading members of the proposed "Combination" have not been without a moral effect on the market and free shipments may be expected until April 1st, when all the proposed changes begin.

Just now it seems to be a question of getting coal forward rather than of securing a buyer for it.

It is reported that the Baltimore & Ohio has reduced its last year's freight rate by 5c. as against advance of from 5 to 15c. made by the Pennsylvania Railroad.

We are informed that some contracts have been placed during the week, notably the Long Island Railroad and the Grand Trunk, though there have been denials and confirmations concerning it. At any rate, the prices at which they were taken have not been made public.

The executive committee of the "combination," is having frequent meetings, and we understand that some difficulty is being experienced with one or two members who demand more than their just share. As we foretold last week, prices for the ensuing year were fixed at the meeting held in Philadelphia on Tuesday. They will go into effect on April 1st and are \$2.35 per ton for Cumberland, Pocahontas and New River coals, f. o. b. Philadelphia, Baltimore, Newport News and Norfolk, with a differential of 15c. in favor of Clearfield and Beech Creek coals. New York prices are \$3 alongside, with the differential of 15c. in favor of the poorer grades.

Transportation from mine to tide is slow, and is giving trouble to the majority of producers on account of the present demand for prompt shipments. There is a considerable quantity of coal now en route to the shipping ports which is promptly shipped on arrival. The large amounts of coal on the way has naturally had their effect on the car supply and producers are not securing as many empties as they would like to.

In the vessel market rates are stronger and higher owing to the increased demand for vessels. This condition will in all likelihood continue until after April 1st. We quote coastwise freight rates as follows from Philadelphia. To Boston, Salem and Portland, 85c.; Providence, New Bedford, New Haven and other Sound ports, 75c.; Portsmouth, 85@90c.; Wareham, 90c.; Lynn and Newburyport, \$1; Bath, 85@90c.

Buffalo, N. Y. March 19.

(From Our Special Correspondent.)

The past week has not been an active one in the anthracite coal trade; the business was of a hand-to-mouth character. Quotations are unchanged, and likely to be continued for two weeks yet. Yesterday might have been considered the first day of spring, and the sun made glad havoc with winter's accumulation of snow and ice. Today heavy snow falling.

Navigation prospects are unsettled. The wise men (♂) say the Straits of Mackinac will not open until about April 20th at the earliest. News from Lake Superior indicates the same time for the commencement of the season's business.

Bituminous coal is quiet. A dealer says: "Look out for a big advance about April 1st, and don't you forget it." Supply reported to be larger. The proposed increase in carrying rates will take effect on and after the 1st of April, hence one of the causes of higher prices for soft fuel.

The Buffalo Department of Public Works have advertised for 30,000 tons of bituminous run-of-mine coal to be delivered to the Water Works, between May 1st, 1896, and April 30th, 1897. March 31st, at 11 a. m., is the day that the tenders will be opened.

Judge Cox has decided that Canadian natural gas may come to Buffalo free of duty, which is of considerable importance to the citizens. For some time there has been consumed there large quantities of natural gas piped from Canada under the Niagara River. There was a question as to whether or not this gas was dutiable, and the matter was referred to the Board of General Appraisers, which held that it was. On application of the Natural Gas Fuel Company the Board reviewed its decision, overruled it, and held that natural gas is a crude bitumen and a crude mineral, and therefore exempt from duty under paragraph 651 of the act of 1890. Judge Cox sustains this decision.

The prospects are that the Detroit River Bridge Bill will be defeated.

Major Marshall, U. S. A. Engineers, has recommended the practical abandonment of the Chicago River as being wholly inadequate for navigation purposes and in place thereof the development of the Calumet River at South Chicago. This has caused great excitement to the citizens, and especially those who have property on the banks of the Chicago River.

The coal docks and pockets at Amherstberg and Sandwich on Detroit River, Canada, are to be enlarged, and new ones are to be built in the Sault Ste. Marie River by the Cuddy & Mullin Coal Company, of Cleveland.

In one of the breakers in Scranton a gas-making plant is being constructed and the finest coal dust will be utilized in the manufacture of gas.

Pittsburg. March 19.

(From our Special Correspondent.)

The coal trade since our last issue has not been very active; the weather has been exceedingly unfavorable; the pools are pretty well supplied with empties, insuring steady work for some time to come, but should the big fall of snow be followed by rain you may expect to hear of a disastrous flood and indications point that way at present. President De Armit's signature to the coal agreement gives general satisfaction and removes all doubts as to his position on the uniformity plan. Pittsburg coal interests will be largely interfered with in the South. The Alabama coal operators have effected a deal with the Southern Railway to

cover the immense coal market among the Mississippi sugar plantations south of Greenville, heretofore occupied by the Pennsylvania operators. This trade takes about 1,500,000 tons annually, most of which has been shipped from Pittsburg by river. The deal includes freight rates from Birmingham to Greenville low enough to enable Alabama to meet Pennsylvania, a fleet of barges to transport the coal from Greenville south and ample tipples at Greenville, which the Southern Railway will provide. In the way of development of coal lands at Washington, Pa., the Cannonsburg Iron and Steel Company burns about \$1,200 worth of slack a month, it will now furnish its own slack, having bought the Mansfield Farm for \$100 per acre. The coal right under the Mathew Barry farm of 253 acres near Cannonsburg was purchased for \$80 per acre and will be operated on a large scale.

Connellsville Coke.—Trade has shown signs of improvement during the past few days. Production and shipments have increased along with the running order of the plants. Nearly all of the plants that have been running only four days, were put on five days last week. It is believed the increasing demand will soon justify the firing up of more ovens, but unless there is something like a boom, it is unlikely the ovens will be run more than five days a week during the summer except such plants, that have been running six days regularly. The summary of the region shows 12,246 ovens in blast and 5,701 idle, estimated production of 117,486 tons; decrease 2,103 tons for the previous week. The average running time was 539 days. January and February production 1,136,226 tons; shipments 1,070,486 tons. The week's shipments for the region were 6,745 cars against 6,432 cars the week previous; increase 313 cars. The shipments were: To Pittsburg, 1,902 cars; to points East, 1,198 cars; to parts West, 3,645 cars. Prices are unchanged.

Shaughal, China. Feb. 12.
(Special Report of Wheelock & Co.)

Coal.—In Japan coal there is positively nothing to report, no sales being worthy of note, and no present inquiry for coals of any description. There are no transactions on Cardiff to record beyond the sale of a small lot among natives at 10'40 tael. No business is done in American anthracite except for household purposes. Native operators are devoting their attention to the New Year festivities, and for the time being there is nothing done in Sydney Wollongong. Quotations are: For American anthracite, 9'00 tael per ton; Welsh Cardiff, 10'50 tael per ton; Australian Wollongong, 9'50 tael per ton. For Japan we quote: 5'75 tael per ton for Takasima lump, and 4'25 tael for Namazuta lump; other sorts, 3'00@3'25 tael per ton for such as can be procured.

We give the receipts of coal at this port for the year ending December 31st, 1895, as follows: American anthracite, 505 tons; anthracite at Hankow, 24,066 tons; Welsh Cardiff, 6,511 tons; Australian coals, 29,834 tons. Arrivals of Chinese coals were: 33,325 tons of Kaiping, and 530 tons of Keelung. Of Japanese coal, 470,828 tons were received. The total receipts of coal for the year were 565,599 tons, and the estimated stock on hand December 31st, 1895, 107,318 tons.

Kerosene Oil.—A very firm business has been transacted at the "Teashop" in Devoe's at quoted price, but this is no indication of the present tone of the market, which must be described as quiet for the time being until after the native holidays. In Batoum there is nothing to report beyond the arrival of about 98,000 cases. We also note the arrival of 66,900 cases of Devoe's, but owing to the early issue of our circular on account of the holidays, we regret that we are unable to give the exact figures of the present stocks of oil in godown, which approximately are: American, 235,000 cases; Russian, 123,000 cases, and Langkat, 14,500 cases. We quote per case: American, Devoe's, 1.67 tael; Russian, Batoum, 1.62½ tael, and Batoum bulk, 1.55 tael; Langkat, 1.62½ tael.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, March 20, 1896.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From Jan. '95.	From Jan., '96.
	March 14, 1895.	March 20, 1896.		
	F'ces.	Tons.	F'ces.	Tons.
Anthracite.....	34	20,005	51	37,270
Coke.....	121	131,611	137	162,676
Charcoal.....	17	3,765	19	5,360
Totals.....	172	155,381	207	201,300
			1,970,458	2,416,917

The condition of the iron market generally must be reported as less encouraging than for several weeks past. While there is a fair amount of work going on, buying has not been active, and there is a growing disposition manifested to wait for future developments. It is true that many manufacturers of finished material are provided with stocks for some time to come, but others who are not so well furnished are in no hurry to buy. They say that the present condition of business is too uncertain, and many of them also say that they will be able to provide themselves later at prices no higher than at present, if not much lower.

The Lake Superior ore producers have not yet announced their prices for the coming season, and this adds somewhat to the prevailing uncertainty. Furnacemen are unwilling to make long contracts

until they know what their ore and coke are going to cost them; and they still fear an increase in ore prices. These must be given out soon, and from such indications as have been given it does not appear probable that the producers will demand an unreasonable increase over last year's figures. They will be restrained by the present condition of trade on the one hand, and on the other by the recent great developments on the Mesabi range and in the adjoining country, suggesting the possibility of an increase in supplies at short notice.

The responsibility for the distinctly more unfavorable state of the market is largely on Congress. The certainty that that body will do nothing towards settling the currency question, and the certainty that it will continue to give us all sorts of "war scares" for political effect are checking business improvement in every direction. To this must be added the prospect of a presidential campaign turning largely on business questions, which ought to be out of politics altogether, and it is no wonder that business men are disposed to curtail their enterprises and to keep everything in as good condition as they can for a possible crisis.

The railroad demand is still comparatively light, and new enterprises make their way slowly. The mining interests is the most active just now, and the demand for new mining machinery is becoming an appreciable feature in the market.

It is understood that the Alabama furnaces are beginning to stock their iron for the first time in two years. The unsold stocks at furnaces have been light ever since the general resumption of activity; but for the past month shipments have been below production.

New York. Mar. 20.

The local market is rather quiet, following in its main features the general condition of the trade. The exception is to be found in the structural department where demand keeps up very well. The long continuance of severe weather has somewhat depressed the building trades by postponing the beginning of work on new enterprises, but enough has been done to make a pretty active season in this direction secure.

Among other new plans we note that the Metropolitan Telephone and Telegraph Company has submitted plans to the Building Department for a new office building to cover three lots on Dey street, and to cost \$400,000. Other parties are preparing plans for several large buildings which will be submitted soon.

The bids for the structural work on the Boston subway, Section 4, were opened in that city this week. The bids were for two classes of steel A rods and plain beams, and B framed beams, the quantities in the order named being 200 tons and 350 tons. They were as follows: New Jersey Steel and Iron Company, for A, \$48 per ton, and for B, \$44.60 per ton. Passaic Rolling Mill Company, A, \$45.60; B, \$49. A. P. Roberts & Co., Pencoyd Iron Company, A, \$50.20; B, \$46. Pennsylvania Steel Company, A, \$45.88; B, \$51.88. Edge Moor Bridge Works, Wilmington, Del., A, \$47; B, \$52. The aggregate of the several bids was as follows: New Jersey Steel and Iron Company, \$25,210; Passaic Rolling Mill Company, \$26,270; A. & P. Roberts Company, \$26,140; Pennsylvania Steel Company, \$27,334; Edge Moor Bridge Works, \$27,600.

Pig Iron.—The market has been somewhat affected by an increasing pressure to sell Southern iron, and there is talk in all directions of shaded prices. While some of this is undoubtedly exaggerated, it is a fact that offers of certain brands have been made below the market, and the effect has been to make buyers hold back in expectation of a general scaling of quotations.

We quote for Northern brands as follows: No. 1 foundry, \$13@13.50; No. 2, \$12.25@12.75; gray forge, \$11.50@12. For Southern iron prices are: No. 1 foundry, \$12.50@13; No. 2 foundry, \$11.75@12.25; No. 1 soft, \$11.50; No. 2 soft, \$11@11.50; forge, \$10.50@11. All prices are for tidewater deliveries.

Cast Iron Pipe.—Demand continues active, but without special developments this week. The New York contract for 2,500 tons has gone to R. D. Wood & Co., of Philadelphia.

Spiegeleisen and Ferro-Manganese.—Very little business is noted, and quotations are unchanged and nominal at \$19@20 per ton for spiegeleisen and \$47@47.50 for ferro.

Steel Billets and Rods.—Little business is noted, and no change in prices. Sales of billets have been made at \$19.50@20, tidewater delivery. Rods can be quoted about \$25.75@26, tidewater delivery.

Merchant Iron and Steel.—Business has been chiefly in small orders. Prices remain steady. Bars are 1.25@1.35c. for common and 1.35@1.50c. for refined. We quote for soft steel bars 1.30@1.40c.; open hearth machinery steel, 1.50@1.60c.; steel hoops, 1.50@1.60c.; steel axles, 1.65@1.80c.; links and pins, 1.65@1.80c.; tire steel, 1.85@2c.; spring steel, 2.10@2.25c. Rivets are 2.20@2.30c. for steel, and 3@3.30c. for iron.

Plates.—There is a fair demand, but mostly in a small way. No change in prices is noted. Universal mill plates are 1.45@1.55c. For steel plates we quote: Tank, 1.45@1.55c.; boiler shell, 1.55@1.65c.; good flange, 1.80@1.95c.; firebox, 2.10@2.50c. Charcoal iron plates are 2.20@2.30c. for shell, 2.70@2.80c. for flange, and 3.20@3.30c. for firebox.

Structural Iron and Steel.—Contracts have been let for several buildings, including one for the

New York University, and negotiations for several others are going on. Beams are a little higher, but otherwise there is no change. We quote for angles, 1.45@1.55c.; channels, 1.60@1.75c.; tees, 1.65@1.75c.; beams (up to 15-in.), 1.65@1.75c. for large lots and 1.90@2.10c. for small orders.

Steel Rails and Rail Fastenings.—Rails are unchanged at \$28 per ton at mill, or \$28.75 at tidewater for standard sections. Girder and street rails are \$28@32 per ton at mill, according to section. No new business is noted.

Rail fastenings are steady and prices unchanged. Quotations are: For fish and angle-plates, 1.30@1.40c.; spikes, 1.65@1.80c.; bolts, 1.95@2.05c., for square nuts, and 2.05@2.15c. for hexagon nuts.

Scrap Iron.—Foundry scrap is quiet, with few good lots offered. We quote \$9@11 per ton, according to size and quality of parcels.

Buffalo. March 18.

(Special Report of Rogers, Brown & Co.)

The pig iron market in this vicinity might safely be called a waiting one, which applies to both producer and consumer. Casting have recently sold at close to the lowest figures of a year ago, when pig iron and coke were lowest, yet there is a much larger demand and foundries generally fairly busy. Many are full of work. Northern manufacturers of pig iron appear to be "between the devil and the deep sea," on the one hand higher prices asked for this season's ores and on the other a market which refuses to respond to efforts to raise it to this new level of cost. These conditions are shaping toward a sharp reduction of output until one or the other gives way. We quote f. o. b. cars at Buffalo, cash basis: No. 1 foundry strong coke iron, Lake Superior ore, \$13.50; No. 2 foundry strong coke iron Lake Superior ore, \$13; Ohio strong softener, No. 1, \$13.70; Ohio strong softener No. 2, \$13.20; Jackson County silvery No. 1, \$15.25@15.75; Southern soft, No. 1, \$12.90; Southern soft No. 2, \$12.50. Hanging Rock charcoal, \$18; Lake Superior charcoal, \$14@14.50.

Cleveland, O. March 19.

(From Our Special Correspondent.)

Iron Ore.—Committees, representing the ore shippers, have been in session at Cleveland again this week and a meeting of all the shippers has been called for Friday. It is expected that at that meeting final action will be taken by the producers respecting prices for the year.

Present sales of ore are moderate in size and number, and are made at about the same figures that have prevailed for some weeks, namely \$4@4.25 for standard Bessemer. These small lots are mainly for mixing purposes and run from 500 to 5,000 tons.

The present movement from the docks on Lake Erie to the furnaces has fallen off considerably. Furnacemen are consuming stocks on hand, which have been larger this year than usual, on account of the desire of shippers last summer to rush everything forward that was possible directly from the vessel to the furnaces.

Nothing has been done this week by way of chartering vessels for the coming season. Reports recently received from the upper lakes say that the indications point to nearly a foot less water next year than the low water which prevailed last year. Should this indication be verified the carrying capacity of the lake fleets will be reduced nearly 10%. In further view of this probability the vesselmen are keeping up a stiff upper lip so far as rates for the season are concerned. The shippers can find nothing in the market conditions, however, to bring them up to the ideas of the carriers, and so each is procrastinating.

Pig Iron.—The week has been quiet in the market for raw iron. Local sales have not been numerous or important. The strong sellers say they are out of the trade until purchasers appear. They are not willing to part with their products at the ruling quotations. Bessemer pig is offered at Cleveland at \$12, but sales are very limited in quantity. Southern foundry irons are decidedly weak in the lake region this week. It is said to be due to competition between producers, who have heretofore been working in comparative harmony. The influx of the Southern grades has depressed Northern irons of mixed ores, but all lake ore products are affected only to a slight degree. Northern strong is quoted at \$12.75 for No. 1, and \$12.25 for No. 2; Ohio Scotch at \$12.50 for No. 1, and \$12 for No. 2. Lake Superior is in fair demand at \$14.

Pittsburg. March 19.

(From Our Special Correspondent.)

Raw Iron and Steel.—General trade during the week has shown little change; business is more active than it was at a corresponding period last year, but it is never the less generally unsatisfactory. The continued close working of the commercial loan markets, snow-storms and wintry weather so late in the season and slow collections in many branches of trade have combined to delay the expected expansion of business. The temper of traders is conservative, yet strongly hopeful. In finished material, in some branches of the trade, the mills are well employed on orders, but the general demand is limited, and the crude iron markets continue dull. Production continues in excess of consumption.

The opening of spring has not brought the increase in the iron and steel trade that was expected; in some lines there is more activity, but in others there is no change for the better. Easier money was expected to induce larger purchases from rail-

roads, but this buying has not yet attained very great proportions and some doubt is now beginning to be felt upon the subject. Meanwhile, it is an evident fact that the capacity in operation is greater than the demand, and therefore, prices are weak or at least hesitating; it would appear, therefore, that until the consumption increases sharply there can be no considerable advance in prices, while it is just as clear that with the present high price of raw material there can be no considerable decline. Reports from the Valley represent a steady market and an improved inquiry for Bessemer.

The Latest.—Within the past 48 hours the market showed increasing firmness; the inquiry was larger and sales increased in volume. The situation may be estimated by a single transaction. A large plant purchased 10,000 tons gray forge not for speculative purposes but for consumption at the plant. This fact indicates prices have touched bottom, as no consumer would purchase that amount unless he was fully assured that prices would go no lower. The rates were \$10.95@11; Bessemer sales range \$12@12.25; steel billets, \$17.15@17.25. The outlook is improving.

COKE SMELTED, LAKE AND NATIVE ORE.	Tons.	Cash.
600 Billets, Mar., at mill.....		17.50
SKELP IRON.		
1,000 Sheared, Pitts. \$1.40 4 m.		
800 Wide grooved, Pitts. 1.37 4 m.		
500 Sheared, Pitts. 1.37 4 m		
SKELP STEEL.		
1,000 Sheared, Pitts. \$1.30 4 m.		
750 Wide grooved, Pitts. 1.15 4 m.		
500 Narrow grooved, Pitts. 1.15 4 m.		
MUCK BAR.		
1,000 Neutral (delivered) Pitts.		\$20.75
BLOOMS, BILLETS AND BAR ENDS.		
1,000 Blooms and Billets ends (delivered), Pitts.		\$13.25
SPELTER.		
100 Prime, Pitts.		\$4.05
SHEET BARS.		
630 Makers mill, Pitts.		\$18.50
STEEL WIRE RODS.		
750 5-gage, makers mill, Pitts.		\$23.00
FERRO-MANGANESE.		
100 80% delivered Pitts.		\$50.00
OLD RAILS AND SCRAP.		
700 Steel rails, P.		\$13.35
500 Iron rails, P.		16.00
500 Steel rails, short pieces, P.		14.00
600 Short wrought scrap, net.		11.50
350 No. 1 Railroad wrought scrap, net.		13.50
330 Old car wheels, gross.		11.90

Cartagena, Spain. March 2.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Business continues brisk, especially in high-grade manganiferous ores, the supply of which has been sold for some time ahead, so that inquiries and offers for prompt cargoes are being refused. There is also an increase in the demand for dry ore, several new contracts being reported. During the month past 16 cargoes of manganiferous and four of dry ore were shipped. Quotations for March are: Ordinary, 50% Portman, 5s. 6d. @ 6s. per ton; special low phosphorus, 5s. 8d. @ 6s. 2d.; extra quality low phosphorus, 6s. 4d.; specular ore, 6% iron, and 0.63% phosphorus, 8s. 9d. For manganiferous ores we quote: No. 1 (20% iron and 20% manganese), 13s. 4d.; No. 1 B. (25% iron and 17% manganese), 10s. 6d.; No. 2 (30% iron and 15% manganese), 10s. 3d.; No. 3 (35% iron and 13% manganese), 9s. 4d. per ton. All quotations are f. o. b. shipping port. Iron pyrites, 4% iron and 45% sulphur, are quoted at 10s. 6d. per ton. Yellow ochre is 42s. per ton.

Exports from Cartagena in February, other than lead and iron ores, were: 305 kilos silver ingots to Marseilles; 700 tons copper ore to Marseilles; 260 tons copper ore to Newcastle; 40 tons copper matte to Newcastle; 1,000 tons zinc ore to Antwerp; 20 tons galena ore to Marseilles; 12 tons galena ore to other ports; 2 1/2 tons tin ore to Liverpool.

Philadelphia. March 20.

(From our Special Correspondent.)

Pig Iron.—This has been the poorest week we have had for months. No one ventures an opinion. Brokers will not shade on good brands. No other sort of iron is wanted just now. The market is not weak, but quiet. Big dealings may break out any hour. Consumption has not declined to any extent, except in rolling mills. Consumers are not higgling over prices, but are only waiting until they have buyers for their foundry and mill products. Quite an amount of first-class iron is virtually sold. Old customers say by such a time they will want so much iron, so the makers rest easy. The anxious people are those who are bringing up the rear. No.

1 foundry is \$13; No. 2, \$12.25; forge, best, \$11.50; common, \$11; Bessemer, at furnace, \$13.

Steel Billets.—There is not the shadow of a change in the billet situation. Sellers want \$20; buyers will not pay over \$19, except in an occasional filling-out purchase. The dullness is due only to the fact that spring and summer business is not urgent.

Skelp.—The manufacturers assert that plans are all completed for the purchase of a great deal of skelp. Promoters who are watching the iron market are not concerned in the least. They look for lower prices.

Bars.—The rush is over for the present. Small buyers are out of the market, but will of necessity be back soon. Refined are \$1.20 and less delivered; steel bars, \$1.25.

Sheets.—No rush, large consumers will not go any further. Prices are weak. Competition is sharp from mills in competing markets. Best sheets range from \$1.80 for No. 10 to \$2.80 for No. 28.

Nails.—The market is quiet. Production is increasing at factories. Prices are not shaded, as consumers are not in a position to add to existing stocks.

Pipes and Tubes.—Wrought pipe capacity has not been kept quite as busy for two weeks. New work is coming in, but in retail lots.

Plate and Tank.—Business is better in plates than usual. New orders are coming in every day. Large requirements are in sight. Manufacturers are encouraged. Agents have canvassed up the trade. Tank is 1'40; universals, 1'45; shell, 1'50; flange, 1'60; firebox, 1'90.

Structural Material.—A sprinkling of orders from Eastern sources is reported to-day, which brought our State mills not less than 2,800 tons, besides some that went to unknown quarters. Agents say there must soon be a lot of big orders, in fact there is business that is overdue and buyers do not explain cause of delay, in letting the mills get to work. Angles are \$1.40; beams and channels, \$1.60.

Rails.—No facts can be unearthed to-day beyond the statement that several companies are nearly ready to place orders for girder rails.

Old Rails.—To-day's quotations are \$15.

Scrap.—The only scrap particularly sought after is choice railroad, as it sells from \$14 to \$14.50. Some concerns have gathered up a good deal of it.

METAL MARKET.

NEW YORK, Friday Evening, March 20, 1896, Gold and Silver.

Prices of Silver per Ounce Troy.

Mar.	St. Ex.	London	N. Y. Cts.	Value of sil. to \$1.	Mar.	St. Ex.	London	N. Y. Cts.	Value of sil. to \$1.
11	4 87 1/2	31 1/2	68 3/4	333	12	4 87 1/2	31 3/4	68 1/2	530
16	4 87 3/4	31 1/2	69 3/4	529	19	4 87 3/4	31 1/2	68 3/4	528
17	4 87 3/4	31 1/2	69 3/4	531	20	4 87 3/4	31 1/2	68 3/4	527

The advance in silver, which in a measure was brought about by large purchases in London of rupee paper for India, accentuating the upward movement of exchange, has culminated at 31 1/2 d., and the market sold down to-day to 31 1/2 d. At this figure demand is good and prices close firm.

The United States Assay Office in New York reports the total receipts of silver at 126,000 oz. for the week.

Gold and Silver Exports and Imports.

At all United States ports, January, 1896, and years 1896 and 1895:

	Specie and bullion.		In ores.		Total ex-cess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
GOLD					
Jan..	\$10,566,516	\$10,294,290	\$5,002	\$178,050	E. \$99,178
1896..	10,566,516	10,294,290	5,002	178,050	E. 99,178
1895..	25,929,828	1,231,339	275,432	68,326	E. 24,905,593
SILV.					
Jan..	\$1,992,629	1,009,298	81,670	1,438,082	E. 2,539,919
1896..	4,902,629	1,009,298	84,670	1,438,082	E. 2,539,919
1895..	3,755,501	662,374		975,344	E. 2,117,783

These figures are furnished by the Bureau of Statistics of the Treasury Department, and include the exports and imports at all United States ports.

Gold and Silver Exports and Imports, New York

For the week ending March 20th, 1896, and for years from January 1st, 1896, 1895, 1894, 1893 and 1892:

We'k	Gold.		Silver.		Total Ex-cess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1896..	\$223,090	\$149,686	\$1,013,424	\$47,915	E. \$1,047,823
1895..	9,978,885	16,075,824	8,869,413	408,486	E. 2,363,988
1894..	28,463,201	11,614,111	6,802,873	292,989	E. 23,328,974
1893..	5,823,152	2,742,512	10,175,104	391,018	E. 12,864,726
1892..	33,700,174	5,045,656	6,947,015	848,412	E. 34,752,725
1891..	12,043,255	5,359,039	5,755,808	339,523	E. 12,100,481

All the gold exported for the week went to the West Indies; of the silver \$192,000 went to France,

\$2,000 to Germany, \$79,574 to South America, and the remainder to London. The gold imported came chiefly from Europe and the silver from South America.

FINANCIAL NOTES OF THE WEEK.

One topic of conversation in financial circles this week has been the reported alliance between certain manufacturers of Republican stamp, and the Free Silver Party, showing a determined attempt to make a log-rolling deal between Protective Tariff and unsound financial action in the direction of free silver coinage. Bankers in New York who take so conservative a view of financial matters in general can scarcely believe that this deal will be consummated. The effect of the rumor is anything but favorable upon the market generally, and even where prices are not materially affected it renews the feeling of distrust which has been the bane of the country's credit nationally and commercially.

Another topic of peculiar interest to our readers, and which greatly concerns the silver mining industry is that there are evident signs of a nearer approach to accord between Great Britain and members of the former Latin Union on the subject of re-monetizing silver at least in a modified degree. The English Government has been cross-questioned on the subject very closely in the House of Commons, and the subject has been also brought up in a similar manner in Germany, France and Austria. The indications point to a desire on the part of the European nations to come to an international agreement, but the former members of the Latin Union desire to impose upon Great Britain the precondition of reopening the Indian mint. With the divided opinions upon this subject in the English Cabinet it is doubtful whether this will be agreed to, but they have stated their willingness to reopen the mint provided some satisfactory arrangement can be arrived at an international convention to be held.

The statement of the United States Treasury on Thursday, March 19th, shows balances in excess of outstanding certificates as below, comparison being made with the corresponding day of last week:

	March 12.	March 19.	Changes.
Gold.....	\$126,716,901	\$128,135,659	I. \$1,418,758
Silver.....	25,033,324	21,434,547	D. 3,598,777
Legal tenders.....	73,704,526	73,730,711	I. 26,185
Treasury notes, etc.....	31,103,524	31,369,475	I. 265,951
Totals.....	\$254,558,275	\$254,670,392	I. \$112,117

Government deposits with national banks on the same date amounted to \$30,242,489, an increase of \$5,469,411 during the week.

The statement of the New York banks—including the 63 banks represented in the Clearing House—for the week ending March 14th, gives the following totals, comparisons being made with the corresponding weeks in 1895 and 1894:

	1891.	1895.	1896.
Loans and discounts.....	\$443,053,100	\$489,004,000	\$466,526,900
Deposits.....	510,266,700	518,496,500	489,809,500
Circulation.....	11,088,900	12,295,500	11,234,800
Specie.....	98,583,000	67,573,600	60,845,100
Legal tenders.....	113,785,900	79,649,300	83,056,100

Total reserve..... \$212,368,900 \$147,222,900 \$143,301,200
 Legal requirement..... 135,066,000 122,621,125 122,452,375
 Surplus reserve..... \$77,302,900 \$17,598,775 \$21,448,825

Changes for the week this year were increases of \$2,038,000 in loans; \$925,100 in deposits, and \$251,000 in circulation; decreases of \$693,000 in specie, \$861,400 in legal tenders, and \$1,785,675 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars, and comparison is made with the holdings at the corresponding dates last year:

	Gold.	Silver.	Total.
Asso. Banks of New York			\$60,845,100
1895.....			67,573,600
Bank of England	\$245,574,720		245,574,720
1895.....	186,814,260		186,814,260
Bank of France	390,331,000	\$249,617,400	640,548,400
1895.....	428,126,150	248,568,286	676,694,436
Imp. Bank of Germany			235,315,000
1895.....			251,895,000
Austro-Hungarian Bank	128,630,500	65,618,500	192,249,000
1895.....	85,965,000	68,060,000	154,625,000
Netherlands Bank	13,118,000	34,563,000	47,681,000
1895.....	22,149,000	35,500,000	57,449,000
Belgian National Bank			13,406,400
1895.....			25,995,000
Bank of Spain	40,022,000	51,683,000	91,705,000
1895.....	40,021,000	60,742,000	100,763,000
Bank of Italy	61,365,000	10,240,000	71,605,000
1895.....	69,255,000	14,435,000	74,690,000
Imp. Bank of Russia	351,560,000	25,650,000	377,210,000
1895.....	274,075,000	52,185,000	326,260,000

The return for the Associated Banks of New York is of date March 14th; all the others are of date March 19th, except the Bank of Italy, which is dated February 10th, and the Bank of Russia, whose return is dated February 1st-13th. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England reports its gold only, not considering silver at all. The Imperial Bank of Germany and the Belgian

National Bank do not report gold and silver separately.

Shipments of silver from London to the East for the year up to March 5th are reported by Messrs. Pixley & Abell's circular as below:

	1895.	1896.	Changes.
India.....	\$983,730	\$219,238	D. \$764,492
China.....	671,650	129,900	D. 541,750
The Straits.....	101,300	76,482	D. 24,818
Totals.....	\$1,756,680	\$425,620	D. \$1,331,060

Arrivals for the week this year were \$142,000 in bar silver from New York, \$3,000 from Capetown, and \$17,000 from the West Indies, a total of \$162,000. Shipments for the week were \$183,600 in bar silver to India.

Although the applications for Council bills in London were not as large as for several weeks past, the entire 60 lakhs offered were disposed of at a good price, the average being 14 8/10 d. per rupee. The demand for these bills was partly off-set by considerable shipments of silver to India, which have been going on for several weeks past. Indian export trade continues active, and there seems to be no reason why the demand for exchange should not continue fair, although present prices are hardly likely to be maintained. In view of the announced determination of the Japanese Government to transfer a considerable part of the gold now on deposit in London subject to its order to the Bank of Japan there is a good deal of speculation as to the course of the Bank and the possible purchases of silver for its account, as affecting the Eastern exchanges. There is not, however, likely to be any considerable movement in this direction, since under the arrangement made with the government the Bank is to be authorized to issue bills or notes against the money transferred, which is by the way, in repayment of advances made by the Bank during the war. These new circulating notes will answer all home demand for currency without the addition of any silver, and it is quite likely that in view of future requirements the Bank may retain a large portion of the gold in London for a time at least. At any rate the transfer has had no immediate effect on the exchanges.

The Italian campaign in Abyssinia has caused a brisk demand for so-called Austrian Maria Theresa or Levantine thalers. These coins were current in Austria during the reign of the Empress Maria Theresa. They have long been withdrawn from European circulation, but still form a favorite medium of payment in the East. The number annually minted in Vienna for consignment to the East varies according to the demand. In Abyssinia payments are chiefly effected in that currency, and, in consequence of the increased financial requirements caused by the prolonged duration of the war, Maria Theresa thalers have been exported from Austria on a much larger scale than usual. Since the beginning of the year no fewer than 600,000 of them have been coined and forwarded by the Vienna mint to the port of Trieste for shipment to Abyssinia. The increase in the demand is important, as formerly only 2,000,000, or at the most 3,000,000 thalers were coined annually. Now, however, one financial establishment in Vienna has contracted to take over 1,250,000 thalers as soon as they can be struck, while another prominent banking firm has also given extensive orders. The silver obtained from the government mines at Pribram, in Bohemia, is chiefly used, but, as the output of these mines is now insufficient to cover the total requirements, the authorities have empowered the Mint to melt down a certain quantity of the old silver currency which has been withdrawn from circulation in accordance with the prescriptions of the Austro-Hungarian monetary reform. Thus the amount of silver necessary to supply the increased demand for Levantine thalers will be principally procured from domestic sources.

Domestic and Foreign Coins.

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

	Bid	Asked
Mexican dollars.....	\$0.54 1/2	\$0.55 1/2
Peruvian soles and Chilean pesos.....	48 1/4	50
Victoria sovereigns.....	4.87	4.90
Twenty francs.....	3.88	3.92
Twenty marks.....	4.75	4.80
Spanish 25 pesetas.....	4.78	4.85

Other Metals

The annual meeting of the New York Metal Exchange was held March 18th, and the reports of the president, secretary and treasurer were presented. The attendance was large and more than ordinary interest was manifested by the members present. The treasurer's report was particularly well received, showing, as it did, an increase of \$1,214 in the surplus fund during the year and an increase from \$272 to \$275 in the book value of memberships. The income during the year was \$1,891 and the expenditures were \$8,690. The improvement in the financial standing of the institution has led to a reduction in dues from \$50 to \$35 per annum.

Copper.—While business again has not been large, there has been a much firmer tone, and the transactions closed were all at full prices. The exports are still very large, and are likely to continue so for some time, but what is, under the circumstances, rather astonishing, is, that the visible supplies in Europe continue to decrease, which

plainly shows how good consumption in Europe is. Our cable reports that for the first fortnight the visible supplies show another decrease of 2,400 tons. Home manufacturers, while reporting a good business, have not entered the market to any extent. Still, holders continue very firm, and are not disposed to make any concessions. We quote Lake Copper, 10 1/2 @ 11; electrolytic copper, 10 1/2 @ 10 1/2, according to brand and quantity, and cathodes 1/2 c. cheaper. Casting copper still rules at about 10 1/2, with a limited demand, while for Arizona copper very high prices are being asked, viz., 10 1/2 @ 10 1/2.

The London market has been somewhat irregular, but in the main very firm, with large transactions. The opening quotations on the 16th were £45 12s. 6d. @ £45 15s. for spot, but on the 18th the market declined to £45, since which time a rather firmer tone has been noticeable, and to-day again £45 10s. @ £45 12s. 6d. for spot, and £45 15s. @ £45 17s. 6d. for three months prompt is recorded. It will be noticed that the margin between spot and futures has become narrower than of late, and this is evidently due to the fact that g. m. b. copper is becoming rather scarce, on the other side, as with the large margin now existing between the ordinary and fine sorts, large quantities of pig copper have been used up. For refined and manufactured we quote: English Tough, £49 @ £49 5s.; best selected, £50 @ £50 5s.; strong sheets, £50 10s.; India sheets, £51 10s.; yellow metal, 4 1/2 d.

The following figures give the production (in tons of 2,240 lbs.) of copper in the United States, and also by the chief foreign mines, and the exports from the United States, for February and the two months ending February 28th:

	February, 1896.	Two mo- 1895.	1896.
Production fine copper, long tons:			
Reporting mines in U. S.	16,316	21,214	31,188
Pyrites and outside sources U. S.	1,200	3,200	2,400
Reporting foreign mines	7,096	13,476	13,930
Total production, long tons	24,612	37,890	47,518
Exports from U. S., fine copper	8,296	10,592	16,464

The total increase in production for the two months was 9,628 tons, or 25.4%. The increase in United States exports was also large.

Chilean Copper Market.—Messrs. Jackson Brothers write from Valparaiso under date of February 1st: The improvement in prices has brought out several parcels on this market, and our sales for the past two weeks have been on a larger scale than for five months. The total amounted to 16,566 quintals. We quote for bar copper \$54 35 (Chilean) per metric quintal, f. o. b.; for regulus, 57%; \$22 83 per metric quintal, f. o. b.; for copper ore, 10%, \$2.98 per metric quintal, f. o. b.

Sulphate of Copper.—A very large demand has of late sprung up for this article, and the inquiries have been so numerous that all stocks have been quickly absorbed, and manufacturers cannot produce enough to fill all orders. Consequently, prices have advanced to 3 1/2 @ 4c. on the spot, and abroad to £19 @ £20.

Tin.—The market has been quite lifeless, and there is nothing of interest to report. We quote for spot and March delivery, 13 1/4, and for April to July, 13 3/8.

The London market also has been devoid of interest. The opening quotation was £60 10s., but the market gradually sagged off and declined to £60 @ £60 2s. 6d. for spot, and 10s. @ 12s. 6d. higher for three months prompt. The statistical position of the article remains a rather bad one.

Lead.—The lower prices have attracted a great deal of attention, and a good business has been done at gradually rising prices. Transactions have been fairly heavy, and we have now to quote 3 1/2 @ 3 1/2, with no sellers at the former figure. A large business has also been reported from the West.

The London market, which was to some extent influenced last week by the heavy arrivals, has shown a great deal of strength, and prices have quickly advanced to £10 5s. for Spanish lead and to £10 7s. 6d. for English, with a good consumptive demand.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is strong and higher, and the latest sales were made on a basis of 2 85, East St. Louis. It looks a little as though a reaction had come, and in all likelihood might witness higher prices from now on.

Spanish Lead Market.—Messrs. Barrington & Hoyt write from Cartagena, Spain, under date of March 2d, as follows: English prices for argentiferous and soft lead advanced, and also those for silver, but the effect on local quotations was counterbalanced by the fall in exchange. The average local quotation for pig lead on wharf has been 58 20 reas per quintal of lead which, taking exchange on London at 30 30 pesetas per £1, is equivalent to £10 15s. 1d. per ton of 2,240 lbs. f. o. b. Cartagena. The silver being paid at the rate of 15 reas per ounce. The exports of pig lead from this port during past month were: To Marseilles 2,279,239 kilos soft, and 100,300 kilos desilverized; Newcastle 2,305,967 kilos; Antwerp, 363,401 kilos; total, 5,068,967 kilos. We quote for lead ores: Potter's ore, 8s. 6d. per cwt.; Linare ore, 6s. 9d. for sulphide and 6s. 6d. per cwt. for carbonates.

Spelter continues very firm. The decrease in production is making itself felt and stocks have considerably decreased also. Consumption remains rather satisfactory and a marked improvement in the demand for sheet zinc has been noticeable. We quote £20 @ £25.

The foreign market has been very firm and good ordinaries are quoted in London at £15 5s. and specials at £15 7s. 6d.

Antimony.—A rather better feeling has been reported from England, but, so far, this has had no influence on our home market, where quotations remain depressed.

Nickel.—The market, locally, is still quiet, but prices are steady. We quote 35 1/2 @ 38c. per lb. for small orders, and 34 @ 35c. for ton lots. The London price is 13 1/2 @ 15d. per lb., with business fair only.

Platinum.—Prices are steady and unchanged, and we quote \$13 @ \$14.50 per oz. New York. London quotations are 49 @ 51s. per oz.

For chemical ware, best hammered metal, Messrs. Eimer & Amend, New York, furnish the following quotation, the prices given being respectively for orders of over 250 grams; for orders of over 100 grams and less than 250 grams, and for orders of less than 100 grams: Crucibles and dishes, 48c. 49c. and 50c. per gram. Wire and foil are 45c., 46c. and 47c. per gram. The current retail price for crucibles is 60c. per gram.

Quicksilver.—Prices have been reduced to \$36 per flask, New York. The London quotations have been reduced to £6 17s. 6d. per flask; from second hands £6 17s. @ £6 17s. 3d. is named.

Receipts of quicksilver at San Francisco in February were 2,523 flasks, and for the two months ending February 28th they were 5,316 flasks, against 3,755 flasks for the corresponding period in 1895, and 5,580 flasks in 1894. Exports from San Francisco by sea for the two months were: New York, 1,500 flasks; British Columbia, 1 flask, Mexico, 773 flasks; Central America, 230 flasks; China, 2,000 flasks; total, 4,504 flasks, against 1,573 flasks for the corresponding period last year. The shipment to China was the first reported for more than a year.

Average Monthly Prices of Metals

In New York since January 1st, 1896, and for the corresponding period in 1895, 1894, 1893 and 1892, in cents per pound, were:

Month.	1896.	1895.	1894.	1893.	1892.
Copper:					
January	9 87	10 00	10 13	12 13	11 00
February	10 62	10 00	9 63	12 00	10 00
Tin:					
January	13 02	13 25	20 16	19 99	20 50
February	13 44	13 35	19 60	20 30	20 00
Lead:					
January	3 08	3 10	3 19	3 87	4 20
February	3 19	3 12	3 31	4 22	4 12
Spelter:					
January	3 75	3 28	3 56	4 39	4 69
February	4 03	3 20	3 85	4 39	4 69

Imports and Exports of Metals.

New York.*	Week, Mar. 12		Year, 1896.	
	Expts.	Impts.	Expts.	Impts.
Aluminum..... lbs.				423
Antimony ore..... short tons		36		459
" regulus, casks		2 0		422
Brass, old..... short tons		14		55
Copper, fine..... long tons	11,811	140	16,368	598
" matte..... " "	1343		3,728	11
" ore..... " "				
" sulphate..... " "	110		1,325	
Fluorspar..... " "		39		39
Iron ore..... " "				
" pigs, bars, rods..... " "			124	1,505
" pyrites..... " "				2,275
" sulphate..... " "				1,710
Ferro-manganese..... " "				314
Ferro-silicon..... " "			75	75
Manganese ore..... " "			128	1,540
Spiegeleisen..... " "				8,160
Lead ore..... " "				
" pigs and bars..... " "	1527	145	8,824	8,375
Nickel..... " "	42		183	5
Steel, billets, rods..... " "			1,295	7,032
Tin..... " "			165	188
Tin and black plates, boxes..... long tons	30	4,396	30	216,933
Zinc (spelter)..... long tons				118

* Metal Exchange Reports. † Week ending March 19.

Baltimore.**	Week, Mar. 12.		Year, 1896.	
	Exp.	Imp.	Exp.	Imp.
Chrome ore..... long tons				500
Copper, fine..... " "	1489		4,565	
" matte..... " "			500	
" sulphate..... " "	754		1,054	
Iron, ore..... " "		6,119		113,518
" pigs, bars, ingots, blooms..... " "				1,172
Iron oxide..... bags				300
" pyrites..... long tons			2,594	5,069
Ferro-manganese..... " "			94	1,113
Ferro-silicon..... " "				58
Limestone..... short "				2,743
Manganese ore..... long "				1,673
Spiegeleisen..... " "			23	333
Steel..... " "				10
Steel wire, bundles..... " "				1,647
Tin, long tons..... " "				32
Tin and black plates, boxes..... " "				52,011
Zinc (spelter) long tons..... " "	117		117	

**From our special correspondent. † Week, March 19.

Philadelphia.††	Imports.	
	Week, Mar. 13.	Year, 1896.
Antimony, casks.....		17
Copper ore, long tons.....		4,300
Iron.....	6,000	23,130
" pig.....	100	200
Manganese ore, long tons.....		2,100
Tin.....		115
Tin and black plates, boxes.....		5,104

†† N. Y. Metal Exch. Repts.

The Minor Metals.—Quotations for these metals are given in the table below, the prices being for New York delivery:

Aluminum:	
No. 1, 98% pure rolling ingots, per lb.....	50 @ 55c.
No. 1, ingots for re-melting, per lb.....	48 @ 53c.
No. 2, 94% pure.....	3 @ 42c.
Ingots from scrap, per lb.....	75 @ 40c.
Aluminum-nickel casting metal, per lb.....	4 @ 45c.
Bismuth, per lb.....	\$1.30 @ \$1.75
Phosphorus, per lb.....	50 @ 55c.
Platinum, per oz.....	\$13 @ \$14.50
Tungsten, pure, powder per lb.....	70c.
Tungstic acid, per lb.....	45c.
Ferro-tungsten, 60% in ton lots, per lb.....	60c.

The variations in price are chiefly on size of order.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, March 20.

Heavy Chemicals.—There is little of interest to report of this market. Caustic soda is quiet as concerns new business, the demand being confined to few spot orders. Alkali is in the same condition, with prices unchanged. Bleaching powder is in but moderate request. We quote: Caustic soda, 2 1/2 @ 2 1/2 c. for spot, according to test; carbonated soda ash, 48%, is 90 @ 1c., according to quantities and deliveries. Alkali is 85 @ 95c., according to test and package. Bleaching powder, prime brands, \$1.70 @ \$1.80. Sal soda, 65c.

Acids.—A fair jobbing demand is reported, which in addition to the regular deliveries on contracts, keeps prices steady. We quote per 100 lbs. in New York and vicinity, in lots of 50 carboys or over, as follows: Acetic acids (in barrels), \$1.40 @ \$1.70. Muratic acid, 18%, 75 @ 80c.; 20%, 80 @ 90c. Nitric acid, 36%, \$3.50 @ \$4; 40%, \$4 @ \$4.50; 42%, \$4.25 @ \$4.75. Oxalic acid, \$7.10 @ \$7.60. Mixed acids, according to mixture. Sulphuric acid, 66%, 75 @ 85c.; chamber acid, \$6.50 @ \$7.25 per ton at factory. Blue vitriol, \$3.65 @ \$4.10, according to size of order.

Brimstone.—We quote for shipments, best un-mixed seconds, \$15 @ 15.25. Thirds are 50c. less. Spot or nearby is \$16 for seconds.

Fertilizing Chemicals.—The fertilizer market has been rather quiet during the past week. The demand while not active seems to be sufficient to maintain prices fairly steady. Quotations are without marked change from last week, and we quote as follows: Sulphate of ammonia, gas liquor, \$2.40 @ \$2.5; bone, \$2.30 @ \$2.35. Dried blood, high grade, \$1.75 @ \$1.80; low grade, \$1.60 @ 1.70 per unit. Azotine, \$1.80. Concentrated phosphate, 30% available phosphoric acid, 70 @ 71 1/2 c. per unit. Acid phosphate, 13% to 15%, av. P₂O₅, 57c. per unit at seller's works in bulk. Dissolved bone black, 17% to 18%, P₂O₅, 90 @ 92c. per unit. Acidulated fish scrap, \$12, and dried scrap with few or no sales, nominally \$21 f. o. b. fish factory. Tankage, high grade, \$19 @ \$20; low grade, \$18 @ \$19. Bone tankage, \$21; ground bone, \$19 @ \$20. Bone meal, \$21 @ \$22.50.

Sulphate of Potash: 90-95%, New York and Boston, \$1.90 1/2; Philadelphia, Baltimore and Norfolk, \$1.98; Southern ports, \$2.

Double Manure Salts: 48-53%, New York and Boston, \$1.01; Philadelphia, Baltimore and Norfolk, \$1.02; Southern ports, \$1.03 1/2.

Muriate of Potash.—New prices for muriate are: New York and Boston, 1 7/8 c.; Philadelphia, Baltimore and Norfolk, 1 7/8 c.; New Orleans, 1 7/8 c., for 80 @ 85% (basis of 80%), in lots 25 tons and upward.

Kainit.—Quotations for 1896 are as follows: New York, Boston, Philadelphia and Baltimore, \$8.55 per ton; Norfolk, \$8.90, and New Orleans, \$9.05 per ton, for 25 tons and upward. Sylvinit at the same ports is quoted at 36 1/2 c., 37 1/2 c. and 38c., respectively.

Nitrate of Soda.—Spot, \$1.70 @ \$1.75; future rivals, \$1.72 1/2 @ \$1.75.

Liverpool. March 11.

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

The market for chemicals is dull and featureless. Soda ash.—Some further resales are reported at low prices, but the article is difficult to move. Quotations are quite nominal, and for tierces, the range may be called about as follows: Leblanc ash, 48%, £4 @ £4 5s. per ton; 58%, £4 5s. @ £4 10s. per ton; ammonia ash, 48%, £3 2s. 6d. @ £3 10s. per ton; 58%, £3 7s. 6d. @ £3 12s. 6d. per ton net cash; bags, 5s. per ton less.

Soda crystals are in moderate request and unchanged at £2 7s. 6d. @ £2 10s. per ton, less 5% for barrels, and 7s. less for bags.

Caustic soda is rather quiet, but prices are steady. We quote spot range, according to market, as follows: 60%, £6 5s. @ £6 10s.; 70%, £7 5s. @ £7 10s.; 74%, £8 5s. @ £8 10s.; 76%, £9 2s. 6d. @ £9 5s. per ton, net cash.

Bleaching powder is flat, and £7 5s. @ £7 10s. per ton. Net cash is the nominal range for hardwood packages, according to destination, while the lower figure could be shaded, but orders are very scarce. Chlorate of potash is in light request and is quoted at 4½d. @ 4¼d. per lb. Bicarb soda is held for £6 15s. per ton, less 2¼% for the finest quality in 1-cwt. kegs, with usual allowances for larger packages. Sulphate of ammonia is quiet, at £8 12s. 6d. @ £8 15s. per ton, less 2¼% for good gray, and 24s. for 25% in double bags, f. o. b. here, according to quality. Nitrate of soda is rather better and on spot £8 5s. @ £8 7s. 6d. per ton, less 2¼% is quoted for double bags, f. o. b. here, according to quality. Carb. ammonia, lump, is quoted at 3½d. per lb.; powdered, 3¼d. per lb., less 2¼%.

Valparaiso, Chile. Feb. 1.
(Special Report of Jackson Brothers.)

Nitrate of Soda.—Seldom have we experienced a more active fortnight in this article. At the same time prices have not advanced in the proportion that might have been expected in view of the animation displayed. The market opened at 5s. 3d. for January-February, 95%, remaining at about same figure, while March-April delivery rose from 5s. 3d. to 5s. 4½d.; May from 5s. 3d. to 5s. 5d. June-July delivery has been placed at 5s. 5d. @ 5s. 6d.; September-October at 5s. 6d. @ 5s. 7d.

For the refined quality some inquiry has existed for May-July shipment, but producers have abstained from offering their produce. The projected combination has again been taken up since our last report, owing to the extra "quota" exacted by the Lautars Company being provided for by other producers, who have ceded an equal amount proportionately out of their respective quotas; apparently nothing remains to be done now than to secure the signatures of all concerned and make the agreement legally binding. The market, however, closed quiet at 5s. 3½d. sellers for February-March, 95%; 5s. 5d. for April-May, 5s. 6d. June-July, 5s. 7d. August-October delivery; and 90% February-March, 5s. 6d. The price of 5s. 3¼d. with 22½ ct. all round freight stands in 7s. 1¼d. per cwt. net costs and freight without purchasing commission. Reported sales are 2,611,000 quintals for the fortnight.

A few vessels have been fixed for nitrate at 21s. 3d. @ 22s. 6d. from discharging ports, and 22s. 6d. after shifting, but the inquiry is very restricted. Disposable tonnage amounts to 55,800 tons register, being 3,500 tons less than last fortnight. We quote for nitrate to United Kingdom ports 22s. 6d.; to United States, 22s. 6d., nominal, to Hampton Roads or orders.

MINING STOCKS.

Complete quotations will be found on pages 284 and 295 mining stocks listed and dealt in at:

New York.	Aspen, Colo.	St. Louis.
Boston.	Colorado Springs.	Paris, France.
Philadelphia.	Duluth, Minn.	Mexico.
Baltimore.	Helena, Mont.	Shanghai, China.
Pittsburg.	Salt Lake, Utah.	Valparaiso, Chile.
Denver, Colo.	San Francisco.	London, England.

New York, Friday Evening, March 20.

The lack of interest which the public has displayed towards mining stocks of late years seems to be too deeply settled to be removed. We have been at various times apparently on the verge of a mining stock boom in this city, but the boom itself has invariably failed to materialize. The past week has probably been the dullest that the mining stock market has known for many months. At the Consolidated Stock & Petroleum Exchange all the brokers are complaining of the dull times, and they certainly are no strangers to dullness. At the New York Mining Exchange the situation is no better than last week, and business there was far from encouraging. It is now announced that the officers and directors of this exchange are ready to resign whenever the members may call for their resignations. Various plans of reorganization are being considered, but one thing is certain: the unfortunate fiasco reported in our last issue will make it next to impossible for any management to achieve success in this city.

At the Consolidated Exchange the Comstocks were quiet as usual. There have been rumors of impending "deals" in one or two of the old-timers, but the public, fortunately for its pocketbook, has learned to put no faith in these old stocks.

The Colorado shares show the heaviest transactions, but even in their case business and interest show a falling off as compared with previous weeks.

The only California stocks to show any transactions were Bulwer, 1,000 shares at 25 @ 27c.; Standard Consolidated, 700 shares at \$1.8 @ \$1.90, and Brunswick, 3,000 shares at 6c. The Quincy Mining Company of Michigan, has declared an extra dividend of \$4 payable on April 10th.

Boston. March 19.

(From our Special Correspondent.)

The dealings in stocks have been moderate with just a few exceptions. Arnold still hangs around \$1¼ and is bidding its time for an expected "boom" later on. Atlantic is off half a point at \$19½, with sales on only two days of the week. Calumet & Hecla, which was \$309 last Thursday has receded to \$305, without much demand. Boston & Montana was, for a time, strong and active, advancing from \$77¼ to \$79½ and closing \$79. There was most of the week, quite a speculative animation in this stock similar to the "deals" of the past, and there is

good buying, even up to the close. Butte & Boston has ceased to be a feature of the market, and sells organization \$1¼ and \$2, awaiting the result of reorganization which is now in the hands of a committee.

Franklin shows a single sale of five shares at \$4, but the nominal price is nearer \$15. The results of the workings on the Franklin Junior (owned by the Franklin) are now looked for with unusual interest, because of the effect it must have naturally on the stock of the parent mine. Kearsarge declined from \$11¼ to \$11, with a later rally to \$12. Osceola has declined from \$28 to \$27. Quincy is stronger, advancing from \$128 to \$130, and the Scrip from \$74 to \$75. Tamarack has declined one point to \$110. Tamarack Junior, at \$16¼, shows an advance of 8% from the last sale, which was March 2d. Tecumseh is ¾ higher at \$3¾, with only one sale for the week, and as yet does not respond to the favorable reports from the mine. Wolverine advanced from \$7¼ to \$7½ and closes \$7¼.

Gold stocks are less active as a rule and generally at lower figures. As yet the gold fever has not "caught on" in Boston, and the movements of most of the stocks are to a great extent speculative. Boston & Cripple Creek, up to 40c. a week ago, is now down to 30c. without known cause. Gold Coin has declined from 90c. to 75c. The third monthly dividend of 1¼c. per share (1,000,000 shares) has been paid this week, but dividends do not seem to help the stock much, as it is now selling at its lowest point. Merced declined from \$31¼ to \$28¼ with a later rally to \$30, but sales were made only on a single day. Pioneer has been a feature of the week, declining at first from \$10¼ to \$8¾, the decline to-day being nearly a point, with sales of some 5,000 shares. The dealings look very much as though "insiders" were selling while the stock is well bolstered up in the newspapers. Santa Ysabel has declined from \$15¼ to \$12¼, with unusually heavy realizing. The price later rallied sharply to \$14.

Santa Rosa, of California, a stock placed here at \$2.50 per share on a \$100,000 share basis, has become embarrassed, and the company must have money or go to the wall. It is said that \$10,000 will lift the company out of its present position, and it is proposed to issue mortgage notes for that sum, two years to run at 6% interest, redeemable on any interest day. The company has some 15,000 shares of stocks in the treasury, a portion of which is to be distributed as a bonus among the takers of these notes, at the rate of one share for every dollar subscribed. The general opinion seems to be that the mine is a good one, but too much money was expended on improvements and new stamps, not really needed at present, because the mine is deficient in water to run them. There is to be a change of officers, and the treasurer of the company will hereafter make his headquarters in Boston.

Chicago. March 18.

(From Our Special Correspondent.)

The market has shown an increased activity with a volume of business almost double that of the preceding week. Prices with the exception of Sunnyside Gilpin closed at a slight decline from the opening. This stock after reaching 15c. at the morning call on the 17th dropped at the 2 p. m. call under heavy orders to sell to 10½c. and mounted again the following day to 15½c. and closed strong at this figure. It is now for the most part in strong hands and there are pointers out that this stock will touch 25c. before many days.

Rhyolite has been moderately active but under the pressure of selling orders closed 2½c. lower than the opening.

Finance declined slightly from the highest point and is considered a good purchase at the present price by those who are acquainted with the property.

Orders are coming in freely from outside points and brokers are looking forward to a large and increasing trade.

The following table gives the highest prices with sales of the stocks recorded on the Chicago Mineral and Mining Board for the week ending March 18th:

Stocks.	Mar. 12	Mar. 13	Mar. 14	Mar. 16	Mar. 17	Mar. 18	Sales
Boston & C. C.	.02	.04	.....	.....	.....	.....	14,000
Capazone	.03¾	.04	.....	.....	.....	.....	2,500
C. C. & C. C.	.06¾	.06	.....	.....	.....	.....	1,500
C. C. G. M. B. & L. Co.	.....	.....	.....	.....	.....	.....	.....
Chi. & G. Mt.	.33¾	.....	.....	.....	.....	.....	15,000
Delaware Cl.	.29¾	.....	.29¾	.....	.29¾	.29¾	2,900
Dictator	.08	.07	.....	.....	.....	.....	90,500
Finance	.07	.06	.06	.06	.06	.06	.....
Golden Stairs	.06	.06	.....	.06	.....	.....	1,100
Gregory Gold	.09	.09	.....	.....	.....	.....	13,500
Imperial	.25¾	.25¾	.25¾	.25¾	.25¾	.25¾	24,500
Justice	.....	.....	.....	.06	.....	.....	500
Lyons Gold	.12¾	.11¾	.11¾	.11¾	.11¾	.11¾	75,800
Pharmacist	.....	.....	.....	.15	.....	.....	100
Rhyolite	.15¾	.14¾	.14¾	.14¾	.13¾	.12¾	96,900
Sonora	.....	.30	.....	.29	.....	.30	3,000
Squaw Mt.	.05¼	.06	.....	.....	.....	.....	4,500
Sunnyside	.....	.....	.....	.....	.....	.....	.....
Gilpin	.13	.13	.13	.13	.15	.15	362,500
Total shares sold, 707,800.							

Cleveland, O. March 19.

(From Our Special Correspondent.)

As the prices of the iron stocks have been advancing quite perceptibly during the past few weeks, considerably more of the shares have been coming on the market recently. In all instances, these shares have not found buyers and the market

has been inclined to sag a little this week. The volume of business done, however, has not been noticeably contracted. Interest has centered in Cleveland Cliffs and in Republic, with some transactions in Lake Superior and other less active properties. Following are current quotations:

Name of Company.	Par val.	March 19.	
		Bid.	Ask.
Aurora	\$25	.....	\$8
Chandler	25	\$42	44
Cleveland-Cliffs Iron Co.	100	42	44
Jackson Iron Co.	25	70	75
Lake Superior Iron Co.	25	30	32
Lake Superior Consolidated	100	21	22
Minnesota Iron Co.	100	70	.....
Pittsburg & Lake Angeline	25	75	85
Republic Iron Co.	25	18	20

Colorado Springs, Colo. March 14.

(From Our Special Correspondent.)

There has been a noticeable improvement in the mining stock market during the past week. As was intimated in this correspondence last week, a reaction was to have been expected and the upward turn then predicted has set in. Many of the stocks that declined a few weeks ago are in a fair way of reaching their old quotations again. Notable among the advancing stocks were Anaconda, Fanny Rawlings, Gold Standard, Jack Pot and Isabella. The latter company has declared a dividend of 1c. per share, or \$22,500, payable on March 27th.

Both the Mining Stock Association and the Board of Trade report a greater inquiry for mining stocks, and a bigger volume of business may be looked for.

BY TELEGRAPH.

Messrs. Gardner & Co. furnish the closing quotations of the Colorado Springs Mining Stock Exchange for the week ending March 19th, as follows:

Name of Company.	Mar. 13	Mar. 14	Mar. 16	Mar. 17	Mar. 18	Mar. 19
Alamo	.06¾	.06¾	.06¾	.06¾	.06¾	.07
Anaconda	.69	.68	.68	.66¾	.64	.59
Argentum-Junata	.61	.61	.61	.62	.62	.50
Blue Bell	.08	.08	.08	.09	.08	.07¾
Cripple Creek Con.	.28	.29	.29¾	.29¾	.28	.28
Golden Fleece	1.50	1.55	1.61	1.64	1.58	1.55
Isabella	.57	.58¾	.58	.57¾	.59	.53¾
Mollie Gibson	.71	.70	.69	.67¾	.61	.67
Mount Rosa	.15	.15¾	.15¾	.15	.14½	.15
Pharmacist	.19¾	.19¾	.15	.14¾	.14¾	.14¾
Portland	1.46	1.6	1.49	1.49	1.49	1.44
Silver State	.01¾	.01¾	.01¾	.01¾	.01¾	.01¾
Union	.53	.53	.53	.53	.52¾	.51
Work	.16¾	.17	.16¾	.16¾	.16	.16

In addition to the above quotations Messrs. A. Pick & Co., of New York, furnish the following:

Name.	Mar. 13	Mar. 14	Mar. 16	Mar. 17	Mar. 18	Mar. 19
Bankers	.18	.19	.18	.18	.18	.18
Des Moines	.06	.07	.07	.06¾	.06	.07¾
Gold & Globe	.21	.22	.22	.23	.22½	.22¾
Gold Standard	.09	.10	.11	.11	.11	.11
Isabella	.58	.58¾	.59	.57¾	.58	.57
Jefferson	.20	.21	.21	.21¾	.21¾	.21¾
Keystone	.07	.06¾	.07	.07	.07	.07

Salt Lake City, Utah. March 14.

(Special Report of James A. Pollock.)

The week's dealings in stocks were inactive and unsatisfactory. Notwithstanding this fact, prices held their own fairly well, but speculation was narrow. It is difficult to attribute this lack of interest to any particular cause, other than that the investing public is not inclined to take hold at the present moment. Money is cheap and the market affords excellent opportunities to give a good present return, with chance of improvement in value.

Ajax suffered a decline movement at the hands of an insider, but quickly regained practically all of its former strength. Alliance was weak and inactive again. Anchor advanced a few points. Bogan held its own. Bullion-Beck was considerably stronger.

Small blocks of Centennial-Eureka sold around \$75, with little of the stock offered. The regular double dividend of \$1 per share is to come on Monday. Dalton did considerable business at slightly shaded quotations. There is no good reason apparent for this decline. Work is to be done in the future by contract. Daly just about held its own. Dividend prospects are still uncertain. Daly-West was strong, with increased inquiry. This property is in splendid shape, and the mill is doing good work. Geyser has settled part of its suits and gained concessions. The stock did little business, however.

Horn Silver was quiet. Good shipments of ore and concentrates are coming from the mines and the new development work is said to be making a satisfactory showing. Little Pittsburg weakened again as the assessment date came nearer, holders discounting the ½c. they will be forced to pay. Work is to be resumed when the snow leaves. Mammoth was in good demand at about the previous week's figures. A break in the hoisting machinery caused a suspension of operations for a few days. It is the intention of the company to put in new hoisting machinery in the near future. The new hoisting machinery for the Morgan (Meears) should arrive within the next ten days. This stock showed fair strength.

The famous cyanide suit brought against the Mer-

cur Company has been amicably adjusted and, thanks to the keen business foresight and splendid management of the directors, the company gained all the points desired. In the future the company will pay a small royalty, all back claims being settled by the payment of a nominal sum, which together with the royalty will not amount to the sum that would have otherwise been expended in the payment of the attorneys, and court costs, even should the Mercur Company have won in the long run. The local stockholders feel highly gratified at the result of the compromise. The company will pay its March dividend of \$25,000 on the 20th, making a total of \$425,000. The little Ontario stock offered was quickly absorbed at very firm prices. The "old reliable" is reported to be in better shape than for years. Silver King was strong above \$15. Its dividend payments now aggregate \$562,500.

For no good reason Sunshine sold lower again during the week. Utah paid a double dividend of \$2,000 on the 10th.

Sioux Consolidated attracted some attention and bidding was somewhat higher. Dalton and Lark sold around 50c. The stock of the Overland will come out next week at 50c. Gold Dust is putting down two shafts. Extensive development work has been laid out and the showing is already very gratifying.

San Francisco. March 14.

(From Our Special Correspondent.)

The market was at a stand-still all the week, and there was very little change in prices, while the dealings were light. News from the mines was not at all exciting, and no one paid much attention to it. The large operators were conspicuously absent, and the small ones were afraid to do anything.

The event of the week was the Hale & Norcross election and the success of the Lynch movement to change the management has set many stockholders to thinking. The immediate result is to be a general reduction in the running expenses of the company and a paring off generally of the extravagant salaries and other charges.

The Bodie Consolidated Mining Company has levied an assessment of 15c. per share.

The Bullion Consolidated Mining Company of Grass Valley has levied an assessment of 20c. per share, delinquent April 13th.

Mining assessments falling delinquent this month amount to \$79,500, of which Nevada mines want \$40,000. California mines \$14,500 and Arizona mines \$25,000.

On Monday there were sold here by auction 65,000 shares of the Skagit Cumberland Coal Company for \$15,000, the buyer being A. W. Blundell. The sale was made by order of court to settle up the estate of Patrick N. Mackay, which is the owner of nearly a third interest in the property. The mine is located in Washington, adjacent to the town of Hamilton, on the Skagit River, 34 miles from the port of Anacortes, on Puget Sound.

THE NEW EXCHANGE.

No date has yet been set for the formal opening of the Gold Mining Exchange. The officers report an increasing interest in the work of the Exchange, and the offer of many properties for examination and listing. In response to a general demand they have issued a circular explaining fully its plans and proposed methods of work.

London. March 7.

(From Our Special Correspondent.)

The South African mining market has been very dull during the past week, and the movements in the stocks of land, gold and diamond companies have been few and unimportant. There are many antagonistic interests in the market, and the various leaders pretend to be executing important movements on the quiet and to have very definite information as to the future of the market. To one who is familiar with the markets this mysterious importance is more assumed than real and is intended simply as a cloak for entire ignorance. The future of the mining industry in the Transvaal and in South Africa generally depends entirely on the course of political events: The gradual discovery of facts relating to the plot against the Transvaal Government is causing the belief to grow that the political difficulties will be very difficult to settle, and that even if things are smoothed over, it will only be a patch up. The arrest of Gardner Williams by the Imperial authorities is significant, because the leaders of the three great corporations are now all under arrest, viz., the Consolidated Goldfields, the DeBeers and the British South Africa Company. If these three companies are all "bossed" by Cecil Rhodes, and he cannot possibly swear that he knew nothing of their concerted action the result of all this uncertainty as to the future will keep the public out of the South African market, but it is not likely that there will be any serious or sudden slump because those who can afford to pay for shares are sure to buy all that are offered and the forced buying in by bears will prevent a collapse of prices.

As I have several times stated, the scare about scarcity of native labor is much exaggerated, and has been invented partly as a bear point and partly to make a case for the gold-field leaders who wish to prove Boer misrule. As the statements about the scarcity have not had the effect desired, the step of actually closing down the mines and batteries has been resorted to, notably by the East Rand Company and the Kleinfontein. From information

to hand, however, I have every reason to believe that if it suited all the labor required could easily be found.

The West Australian section has been very dull. New issues continue to make their appearance, but it really looks as if the end of the boom had already come. Indians have been fairly active. The most important section of the mining market, however, is undoubtedly New Zealand, in which there is an unmistakable movement. New issues of New Zealand mines are making their appearance, and there are also several influential exploration companies being formed to acquire mines in that colony. Last week I mentioned that the Exploration Company had formed the "Consolidated Gold Fields of New Zealand" to handle New Zealand properties; this week the London and New Zealand Exploring Syndicate has been formed by the same parties who formed the London and West Australian Exploring Syndicate, and who have been one of the most successful of West Australian promoting companies. Appearances certainly point to a boom in New Zealand mines during the summer.

In the American section the most important news is that "Baron" von Richthofen, of Denver, whose advent in London was mentioned some time ago, has succeeded in obtaining influential support for his schemes. He has formed the "Anglo-Colorado Exploration Syndicate," to acquire the Rigi, Eclipse, Moose, Abe Lincoln and Chequetta claims in the Cripple Creek district. Work is being done on the first three by the manager, Mr. Charles J. Moore. As the syndicate has been formed privately it is difficult to obtain further information as to the properties. The chief man in the syndicate is the Earl of Essex, who married for a second wife Miss Adele Grant, of Washington.

The Montana Company is in a fairly good condition, to judge by the speeches at the meeting held the other day. During 1895 dividends amounting to £33,000 were paid. The yield per ton was less in the latter half of the year than in the first six months, owing to the stamp mill which treated the low-grade ores being closed for repairs from February to May. During the summer very little development was done, but in October the New Castle-ton lode showed signs of improvement, and since then has been opening up in a most satisfactory manner. The outlook for the company is therefore promising.

The Twin Lake Placers Company, Limited, working in Clear Creek, Colo., for some reason known only to the chairman, refuse to supply the newspapers with copies of their yearly reports. It is not a private company, for they send returns of their monthly output to the papers and also advertise a quotation for their shares. The only explanation is that the yield per cubic yard has gradually decreased from 20c. at the start to 17c. in 1892, 10c. in 1893 and 1894, and 6½c. in 1895. In spite of this fall a profit has been made sufficient to pay a dividend of 7% on a capital of £26,000. In the absence of exact figures as to income, expenditure and balances, it is impossible to tell the cost of handling the 812 773 cu. yds. of earth which were treated in 1895, but the cost is approximately 5c. per yard. So far as I know this is the only placer property in the United States which is being worked by an English company, so the refusal of the directors to supply the press with reports is the more to be regretted.

Paris. March 8.

(From Our Special Correspondent.)

The course of events here has not been smooth, and the attention of everyone has been turned from mining stocks by the political occurrences of the week. The Italian defeat in Ethiopia promises to have most serious consequences, the end of which one cannot clearly foresee. Everyone is talking of the effect upon the Triple Alliance and on Italy's position in Europe, while opinions are of the most diverse kind. The immediate effect has been a heavy fall in Italian securities, and a rush of holders to sell out before a general crash in them comes. These stocks have not been in very much favor for some time past, but there are many holders, and a good number of them seem to think that the impending bankruptcy of that unfortunate and too ambitious kingdom will be hastened. Perhaps; but in these cases a remedy is sometimes found, and it may be that this disaster will stimulate a reaction. Meantime it has given rise to a feeling of uncertainty which does not help the stock market.

The strongest feeling this week is in the metallurgical shares. The reports lately published show that the rail renewals and purchases of new equipment on our railroads have been light for two years past, and it is certain that heavy orders for material must be given out this year. Some good contracts for ships are also expected, to say nothing of the demand for general construction, which is better than for some time past.

There continues to be some activity in the zinc shares, and their prices are all higher. The Velle Montague Company, it is said, has bought a property in England, and it is reported that there is some discussion among the managers as to securing mines in your country; but this seems a little doubtful.

There has been little done in the copper stocks, and they have shown hardly any change in prices. Nickel continues to hold most of its late advance.

The South African market has been rather heavy, and prices are generally lower. There is a good deal of talk among French stockholders as to holding managers responsible for their interference in

politics, but it is not easy to see how it is to be brought about.

There is a good deal of interest shown just now in Russian investments, and several new companies are to be brought out, I understand, besides those which are already dealt in here.

After all foreign politics are the most important element just now, and I fear that they will continue to disturb us for some time to come. AZOTE.

MEETINGS.

Name of Co.	Location of office.	Date.	Time.
Bozeman.....	Bozeman, Mont.....	April 6	7:30 p. m.
Cleveland.....	Walker Bros. Bank Bldg., Salt Lake City, Utah.....	" 11	12 m.
Colo. C. & I. Co.	Pueblo, Colo.....	" 6	" "
Comanche.....	J. F. Forbis, Butte City, Mont.....	" 18	" "
Empire (Zinc)....	Joplin, Mo.....	Mar. 25	9 a. m.
Pulitzer.....	718 Mining Exch'ge, Denver, Colo.....	April 2	2 p. m.
San Pedro.....	53 E. Prospect St., Cleveland, O.....	" 16	" "
Ybarra (Gold)....	132 Market St., San Francisco, Cal.....	" 21	8 p. m.

ASSESSMENTS.

Name of Co.	Loc'n.	No.	Delq.	Sale.	Amt.
Andes.....	Nev.....	42	Mar. 6	Mar. 28	.15
Bay State, M. & D	"	30	" 9	" 28	.02
Belcher.....	"	52	Apr. 7	Apr. 28	.25
Brunswick Con.	Cal.....	10	Mar. 23	" 22	.03
Bulwer Con.....	Nev.....	12	" 11	" 3	.65
California.....	Cal.....	10	" 12	Mar. 31	.02
Con. Cal. & Va.	Nev.....	6	Apr. 8	Apr. 28	.30
Dalton.....	Utah.....	9	Mar. 18	" 4	.01
Gibraltar Con....	Cal.....	3	Feb. 21	Mar. 24	.01
Gold Bar Con....	"	3	Mar. 19	Apr. 10	.05
Golden Sand.....	"	1	" 16	" 7	.01
Lady Emma.....	"	"	Apr. 6	" 27	.15
Leo.....	Mont.....	"	Mar. 18	" 9	.004
Little Pittsburg.	Utah.....	"	" 28	" 8	.01
Live Oak Con....	Cal.....	"	" 9	" 10	.10
Mabelle.....	Ore.....	1	" 2	Mar. 30	.10
Marguerite.....	Cal.....	2	Apr. 1	Apr. 30	.10
Morning Star....	Nev.....	11	Mar. 13	" 14	.004
No. Banner Con.	Cal.....	38	" 31	" 22	.03
Osceola Con.....	"	5	" 14	" 8	.01
Orleans.....	"	1	Jan. 29	Mar. 24	.10
Sierra Nevada....	Nev.....	110	Mar. 7	" 27	.25
Silver King.....	Cal.....	13	" 9	Apr. 6	.25
*Thorpe.....	"	1	Apr. 20	May 15	.05
Wm. Tell Con....	"	14	" 2	Mar. 23	.061

*New assessment.

DIVIDENDS.

NAME OF COMPANY	Current Dividends.		Paid since Jan. 1, 1896.	Total to date.
	Date.	Amount.		
*Etna Con.....	Mar. 1	\$10,000	\$10,000	\$50,000
Alaska-Mexican	"	"	45,200	119,031
Alaska Trendwell	"	"	75,000	2,750,000
Belden, F. E.....	"	"	4,000	221,000
*Boston & Mont.	"	"	300,000	3,725,000
*Bullion Beck & Ch	Mar. 16	15,000	65,000	2,015,000
Calumet & Hecla	" 3	500,000	500,000	43,850,000
*Centennial-Eureka	" 16	30,000	150,000	1,650,000
C. O. D.....	" 2	5,000	5,000	"
Dalton & Lark....	" 15	12,500	12,500	12,500
Dominion Coal....	"	"	600,000	"
Galena.....	Mar. 10	3,000	3,000	18,000
Gold Con.....	Mar. 16	15,000	30,000	45,000
Golden fleece....	"	"	15,000	419,979
Gold & Globe Hill	"	"	15,000	24,375
*Hecla Con.....	"	"	30,000	2,130,000
Highland.....	"	"	25,000	3,109,918
*Homestake.....	Mar. 25	31,250	92,750	5,775,500
Horn Silver.....	"	"	50,000	5,130,000
*Isabella.....	Mar. 25	22,500	45,000	67,500
Le Roi.....	" 3	25,000	25,000	10,000
*Mercur.....	" 20	25,000	75,000	425,000
Minnesota (iron).	Apr. 15	247,500	247,500	2,932,500
*Mont. Ore Pur. Co.	Mar. 20	4,000	120,000	280,000
Moose.....	"	"	6,000	186,000
Napa Con.....	Apr. 1	10,000	30,000	770,000
*Ontario.....	Mar. 31	15,000	45,000	13,220,000
Osceola Con.....	"	"	75,000	2,025,000
Outaouchey.....	Mar.	1,000	1,000	1,000
Portland.....	"	"	65,000	685,000
*Quincy.....	Mar. 20	200,000	40,000	8,070,000
*Silver King.....	" 7	37,500	112,500	562,500
Smuggler-Union..	"	"	500,000	1,640,000
*Utah.....	Mar. 10	2,000	5,000	137,100
*Victor.....	" 13	20,000	60,000	525,000
*Victor M. & L....	"	"	6,000	30,000
Totals.....		\$1,268,750	\$3,815,450	\$102,757,403

* February dividend paid.

This table does not give all the dividends paid by mining companies, as it is impossible to obtain a complete list of dividends declared. Many companies are close corporations and refuse to give the information. Readers of the *Engineering and Mining Journal* will confer a favor on the publishers if they will notify the *Journal* of any errors or omissions in the above table.

STOCK QUOTATIONS.

BOSTON, MASS. Table with columns for Name of Company, Location, Par value, and dates Mar. 11 through Mar. 19. Includes companies like Alouez, Arnold, Atlantic, etc.

NEW YORK. Table with columns for Name of Company, Location, Par value, and dates Mar. 14 through Mar. 20. Includes companies like Alamo, Alice, Alliance, etc.

* Official quotations Boston Stock Exchange. Total sales, 19,479.

* Official quotations Con. Stock & Petroleum Exchanges. Total sales, 27,356.

INDUSTRIAL COAL AND COAL RAILROAD. Table with columns for Name of Company, Par value, and dates Mar. 14 through Mar. 20. Includes companies like Balt. & Ohio, Ches. & Ohio, etc.

* Official quotations N. Y. Stock Exchange. Total shares sold, 103,427.

PITTSBURG, PA. Table with columns for Name of Company, Location, Par value, Bid, Ask, Sell price, and Last price. Includes companies like Nat. Gas, Allegheny, etc.

* Official quotations Pittsburg Stock Exchange.

COLORADO SPRINGS, COLO. Table with columns for Name of Company, Par value, and dates Mar. 9 through Mar. 14. Includes companies like Ajax, Alamo, Am'rican, etc.

* Official quotations and sales Colo. Springs Mfg. Stock Assoc. * Board of Trade Exchange.

ST. LOUIS, MO., STOCKS. Table with columns for Name of Company, Company's Office, Par value, Bid, Asked, and Last Dividend. Includes Central Lead, Con. Coal, etc.

SAN FRANCISCO, CAL. Table with columns for Name of Company, Location, Par value, and dates Mar. 14 through Mar. 20. Includes companies like Alta, Belcher, Best & Belcher, etc.

* Official telegraphic quotations, San Francisco Stock Exchange.

BALTIMORE, MD. Table with columns for Name of Company, Location, Par value, Bid, Ask, and Last price. Includes Balt. M. & S. N. C., Conrad Hill, etc.

* Official quotations Baltimore Stock Exchange.

MISCELLANEOUS SECURITIES. Table with columns for Name of Company, Location, Par value, Bid, Ask, and Last price. Includes American Coal, Catecaugay Ore & Iron, etc.

LONDON. March 7.

Table with columns: NAME OF COMPANY, Country, Product, Capital stock, Par value, Last dividend, Quotations (Buyers, Sellers). Includes companies like Americans, Alaska-Mexican, De Lamar, etc.

DENVER, COLO.

Table with columns: NAME OF COMPANY, Par, Mar. 9, Mar. 10, Mar. 11, Mar. 12, Mar. 13, Mar. 14, Sales. Includes companies like Addie C., Agate, Alamo, Amity, etc.

PARIS. Week ending March 6.

Table with columns: NAME OF COMPANY, Country, Product, Capital Stock, Par value, Divs. last year, Op'ning, Closing. Includes companies like Acieries de Creusot, Pirming, Pives-Lille, etc.

PHILADELPHIA, PA.*

Table with columns: NAME OF COMPANY, Location, Par Value, March 12, March 13, March 14, March 15, March 16, March 17, March 18, Sales. Includes companies like Acety. L.H. & P., Bethlehem Ir., Cambria Iron, etc.

MEXICO. Week ending Mar. 12.

Table with columns: NAME OF COMPANY, State, No. of shares, Last dividend, Last assessment, Opening, Closing. Includes companies like Amistad y Concordia, Agustinas, Arvalo y Anexas, etc.

SALT LAKE CITY, UTAH.* Week ending Mar. 11.

Table with columns: Name of Company, Par value, Bid, Asked, Actual selling price, Name of Company, Par value, Bid, Asked, Actual selling price. Includes companies like Ajax, Amer. Nat. Gas, Anchor, Bogan, etc.

VALPARAISO, CHILE.* Week ending Feb. 1.

Table with columns: NAME OF COMPANY, Capital, Share value, Last dividend, Prices (Bid, Asked, Last sale). Includes companies like Arturo Prat, Caracoles, Descub. de Huantajaya, etc.

ASPEN, COLO.* Week ending Feb. 12.

Table with columns: NAME OF COMPANY, Location, Par value, Bid, Asked, Sales, Price. Includes companies like Alta Argent., Argentin-Juniata, Aspen Contact, etc.

HELENA, MONT.* Week ending Mar. 7.

Table with columns: NAME OF COMPANY, Location, Company's office, Par value, Bid, Asked, Shares sold, Price, Date. Includes companies like Am. Dev. & M. Co., Bald Butte, Bi-Metallic, etc.

DULUTH, MINN.* Week ending Mar. 14.

Table with columns: NAME OF COMPANY, Location, Company's office, Par value, Bid, Asked. Includes companies like Adams Iron, Biwabik Mt. Iron, Lake Superior Con., etc.

NOTE.—In most Mexican mining companies the shares have no fixed par value. The capital is formed of a certain number of shares, the total value not being named. Prices are in Mexican dollars.

* Special Report of Jackson Bros. Values are in Chilean pesos or dollars.

* Special Report of J. P. Bissett & Co. The prices quoted are in Shanghai taels.

* All the companies are located in Colorado. Total shares sold: list: 7,605; unlisted, 1,515,700.

Official quotations Philadelphia Stock Exchange. Total sales, 2,576.

* Special Report of J. F. MacMillan. Total sales, 97,600.

* Special Report of Samuel K. Davis. Total shares sold, 8,200.

* Special Report of S. E. Smith.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last), Dividends (Total Paid, Date and Amount of Last), and Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount 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 \$42,390,000.

Note.—Corrections to this table are made monthly. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.

CLASSIFIED LIST OF ADVERTISERS.

Air Compressors and Rock Drills
 Bostelmann, Louis F.
 Bullock, M. C., Mfg. Co.
 Burlington Rock Drill Co.
 Clayton Air Compressor Works.
 Fraser & Chalmers.
 Ingersoll-Sergeant Drill Co.
 (See Diamond Drills)
Aluminum Bronze
 Fairbanks Co.
Amalgamators
 Bucyrus Steam Shovel & Dredge Co.
 Fraser & Chalmers.
Amalgam Plates
 Western Plating and Mfg. Co.
Anti-Friction Metals
 Besley, Chas. H., & Co.
 Chester Steel Cast. Co.
Architects and Builders
 Berlin Iron Bridge Co.
 Pittsburg Bridge Co.
 Pollock, Wm. B. & Co.
Assayers' and Chemists' Supplies
 Alnoworth, Wm.
 Baker & Adamson.
 Baker & Co.
 Becker, Christian.
 Bullock & Crenshaw.
 Denver Fire Clay Co.
 Eimer & Amend.
 Henry Hill Chem. Co.
 Lantz, John B.
 Lindley & Fitzpatrick.
 McCoy & Houlahan.
 McIntyre, W. D., & Co.
 Miller, J. W., & Co.
 Morath Investment Co.
 Parsons & Stover.
 Partridge & Stover.
 Peek, Frank G.
 Prentice, Russell.
 Proudfit, J. W., & Co.
 Smith, C. H.
 Riley, J. W.
 Sneider, E. C.
 Sill & Sill.
 Sism, Beers & Co.
 Snow, E. P.
 Sprague, J. A.
 State Trust Co.
 Van Deusen & Waterman.
 Walters, Marshall & Co.
 Waudel, H. V.
 Weyand Bros.
 White, Samuel.
 Williamson, W. W.
 Woods Investment Co.
 Wyoming Mfg. Bureau.
 Mayer, Andrew.
 J. Terry Mfg. Co.
 Link Belt Machinery Co.
 Mfg. Co.
 New York Belting & Packing Co., Ltd.
Belt Lacing
 Bristol Co.
Blasting Caps
 Metallic Cap Mfg. Co.
Blasting Batteries
 Climax Fuse Co.
 Lau, J. H., & Co.
Pressure Blowers
 Connorsville Blower Co.
Boilers
 Denver Eng. Wks. Co.
 Enterprise Boiler Co.
 Fraser & Chalmers.
 Philadelphia Eng. Wks., Ltd.
Brattice Cloth
 Besley, Chas. H. & Co.
Brewers
 Pabst Brewing Co.
Brick Machinery
 Fresno, E. H., & Co.
Bridges
 Berlin Bridge Co.
 Pittsburg Bridge Co.
Buckets
 Scaife, Wm. B. & Sons. (See Machinery.)
Carbons
 Bishop, Victor, & Co.
 Bostelmann, Louis F.
 Lexow, Theodore.
Chain and Link Belting (See Belting.)
Chemicals
 Baker & Adamson.
 Bullock & Crenshaw.
 Eimer & Amend.
 Henry Hill Chem. Co.
Coal
 Berwind-White Coal Mfg. Co.
Castner & Curran
 Consolidation Coal Co.
Coal Cutters
 Ingersoll-Sergeant Drill Co.
 Jeffrey Mfg. Co.
 Leyner, J. Geo. (See Machinery.)
 Link Belt Machinery Co.
Compressors
 Clayton Air Compressor Works.
 Norwalk Iron Works Co.
Concentrators, Crushers, Pulverizers, Separators, Etc.
 Allis, Ed. P., & Co.
 Beckett Foundry & Machine Co.
 Blace, Theo. A.
 Boston Ore Machinery Co.
 Bradley Pulverizer Co.
 Colorado Iron Works.
 Denver Eng. Works Co.
 Englebach Mach. Mfg. Co.
 Fraser & Chalmers.
 Frue Vanner Concentrator.
 Handrie & Bothhoff Mfg. Co.
 Joplin Mach. Co.
 Krom, S. H.
 Krupp, F.
 Link Belt Machinery Co.
 McCully, R.
 Scoville, H., & Co.
 Stedman Foundry & Mach. Co.
 Walburn-Svenson Mfg. Co. (See Machinery.)
Contractors
 (See Machinery.)

Copper Dealers and Producers.
 American Metal Co.
 Arizona Copper Co.
 Atlantic Mining Co.
 Balbach S. & Ref. Co.
 Baltimore Cop. Wks.
 Bath, H., & Son.
 Boston & Mont M Co.
 Bridgeport Copper Co.
 Butte & Boston M. Co.
 Canadian Copper Co.
 Copper Queen Mfg. Co.
 Detroit Cop. Mfg. Co.
 Elliott's Metal Co., Ltd.
Corrugated Iron
 Berlin Iron Bridge Co.
 Scaife, Wm. B. & Sons.
Crucibles, Graphite, Etc.
 Denver Fire Clay Co.
 Dixon, Jos. Crucible Co.
Dumper Regulators
 D'Este & Seelye.
Cyanide
 Roessler & Hasselacher Chemical Co.
Diamonds
 Bishop, Victor, & Co.
 Bostelmann, L. F.
 Lexow, Theodore.
Diamond Drills
 Bishop, Victor, & Co.
 Bostelmann, L. F.
 Bullock Mfg. Co., M.C.
 Denver Fire Clay Co.
 Sullivan Machinery Co.
 (See Air Compressors and Rock Drills.)
Draughtmen
 Young, Wm. R.
Drawing Materials
 Besley, Chas. H., & Co.
 Dietzen, S., & Co.
 (See Engineering Instruments.)
Dredges
 Bucyrus Steam Shovel & Dredge Co.
 Marion Steam Shovel Co.
 Southern & Co.
Dryers
 Brown, Horace T.
 Hummer, F. D. & Son Co.
 Denver Eng. Wks. Co.
Dump Cars
 Denver Eng. Works Co.
 Hendrie & Bothhoff Mfg. Co.
Educational Institutions
 Arizona School of Mines.
 Columbian University.
 Chicago School of Assaying.
 Correspondence School of Mines.
 Lehigh University.
 Mass. Inst. of Technology.
 Michigan Mining School.
 Royal Mining Academy.
Electrical Batteries
 Macbeth, James, & Co.
Electrical Machinery and Supplies
 Besley, Chas. H. & Co.
 Card Electric Co.
 Denver Eng. Wks. Co.
 General Electric Co.
 Jeffrey Mfg. Co.
Elevators, Conveyors and Hoisting Machines
 Brown & Holst & Conv. Mach. Co.
 Caldwell, H. W., & Co.
 California Wire Wks.
 Cooper, Hewitt & Co.
 Crook, W. A., & Sons.
 Denver Eng. Wks. Co.
 Field & Goetzman.
 (See Wire Rope Tramway and Machinery.)
Emery Wheels
 Besley, Chas. H. & Co.
 New York Belting & Packing Co., Ltd.
Engineers, Chemists, Metallurgists
 See Directory Pages 4, 5 and 6.
Engineers' Instruments and Supplies
 Heer, Peter.
 Mahn & Co.
 Seelig & Kandler.
 Umbach, T. F.
 Radion Iron Works.
 Racine Hardware Co.
 Stillwell-Bierce & Smith-Valle Co.
 Tod, William & Co.
 Union Iron Works.
 Webster, Camp & Lane Mach. Co.
Explosives
 Ingersoll-Sergeant Drill Co.
 Southern & Co.
 Vulcan Iron Works.
Fire-brick and Clay
 Chur, A. T.
 Denver Fire Clay Co.
Furnaces
 Brown, Horace.
 Roskins, Wm. (See Machinery.)
Fuses, Powder
 Ingersoll-Sergeant Drill Co.
Fuse, Safety
 Climax Fuse Co.
Gas Engines
 Davy Gas Engine & Mfg. Co.
 Norman, J. J., & Co.
Gas Works
 Pollock, Wm. B. & Co.
 Wood, R. D., & Co.
Gauges, Recording, Etc.
 Bristol Mfg. Co.
Gearing
 Besley, Chas. H., & Co.
 Chester Steel Cast. Co.
 (See Machinery.)
Grease, Graphite
 Besley, Chas. H. & Co.
Harveyized Steel
 Pierce & Miller Engineering Co.
Heavy Machinery
 Denver Eng. Works Co.
 Fraser & Chalmers.
House, Rubber, Etc.
 New York Belting & Packing Co., Ltd.
Injectors
 Penberthy Injector Co.
Insulating Wires and Cables
 Okonite Co., Ltd. The
Insurance Companies
 Hartford Steam Boiler Inspect'n and Ins. Co.
 Mutual Life Insurance Co.
Joint Bearings
 Tight Joint Co.
Lead Linings for Chlorination Tubs
 Raymond Lead Co.

Locomotives
 General Electric Co.
 Hunt, C. W. Co.
 Porter, H. E., & Co.
Machinery, Milling and Other Machinery
 Allis, Edw. P., & Co.
 Bacon, E. C.
 B'ckett Fdy. & Mch. Co.
 Besley, Chas. H., & Co.
 Bunker, T. A.
 Bostelmann, L. F.
 Boston Ore Mach'y Co.
 Bradley Pulverizer Co.
 Buckeye Engine Co.
 Caldwell, H. W., & Co.
 Card Electric Co.
 Card'ner, Geo. B., & Co.
 Channon, H. Co.
 Colorado Iron Works.
 Connorsville Blower Co.
 Crandall & Huff.
 Crook, W. A., & Sons.
 Davis-Colby Ore R. Co.
 Denver Eng. Wks. Co.
 Elliott, Wm., & Son.
 Englebach Mfg. Co.
 Field & Goetzman.
 Frazer & Chalmers.
 Hammond, Mfg. Co.
 Hendrie & Bothhoff Mfg. Co.
 Ingersoll-Sergeant Drill Co.
 Jeffrey Mfg. Co.
Machinery Steel
 Taylor Iron & Steel Co.
Metal Dealers
 American Metal Co.
 Am. Zinc-Lead Co.
 Baker & Co.
 Bath, Henry & Son.
 Besley, Chas. H. & Co.
 Bridgeport Copper Co.
 Elliott's Metal Co., Ltd.
 Eureka Co.
 Wilson.
 James & Shakspeare
 Johnson, Matthey & Co.
 Lambert's Wharf Co.
 Lawson Bros.
Metallurgical Works and Ore Processing
 Amer. Zinc Lead Co.
 Baker & Co.
 Balbach Sm. & Ref. Co.
 Bridgeport Copper Co.
 Canadian Copper Co.
 Denver Eng. Wks. Co.
 Elliott's Metal Co., Ltd.
 Foster, Blackett & Wilson.
 Fraser & Chalmers.
 General Gold Extraction Co.
 Mattiessen & Hegeleir Co.
Mine Cars
 Crandall & Huff.
 Denver Eng. Wks. Co.
 Hendrie & Bothhoff Mfg. Co.
 Hunt, C. W., Co.
 Sheffield Car Co.
 (See Machinery.)
Mine, Mill and Smelters Supplies
 Carpenter, Geo. B. & Co.
 Crandall & Huff.
 Denver Eng. Wks. Co.
 Gates Iron Works.
 Park'nt & Wilkinson.
 Roessler & Hasselacher Chemical Co.
 Stieren, William E.
Mining and Lumber Companies
 Atlantic Mfg. Co.
 Arizona Copper Co.
 Boston & Mont. Mfg. Co.
 Butte & Boston Mfg. Co.
 Clark Land & Mines Co.
 Copper Queen Mfg. Co.
 Nickel Canadian Copper Co.
Ore Hoisters
 Brown, Horace T.
 Cummer, F. D., & Sons Co.
 Davis-Colby Ore Roaster Co.
Ore Testing Works
 Hunt, F. F.
 Leouox & Co.
 Montana Ore Purchasing Co.
 Newark Pulv'g Wks.
 Orford Copper Co.
 Pennsylvania Salt Mfg. Co.
 Ricketts & Banks.
 Stillwell-Bierce & Smith-Valle Co.
 State Ore Sampling Co.
 Walburn-Svenson Mfg. Co.
Packing and Pipe Coverings
 Brandt, Randolph.
 Jenkins Bros.
Perforated Metals
 Aitchison, R., Perf. Metal Co.
 Fraser & Chalmers.
 Harrington & King Perforating Co.
Phosphor-Bronze Smelting Co.
Pile Drivers
 Bucyrus Steam Shovel and Dredge Co.
 Ingersoll-Sergeant Drill Co.
Pipes
 Pollock, Wm. B., & Co. | Wyckoff, A., & Sons,
 Baker & Co.
 Johnson, Matthey & Co.
Powder
 Atlantic Dynamite Co.
 Cannon Powder Co.
 Ingersoll-Sergeant Drill Co.
Pressure Blowers
 Connorsville Blower Co.
Pressure Regulators
 D'Este & Seelye. (Curtis.)
Pulverizers
 American Fertilizer.
 Atlas & Explosives.
 Australian Mfg. Stand.
 Bullionist.
 Colliery Guardian.
 Denver Republican.
 Economic Mining.
 El Minero Mexicano.
 Electrical Engineer.
 Electrical Industry.
 Financial Times.
 Indian Engineer.
 Pumps Works.
 Denver Eng. Wks. Co.
 Fraser & Chalmers.
 Gouids Mfg. Co.
 Hooker Steam Pump Works.
 Jeannette Iron Wks.
 Stillwell-Bierce & Smith-Valle Co.
 Tod, Wm., & Co.
 Worthington, Henry

Quarrying Machines
 Bostelmann, L. F.
 Ingersoll-Sergeant Drill Co.
 Rand Drill Co.
 Sullivan Machinery Co.
Quicksilver
 Eureka Co.
Railroads
 C. B. & Quincy R. R.
 Denver & Rio Grande R. R.
 Denver, Leadville & Gunnison Ry.
 Florence & Cripple Creek R. R.
 Midland R. R. of Kentucky.
 Rio Grande Southern R. R.
 U. P., D. & G. R. R.
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 Crandall & Huff.
 Fairbanks Co.
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 Mathison Smelting Co.
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 Pennsylvania Salt Mfg. Co.
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 D'Este & Seelye. (Curtis.)
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 Carpenter Steel Co.
 Chester Steel Cast. Co.
 Crombie Steels Works.
 Crandall & Huff.
 Gracian Steel Co.
 Gurnea, S. A., Fdy. Co.
 Ingersoll-Sergeant Drill Co.
 Joplin Mach. Co.
 Pierce & Miller Eng'g & Refining Co.
 Robinson & Orr.
 (See Metal Dealers.)
 Pollock, Wm. B. & Co.
 Scaife, Wm. B. & Sons.
 Taylor Iron & Steel Co.
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 Denver Eng. Wks. Co.
 Gates Iron Works.
 Jessop Wm. & Sons Ltd.
 Walker Mfg. Co.
 Williams Mfg. Co.
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 Okonite Co., Ltd., The.
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 D'Este & Seelye. (Curtis.)
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 Fairbanks Co.
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 Pratt & Whitney Co.
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 Eddy Valve Co.
 Fairbanks Co.
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 Fraser & Chalmers.
Vulcanite Emery Wheels
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 Sullivan Machinery Co.
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 Harrington & King Perforating Co.
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 Broderick & Hascam.
 Rope Co.
 California Wire Wks.
 Carpenter, G. B., & Co.
 Chester Steel Co.
 Channon, H. Co.
 Cooper Hewitt & Co.
 Hunt, C. W. Co.
 Leschen, A., & Sons.
 Rope Co.
 Phelps, Dodge & Co.
 R'bling, J. A. Sons & Co.
 Roneways Syndicate.
 Trenton Iron Co.
Wire Rope Tramway
 Brown, Holst & Conv. Machine Co.
 California Wire Wks.
 Colorado Iron Works.
 Denver Eng. Wks. Co.
 Fraser & Chalmers.
 Hunt, C. W. Co.
 Roebing, J. A., Son & Co.
 Roneways Synd. It.
 Vulcan Iron Works.

POSITIONS VACANT.

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.

1439 WANTED - A PRACTICAL MECHANIC, to have charge of large twisting and compressing machinery, and also supervise machine shop, at an iron ore mine in Michigan. Must be a draftsman. Address A., ENGINEERING AND MINING JOURNAL.

1440 WANTED - GRADUATE OF TECHNICAL school as assayer and assistant to the manager of gold mine in Oregon. No practical knowledge required. Salary to start with, \$75 a month; will increase soon if services are satisfactory. Address R. L., ENGINEERING AND MINING JOURNAL.

1441 WANTED - ASSAYER AND METALLURGICAL chemist wanted as assistant in private assay laboratory in Chicago; must be able to give instruction to students in such branches and make himself generally useful. Really competent men only need answer. Give full details as to age, experience, ability and salary expected, which must be moderate. Address ASSISTANT, ENGINEERING AND MINING JOURNAL.

1442 WANTED - A MAN THOROUGHLY familiar with brass and copper sheet rolling, and capable of making a detailed report upon the same. Address SHEET BRASS, ENGINEERING AND MINING JOURNAL.

1443 WANTED - A CHEMIST, PRACTICALLY familiar with the manufacture of fine medicinal chemicals. One who has been, or is employed in one of the large plants of this sort, preferred. A good opportunity for a young man to show his ability. Address Z., ENGINEERING AND MINING JOURNAL.

1444 WANTED - YOUNG MAN, GRADUATE in chemistry, possessing high-grade technical ability and originality, for position in new electro-chemical industry. One residing in or near New York City preferred. Give references and particulars. Address ELECTRO-CHEMISTRY, ENGINEERING AND MINING JOURNAL.

1447 - WANTED - FOR A GOLD MINE in Georgia, competent assistant foreman; also nine miners experienced in the use of power drills as head men; chance for family without children to take charge of boarding house for 40 men; references required - state wages expected for steady work. Address GOLD STAR, ENGINEERING AND MINING JOURNAL.

SITUATIONS WANTED.

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

GRADUATE MINING ENGINEER (AGE 29) well grounded also in mechanical and civil engineering branches and experienced in connection with extensive mining operations, desires engagement as manager, assistant manager or superintendent, with mining company or other suitable employment. Has had commercial experience and is familiar with reliable systems of mine accounting and with general business routine. Excellent references. Address, S. B., ENGINEERING AND MINING JOURNAL. No. 17,372, March 28.

A COMPETENT COPPER REFINER WANTS position as foreman. Thoroughly understands reverberatory furnace work. Good references. Address COPPER REFINER, ENGINEERING AND MINING JOURNAL. No. 17,373, March 28.

A COMPETENT ASSAYER DESIRES POSITION, after April 1, either in the United States, Mexico or South America. At present with the largest smelter in the East. Address H., ENGINEERING AND MINING JOURNAL. No. 17,376, April 4.

MINING ENGINEER - GRADUATED FROM Columbia School of Mines, would like position of assistant to superintendent, in charge of mines or reduction works. Address L. H. B., ENGINEERING AND MINING JOURNAL. No. 17,377, April 18.

EXPERIENCED COPPER METALLURGIST is open for engagement. Economic manager, and well posted in all latest improvements. Speaks Spanish fluently and would go to Mexico. Best references. Address COBRE, ENGINEERING AND MINING JOURNAL. No. 17,380, April 18.

Contracts Open.

WATER-WORKS AND ELECTRIC LIGHT Plant. - Sealed bids will be received by the undersigned up to April 2d, 1896, for the erection or construction of a combined system of water-works and electric lights for the city of Dublin, Ga., in accordance with the survey and plans now in the hands of the City Clerk of Dublin. Specifications and drawings will be furnished bidders at a cost of (\$1) one dollar each. Work to commence on said plants by May 1st, and must be completed by September 1st, 1896. For further particulars apply to the chairman or to Jno. D. Prince, N. B. BAUM, Chairman.

WATER-WORKS. - Sealed proposals will be received until March 31st, 1896, addressed to the Secretary of Water-Works Committee, Columbus, Columbia County, Wis., for furnishing all material and labor to complete a system of water-works. The work includes approximately 4,650 lin. ft. of 10-in. pipe, 12,600 lin. ft. of 6-in. pipe, 3,650 lin. ft. of 4-in. pipe, 7 1/2 tons of special castings, two (2) compound pumps and boilers, one brick pumping station and chimney, one brick tower and steel tank, one 19 x 30 ft. well, 32 fire hydrants, 18 gate valves. Each bid to be accompanied by a certified check for the sum of five hundred (\$500) dollars, made payable to the City Treasurer. Specifications can be obtained of and plans be seen at the office of H. R. COOK, Columbus, Wis.

WATER-WORKS AND ELECTRIC LIGHT Plant. - Sealed bids will be received by the undersigned up to April 2d, 1896, for the erection or construction of a combined system of water-works and electric lights for the City of Dublin, Ga., in accordance with the survey and plans now in the hands of the City Clerk of Dublin. Specifications and drawings will be furnished bidders at a cost of one dollar (\$1) each. Work to commence on said plants by May 1st, and must be completed by September 1st, 1896. For further particulars, apply to N. B. BAUM, Chairman, or to Jno. D. Prince.

PIPE SEWERS. - Sealed proposals will be received by the Mayor and City Council of Eufaula, Ala., until April 23, 1896, for constructing pipe sewers and for furnishing sewer pipe (separate bids). Extent of proposed work is 7 1/2 miles of pipe sewers from six (6) to eighteen (18) inches in diameter. Plans and specifications will be on file at the office of the City Clerk, and copies of specifications, forms, etc., may be obtained from the City Clerk, after March 20, 1896.

GRADING. - On April 1st, at our office in Lima, O., we will let 45 miles of grading on the Lima Northern Railway, between Napoleon, O., and Adrain, Mich. W. B. STRANG, JR., & CO.

MARBLE WORK AND METAL WORK. - Office of Building for Library of Congress, Washington, D. C. Separate sealed proposals will be received at this office until the 7th day of April, 1896, and opened immediately thereafter in presence of bidders, for furnishing and delivering the following materials and work, namely: 1. Marble floor tiling for the two West courts; 2. Mosaic floors for Main Stair Hall and three corner Pavilions; 3. Marble and Granite floor for south court; 4. Miscellaneous woodwork; 5. Bronze and iron park lamp-posts and lamps. Specifications, general instructions and conditions, and blank forms of proposal may be obtained on application to this office. BENJAMIN R. GREEN, Supt. and Engineer.

STONE. - U. S. ENGINEER OFFICE, CINCINNATI, O. - Sealed proposals for furnishing and delivering about 7,612 cu. yds. of stone for Lock No. 7, Kentucky River, near High Bridge, Ky., will be received here until April 1st, 1896, and then publicly opened. Information furnished on application. JAMES F. GREGORY, Maj. Engrs.

DREDGE. - PROPOSALS FOR HYDRAULIC Dredge, Mississippi River Commission, 2732 Pine st., St. Louis, Mo. - Sealed proposals, in triplicate, for a hydraulic dredge will be received here until April 3d, 1896, and then publicly opened. Information furnished on application. H. E. WATERMAN, Capt. Engrs., Secretary.

WATER-WORKS. - Sealed proposals will be received by the Mayor and City Council of Eufaula, Ala., until April 23d, 1896, for constructing a system of water-works, and for furnishing the materials for the same. Works will embrace approximately 10 1/2 miles of pipe, stand-pipe, and other appurtenances. Plans and specifications will be on file, and may be seen at the office of the City Clerk, and copies of specifications, forms, etc., may be obtained from the City Clerk after March 20th, 1896.

WATER-WORKS. - Sealed proposals for furnishing and laying 10 1/4 miles of cast iron pipe, specials and gates, sizes 4 in. to 12 in., will be received by the Board of Water Commissioners of the Village of Nyack, at their office at Nyack, N. Y., until April 8th, 1896. Proposals will be received for material and labor separately, or material and labor combined. Specifications may be obtained and plans seen at the office of the Commissioners, at Nyack, N. Y., after March 20th, 1896. A bond of \$10,000 with sureties will be required from the contractor, and a certified check for \$500 must be deposited with proposal.

CEMENT. - U. S. Engineer office, Mobile, Ala. - Sealed proposals for furnishing hydraulic cement, gravel or crushed stone or broken stone and sand at McGrews Shoals Landing, Tombigbee River, Ala., will be received here until April 9th, 1896. Information furnished on application. WM. T. ROSELL, Major, Engineers.

CEMENT. - U. S. Engineer Office, Cincinnati, O. - Sealed proposals for furnishing and delivering about 4,000 barrels American Natural Cement for improving Kentucky River near High Bridge, Ky., will be received here until April 2d, 1896. Information furnished on application. JAMES F. GREGORY, Maj. Engrs.

CONCRETE. - U. S. Engineer Office, 1428 Arch St., Philadelphia, Pa. - Sealed proposals for furnishing and delivering cement, broken stone and sand at Finn's Point, N. J., will be received here until April 9th, 1896. Information furnished on application. C. W. RAYMOND, Maj., Engrs.

BRIDGE. - Bids will be received at my office in Hawkinsville, Ga., until May 6th, 1896, for furnishing material and placing iron or steel viaducts to west side approaches to river bridge, at Hawkinsville, in lieu of present wooden structure. Total length of said approaches is about four hundred (400) feet. Bids are asked on two hundred (200) feet of same, with privilege of whole length. The right to reject any or all bids is reserved. For further particulars address me, at Hawkinsville, Ga., P. T. McGRIF, Ordinary, Pulaski County, Ga.

BRIDGE AND STONE. - Sealed proposals will be received by the city of Lima, Ohio, at the office of the City Clerk, until April 2d, 1896, and opened immediately thereafter, for the construction of a steel bridge and the necessary stone abutments therefor, over the Ottawa River, on east Market street in said city of Lima, Ohio, and for removing the present old bridge from said location, and erecting the same in place complete, upon abutments furnished by the city, at the side of the West street crossing of said Ottawa River. The superstructure shall consist of, viz.: One span, 80 ft. clear length. One roadway, 40 ft. clear width. Two sidewalks, each 8 ft. clear width. Capacity of roadway and sidewalks, exclusive of dead load, shall be 100 lbs. per square foot. Factor of safety, 4 to 6. Proposals for the stone work shall be made for both No. 1 Piqua bridge stone, and for first-class sandstone masonry, and the price per cubic yard shall include all material and labor necessary to the completion of same including the tearing down of the present old abutments and storing the stone at the bridge site for the use of the city of Lima, and the performance of all excavation. The stone masonry shall be completed on or before the 10th day of June, 1896, and the superstructure shall be completed within fifteen (15) days thereafter. Plans and specifications may be had on application to the undersigned. The city reserves the right to reject any or all bids. R. H. GAMBLE, City Civil Engineer.

STONE. - U. S. Engineer Office, Cincinnati, O. - Sealed proposals for furnishing and delivering about 7,612 cu. yds. of stone for Lock No. 7, Kentucky River, near High Bridge, Ky., will be received here until April 1st, 1896. Information furnished on application. JAMES F. GREGORY, Maj. Engrs.

MATERIALS FOR CONCRETE. - U. S. Engineer Office, 1428 Arch street, Philadelphia, Pa. - Sealed proposals for furnishing and delivering cement, broken stone and sand at Finn's Point, N. J., will be received here until April 9th, 1896. Information furnished on application. C. W. RAYMOND, Maj. Engrs.

CEMENT. - U. S. Engineer Office, Cincinnati, O. - Sealed proposals for furnishing and delivering about 4,000 bbls. American Natural Cement for improving Kentucky River near High Bridge, Ky., will be received here until April 2d, 1896. Information furnished on application. JAMES F. GREGORY, Maj. Engrs.

BRIDGE. - Bids will be received at my office in Hawkinsville, Ga., until the 6th day of May, 1896, for furnishing material and placing iron or steel viaducts to west side approaches to river bridge, at Hawkinsville, in lieu of present wooden structure. Total length of said approaches is about four hundred (400) feet. Bids are asked on two hundred (200) feet of same, with privilege of whole length. The right to reject any or all bids is reserved. For further particulars address me, at Hawkinsville, Ga., P. T. McGRIF, Ordinary, Polaski County, Ga.

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Transfer books will close in New York City on Thursday, March 26th, 1896, at 3 o'clock P. M., and at San Francisco on Saturday, April 4th, 1896, at 12 o'clock M.

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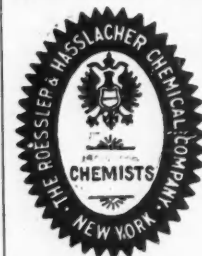
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