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The Dunbar Furnace Company, which owns and is operating a block of Semet-Solvay coke ovens at Dunbar, Pa., is preparing plans for a large electric power plant, to be run by the surplus gas from the ovens. The plant will be able to supply more power than the company needs for its own work, and it proposes to furnish power to others at a reasonable rate. It is not stated whether all the gas is to be used to generate steam, or whether a part of the plant is to be run by gas engines. The latter plan would certainly be worth a trial. There is certainly no reason why any coke plant properly conducted should not utilize the surplus gases in this or similar ways.

India continues to buy silver on a large scale, notwithstanding the limitations enforced by a year of bad crops and famine in certain districts. The shipments from London to the British East Indies for the eleven months ending with November are officially given at £6,017,165 this year, against £4,529,624 in 1896, showing an increase of 32.8 per cent.; and at the lower prices of the metal which have prevailed this year the increase in the actual quantity of silver must have been 40 per cent. at least.

On the other hand, the shipments from London to China this year have been only £401,597, or £358,054 less than in 1896. This has been partly made up by larger exports from San Francisco directly, and by shipments from Australia. Nearly all the silver from the Broken Hill mines now goes to China instead of London.

In the *Engineering and Mining Journal* for December 11th we referred at some length to the operations of the Brice plant in Chicago, which was to turn antimony into gold, but which has, up to date, furnished none of the precious metal. According to advices from Salt Lake City, affairs are equally in a muddle in Utah, where the antimony ore is being mined. It seems that the miners have not been paid for their work of two months, nor have the men who hauled the ore to the railroad. Another point, which gives additional emphasis to the nature of Mr. Brice's operations, is the exaggerated statement of the amount of antimony ore that has been consigned to the National Metallurgical Company, at Chicago. Utah has supplied all these products, as told in the newspapers, and the number of carloads given in some of these accounts, apparently with the authority of the company, varies from 15 upward. On December 17th three cars all told had been shipped, as reported to us by the Rio Grande Western Railroad, over which all this ore is forwarded; two in November and the last, 10 days ago. Thus it seems to be a clumsy lie all through. It is well this latest gold-making bubble has burst so soon, and it is to be hoped no more gullible people will chase after the worthless shares of the company, which, according to some Chicago papers, sold recently at several times their par value. This, however, is extremely doubtful.

Mr. A. M. Beam.

We have received a long, rambling and somewhat incoherent letter in reply to the demonstration of Mr. Beam's ignorance or worse than ignorance which was republished in the *Engineering and Mining Journal* December 4th, 1897.

Mr. Beam has remained silent for more than nine years under this demonstration and even now he does not deny that statement of facts, but apparently desires to obscure these by pretending that scientific men and educated metallurgists are opposed to progress and claiming, by inference, that it is to the charlatans and humbugs that the art owes its development.

The *Engineering and Mining Journal* is always ready to encourage everything that honestly promises to improve our art, which, though infinitely better than that of even 50 years ago, is still in its infancy. When honest men claim that they can extract large amounts of gold from rock in which the chemist's art cannot find any we think they are deceived and had better investigate again, but when such claims are made by men who have been proved to be dishonest on other similar occasions we do not consider their statements of any value, and though it may be possible that they can in some new or old way extract gold from ores that contain it, as others do, all their claims should be certified to by reputable experts before they can be considered worthy of attention.

If Mr. Beam will have one or more competent and reputable metallurgists examine his process and send us a description of the same, for which these experts make themselves responsible, we will gladly publish and comment upon the same, but we should consider it worse than a waste of space to publish any claims made upon the authority of Mr. Beam himself.

Lake Superior Traffic in 1897.

We have frequently referred to the extent and value of the traffic on the great lakes; and we have now the official statement of the business passing through the Sault Ste. Marie Canal to and from Lake Su-

terior up to December 1st, which is practically the close of navigation. The amount of this business is largely dependent upon the iron and copper mines of the Lake Superior region, but it does not include the whole Lake traffic, since the very large grain and ore freights from ports on Lake Michigan do not pass the Sault. The full measure is given only by the number of vessels recorded at Detroit, which has not yet been reported for the season.

The following table shows the total tonnage of freight passed through the Sault Ste. Marie Canal for three years, in net tons of 2,000 pounds:

	1895		1896		1897	
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.
Westbound.....	2,931,646	20.1	3,475,792	21.6	3,175,879	17.9
Eastbound.....	11,075,453	79.9	12,621,088	78.4	14,609,573	82.1
Totals.....	14,610,099	100.0	16,097,880	100.0	17,785,452	100.0

The season just closed has therefore shown an increase over 1896 of 1,687,572 tons, or 10.5 per cent. It is to be noted, however, as showing the increase in size of lake carriers, that the number of vessels reported, 16,862 this year, was less by 1,583 than in 1896. The average cargo increased from 873 to 1,055 tons, a remarkable gain.

The increased proportion of eastbound freight this year was in part due to the heavy tonnage of iron ore, and in part also to the lighter movement of coal westward. The shipments of bituminous coal were seriously interfered with by the long strike of the miners, and up to the end of October were far behind those of last year. In the month of November, however, a very large amount was sent forward, the total reaching 648,250 tons, or the largest quantity ever reported in a single month; and these heavy shipments brought the total up to a point only about 8 per cent. below 1896. The shortage of bituminous coal helped the anthracite traffic, and there were some shipments made of what are known as the steam sizes of anthracite, to take the place of bituminous required for immediate consumption.

The very large share which the mineral traffic has in the lake business is shown by the following table, which gives the chief items of that class of freight passing through the canal, also in net tons of 2,000 lbs.:

	1895.	1896.	1897.
Iron ore.....	8,040,558	7,885,469	10,569,965
Copper.....	107,117	116,412	118,670
Pig iron.....	24,481	27,948	13,316
Coal, anthracite.....	445,277	394,210	531,183
" bituminous.....	2,107,894	2,605,172	2,400,533
Salt.....	35,080	33,252	39,963

The mineral freight therefore constituted 76.6 per cent. of the total, the remainder of the eastbound traffic being chiefly grain from Duluth and Superior, while the westbound business was constituted by general merchandise, machinery and the like. Iron ore alone furnished 59.4 per cent. of the total tonnage.

These facts serve once more to show the enormous value of the lake waterways, without which it is safe to say that the iron industry of the United States would never have been able to reach its present commanding position. The future seems to present every prospect for the growth of the lake traffic; and new economies are continually being introduced into its management. Nowhere else in the world are large quantities of freight handled so quickly and at so low a cost.

Light Railroads.

Among the many projects that have been started (on paper) for gaining access to the Klondike and the Alaskan goldfields, it is strange that no attention has been given to the single-rail system. There is nothing new in this idea so far as cheap construction is concerned, but originally, as the rolling stock and locomotives were of necessity light, and depended on vertical adhesion, it was impossible to surmount a steep grade.

The latest development of the single-rail system is well brought out in a paper by Mr. F. J. Rowan, recently read before the Federated Institute of Mining Engineers. The immediate point of this paper was to show that a single rail could be used for the cheap conveyance of coal and other minerals to a point of shipment, in spite of heavy grades, at a small construction cost, with the added advantage of ability to move the whole track at very small expense to another point in the neighborhood, thus avoiding handling, cartage, and re-handling charges when it might become necessary to ship from another point.

The secret of this new development consists entirely in depending on horizontal adhesion in place of vertical, which latter cannot be attained without a weight simply impossible on a one-rail system. Of course our readers are well aware of what has been done by the rack-rail system in this country, notably at Pike's Peak, and abroad in Switzerland, Germany and other countries. It might be necessary in Alaska to supplement the one-rail system with the rack-rail at the steepest part of the summit of whichever pass was selected.

To explain what may be new to some of our readers interested in the subject, the form of construction on which the single rail is carried is a series of A-shaped supports, such as we use in high trestle building or in erecting an aerial wire ropeway. To make these additionally secure

they are made triangular, and the single rail is laid on the apex, with a bearing rail on each side.

The driving power of the locomotive is applied solely by horizontal grip applied by small drivers on each side of the rail, thus precluding speed, and the experience of Mr. Rowan is that a locomotive weighing six tons can take 20 tons of train up an incline of 1 in 10 at a speed of 10 miles an hour. As he states also, an electrical locomotive to do the same work on this system would weigh considerably less.

There is one advantage specially in favor of the adoption of this system of construction in northern latitudes, that in heavy snowdrifts and slides the track is not interfered with provided it is placed high enough, and with proper construction there is ample clearance between the supports to protect them from serious change.

There has been a prejudice against the single-rail system generally, not so much from instability of construction, but from the fear that, the train being carried on a single rail above the ground, it must be unstable and therefore liable to lose its center of gravity, or capsize. The fact is that the center of gravity is proportionately lower than is possible in an ordinary railroad train, and, therefore, there is less tendency to oscillation or probability of derailment.

While an ordinary railroad is preferable in many cases, there are probably a number in which the single rail could be used to advantage in mining countries of mountainous and difficult formation. The removal of the track when a change of line is needed is more difficult and expensive than in the case of a Hunt or a Decauville tramway, and the construction of the locomotive is more complicated than is needed for roads of the type mentioned. The horizontal adhesion plan is an advance, but it still leaves the single rail superior only for special locations; for these it is worthy of study.

The Consolidated Gold Fields of South Africa.

The Consolidated Gold Fields of South Africa, a summary of whose very brief report is given in another column, is one of the many important companies which have sprung up chiefly within the past few years, and which have had their principal development in the Transvaal and Western Australia. They are not mining companies properly, but owners and promoters of mining companies, taking profits not only from actual dividends on their holdings, but also from sales of lands and stocks and generally from promoting organizations. The company in question is not only a large concern, but its operations have a special interest because for three years past it has steadily pursued the policy of dropping its holdings in the older outcrop companies and investing in the deep-level companies and in deep level claims, so that its future prosperity depends almost entirely on the success of those companies which are mining on the extension of the Witwatersrand blanket deposit beyond the limits claimed by the outcrop companies.

The work in this direction has made such an advance that one of the subordinate deep-level companies, the Rose Deep, is just ready to begin milling, while another, the Robinson Deep, has cut the reefs and begun development work, and two more will soon reach the same stage. The actual returns from the few deep-level mines which have reached the producing stage are still limited, and the working of these new mines will be watched with a great deal of interest.

Beyond the bare facts which we have already given, and some additions as to depths of shafts, the report is lacking entirely in details of operations. It gives, in fact, very little information beyond the financial statements, and its stockholders are really in the dark as to the actual condition of their properties. They are told of the extent of the deep-level claims which they control, but there is nothing to show what returns have been made or are to be made, nor what the cost of the work so far done has been. This is not the custom of most English companies, which are obliged by law, and still more by public opinion, to give full information to their stockholders. But the Consolidated Gold Fields seems disposed to follow the bad custom of some American companies, and to withhold all definite information.

It is frequently the case that at an English company meeting more can be learned from the speeches of the chairman and others than from the printed report. Explanations made and answers given to questions put by the shareholders—who usually attend in numbers—will often draw out statements of value and explain doubtful points. At the meeting of the Consolidated Gold Fields, however, very little was given. The chairman confined himself to financial statements and the discussion of mining reforms in the Transvaal. Mr. C. D. Rudd, who is intimately associated with the company's operations, referred to the reduction of mining costs and the increased output of the district. Finally, Mr. John Hays Hammond, who is the company's consulting engineer and chief adviser, simply spoke in glittering generalities about the future of deep level mines. Mr. Hammond may, or may not be right in his assertions that \$2,000,000,000 in gold will be extracted from the deep levels of the Witwatersrand, and that the additional cost of deep mining will be more than offset by possible future economies in working and management;

but he surely ought to have something more definite to tell the shareholders whose investment depends so largely upon his judgment.

The shareholders should insist on knowing more, or they should drop their investment at the earliest opportunity. If secrecy does not mean bad management it means speculative management, which is almost the same.

One thing evident from the report is that the deep-level mines are costing more than the estimates. It is admitted that large advances had to be made during the past year to several of the subsidiary companies; and the nominal profit shown on the books has been divided to the stockholders, not in money, but in the shares of one of those companies. It is evident that the first cost of a deep-level mine and its plant is a more serious affair than had been anticipated, and that larger returns must be realized before any one will undertake to go down the 5,000 ft. which Mr. Hammond anticipates will be reached before long.

Some Lessons of the Engineers' Strike.

The "ultimatum" of the federated employers, presented December 1st to the delegates of the striking engineers of Great Britain, may or may not prove to have been really an ultimatum. In such a struggle there is usually a position back of the last ditch, yet short of complete flight or surrender. But it would be a calamity to both parties if some of the positions now held by the employers should be abandoned. For instance, under the head of Freedom of Employment, they stipulated that every workman should be free to belong to a trade union or not, as he may think fit; that every employer should be free to employ any man, whether he belong or not to a trade union; and that every workman should undertake to work peaceably and harmoniously with all fellow-employees, whether he or they belong to a trade union or not. That sounds like a simple recitation of the alphabet of liberty; but the delegates of the unions, in the address with which they accompanied the submission of the ultimatum to a vote of the members, declare that these propositions, and all the rest, being pervaded with the idea of "individual bargaining between employer and workman," are "diametrically opposed to the first principles of trade unionism."

They regard as particularly obnoxious on this ground the stipulation that every workman should be paid according to his ability, and that no employer shall be restricted in employing any workman at any rate of wages mutually satisfactory to them. To this stipulation, the employers had appended a note, saying that it must be distinctly understood that there was no intention whatever to diminish the rate of wages paid to efficient workmen. They explained further that in most works there are old or partially disabled or ineffective men, who can, nevertheless, be used on work which they can do, and at wages which they can earn. The requirement that all workmen shall receive a given minimum wage, whether they can earn it or not, simply presses the discharge of old men and cripples. But it is officially declared that the employment of such men or any others at wages satisfactory to them is "diametrically opposed to the first principles of trade unionism." No wonder the *London Times* says that, "if this be true, it is difficult to avoid the conclusion that trade-union principles are, in direct contravention of common sense."

Several facts of profound importance underlie the details of this pending controversy, and are to some extent independent of its particular issues.

1. Modern trade unionism is not in spirit and purpose the same as the industrial movement out of which it has grown. Step by step, the trade unions have encroached upon the right of free contract and violated the laws of commerce; and successive concessions made to them have bred in them an impression that they have only to demand and receive. Their only limit has been the immediate destruction of business. Whatever employers could be forced to yield, as the alternative of absolute stoppage, they have thought it right and safe to exact. And their reckless employment of the advantages they have won has at last produced a revolt on the part of their victims which threatens not only to defeat their present advance, but to force a considerable retreat.

2. The leaders of the trade unions are not wise enough to see when they have by strangulation impaired the laying-power of the goose of the golden eggs. They think they can go on until they see the bird actually beginning to die. Thus, they appear to be ignorant of the tremendous fact that they are steadily undermining the commercial prosperity of Great Britain by the short-sighted selfishness of their course. The harm already inflicted is irreparable, and, if continued, it will become in many lines of business fatal.

3. The deepest source of mischief in this respect is not the enforcement of high wages or other elements of gain to the workman; it is the lack of loyalty and fidelity bred in the workman himself by a long course of asking and not giving. Since Charles Reade wrote his famous philippic on "The British Workman," the type of shirking arrogance which he satirized has become even more clearly defined. Ambition, hard work,

devotion to an employer's interest, are all "diametrically opposed to the first principles of trade unionism."

The simple truth is that American machinists, who get higher wages, more fully earn their wages than do their British compeers. Mr. Angus Sinclair, editor of *New York Locomotive Engineering*, in a letter to the *London Times* on the transfer of locomotive building to American shops, after showing that the progressive spirit of the American manufacturers in the employment of successive mechanical improvements has much to do with their success in international competition, proceeds to touch this point of the character of American labor as follows:

"In a newspaper controversy about the rights and wrongs of the engineering strike going on in Great Britain, I have repeatedly seen the statement made by workmen that if their trade is driven away from the British Isles they will follow it. Should they follow it to America, they will have to greatly change their ways to secure steady employment. Instead of an eight-hour day, they will be glad to remain in the shop 56 or 60 hours a week. If they object to attending as many machine tools as other mechanics operate, they will be sent to the office for their time check. If they happen to be employed on day work, which is necessary in a few departments, they will find that they cannot push a file or wield a scraper with deliberate leisure. They will find a foreman in evidence, who has a habit of saying, 'Do you intend working all the week on that two-hours' job?'"

It is reported from England that the employers who have been making shift to get on since this strike began with the services of apprentices and "free" laborers have discovered that these substitutes accomplish much more than their skilled predecessors, to whose "first principles" of a maximum wage for a minimum work any exhibition of generous zeal of industry was "diametrically opposed."

In short, the trade unions engaged in this strike have run against three great first principles which can be warranted to withstand the shock, namely: (1) Whoever demands more than justice will ultimately fail, and may even as a penalty of failure get less than justice. (2) Destroying the trade of a country is not the way to improve the condition of its operatives. (3) There are two sides to the labor question; and it is high time to consider not merely what the employer pays, but also what he gets for his money.

R. W. R.

NEW PUBLICATIONS.

THE LAW OF MINES AND MINING IN THE UNITED STATES. By Danie Moreau Barringer and John Stokes Adams, of the Philadelphia Bar, Boston; Little, Brown & Company, 1897. One volume, cxxv and 870 pages. Price, \$7.50.

It is at first thought remarkable that after so long a period of dearth of text-books on the United States mining law, two books should appear simultaneously, both aiming to supply this want. But, after all, the wonder is that there are not more attempts to do so. (Mr. Morrison's excellent collation of leading cases, comprising many volumes, is a library in itself, but not a text-book.) The two books to which I refer are the treatise of Mr. Lindley, which I recently reviewed, and the one now before me.

The Philadelphia bar is scarcely as good a school of practice in the Federal mining law as that of Colorado, where Mr. Morrison was trained, or that of California, where Mr. Lindley, I presume, has gained his experience. On the other hand, some important cases, involving the common law and State statutes, have arisen in the great mining State of Pennsylvania; and in this department of the law of mining in the United States the lawyers of Philadelphia have doubtless learned much. At all events, the present treatise contains a good deal of instructive and interesting material drawn from Pennsylvania cases.

As compared with Mr. Lindley's critical discussion of Federal law proper, it is inferior in clearness and accuracy. For instance, it declares (p. 443):

"The apex rule has an exception in the case of patented agricultural land. As the entire ownership of this land to the center of the earth has been vested by government grant in the patentee, the United States can give no one else the right to enter upon any part of it, and, consequently, the locator of mineral ground cannot follow his vein under such land."

I cannot enter here upon a thorough discussion of this important question; all I wish to say is that the above statement is misleading. In the first place, it ignores the effect, at least upon agricultural patents granted between 1866 and 1872, of the express provision of the Act of 1866, "which land adjoining shall be sold subject to this condition," namely, the condition of the extra lateral right attached to an apex in the neighboring land. In the second place, it rests upon a single case (*Amador Medean Gold Mining Company vs. South Spring Hill Gold Mining Company*, 38 Fed. 668) decided in 1888 by Judge Sawyer in the Circuit Court for the Northern District of California.

This case was appealed to the United States Supreme Court, where the judgment below was reversed, but upon technical grounds and without decision on the merits. The question has therefore now been settled by the Supreme Court; and it is extremely doubtful whether the view of Judge Sawyer would be confirmed. A comparison of the summary and confident treatment of it by Messrs. Barringer and Adams with the careful discussion given to it by Mr. Lindley (Vol. II., Section 612) will show what I meant by my criticism.

On the other hand, this treatise gives in many instances abstracts of cases to which Mr. Lindley only refers by title; and this feature of it makes it a valuable companion and complement to his work. So far as I have noticed, however, it does not give duplicate references, but confines itself to the citation of a single official report of each case. In this respect, Mr. Lindley's greater fullness of reference is an important

convenience to practitioners not having immediate access to complete law libraries.

One of the authors, Mr. Barringer, has had experience as a mining engineer and geologist, and has published a book entitled "A Description of Minerals of Commercial Value." Mr. Barringer has furnished for this treatise a geological preface of 75 pages. Of course, he does not pretend that he can put into that brief compass enough to prepare a lawyer to try a mining case. On the contrary, he recommends to "every lawyer who has a large practice in mining law" the admirable work of Prof. Joseph Le Conte. He might have gone a good deal further than that, without suggesting anything new to lawyers of even small practice in such cases. It may be questioned whether it was worth while for Mr. Barringer to take up space in this volume with so brief a treatise as his geological preface. Both lawyers and laymen are likely to look elsewhere for their geology. However, the preface is intelligent and readable. It may not be greatly helpful, but it will be harmless. It contains some familiar but well-selected illustrations, which perhaps an advocate might find useful before a jury.

R. W. R.

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.

The Organization of Gold Mining Business. By Nicol Brown. Glasgow, Scotland; Duncan Campbell & Son, New York; Spon & Chamberlain. Pages, 177.

Engineering and Architectural Jurisprudence. By John Cassan Wait. New York, 1898; John Wiley & Sons, and London; Chapman & Hall, Limited. Pages, 905. Price, \$6.

Field Columbian Museum: Annual Report of the Director to the Board of Trustees, for the Year 1895-97. F. J. V. Skiff, Director. Chicago, Ill.; published by the Museum. Pages, 86.

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.

The Hartsfeld Furnace Again.

Sir: Charles L. Hartsfeld, who calls himself the National Ore and Reduction Company, is on his last legs. He does not prosper by the so-called smelting furnace he sells. After the parties, who held him under cover for the last year saw his smelting furnace was a fraud they resigned from the Hartsfeld Company. My opinion is that it will not be long before he will change the name of his company in order to get another chance. Wherever he can get hold of the miner he says in his pamphlet: "Send 50 to 100 lbs. of ore to us and we will treat it in our testing furnace, which is the same as our large furnaces." Having only that amount of ore, he can give fairly good results; but if anyone ships him a carload of 20 tons he cannot reduce it without a freeze-up. The way your valuable journal has written him up from time to time has killed him by inches. I intend to expose him to the fullest extent, both in the United States and Mexico. I will also state that he has not sold any furnaces since last June, except a few of his "Baby furnaces," which are about the size of a barrel.

ST. LOUIS, MO., Dec. 8, 1897.

A. W. GILLILAND.

Alaska and Klondike Mining Companies.

Sir: I notice in recent issues of your valuable paper that you are investigating the foundation of some of the Alaska mining companies which have organized during the past few months, and I am sure that you will receive hearty thanks from the public for your efforts in its behalf. Of the concerns of this kind throughout the country there is one in this city—The Rhode Island & Alaska Gold Mining Company—in which many of your readers are particularly interested at this time, and they claim to have special advantages in store for their stockholders, in the form of mines ready to produce wealth when the labor is applied to them, and mining engineers of great ability already on the ground who are thoroughly acquainted with the country and who thoroughly understand the nature of mining in Alaska; in fact if all they advertise is true and can be proven many people in this city and vicinity would be glad to join them or purchase their stock; but inasmuch as so many of these schemes have been started without anything solid upon which to base their claims the public are very naturally a little shy until they can be assured that they will get a "fair run for their money." I enclose you a circular which this concern has circulated very extensively, and if you would kindly investigate their plan and advise us through the next issue of the *Engineering and Mining Journal* you will confer a great favor upon your readers in this section.

PROVIDENCE, R. I., Dec. 15, 1897.

[We have read the prospectus of the company referred to by our correspondent. The capital is \$500,000, but no information is given as to the amount of working capital this will provide, nor what is to be paid for with it nor at what price. It has all the appearance of being simply a foolish scheme, and it offers no data that should induce anyone to take stock in it, or to go to Alaska. Rhode Island may not have any gold mines but there is more money to be made there by honest industry than most of those who go to the Yukon will bring back.—EDITOR E. & M. J.]

The Beam Process.

Sir: In recent numbers of the *Engineering and Mining Journal* I have read with interest editorials and comments on the Beam process. Mr. C. P. Stevenson's letter written from Buffalo published in your issue of November 27th, 1897, is unsatisfactory entirely to those owners of low-grade ore bodies and metallurgists in general who are interested in keeping in touch with new processes of ore treatment.

It is one thing to ship a few tons of ore to Denver to be "tested," but quite another thing, as most of your readers know, to successfully operate a mill embodying such and such a process up in a Canadian low-grade ore district. Mr. Stevenson, besides taking the advice of experts on the subject, should have looked further to see if the Beam process was in successful operation anywhere in Colorado, or the entire West for that matter. Of course the "test plant" in Denver is in successful operation as long as there is a sufficient supply of ores to experiment on.

My first experience with the Beam process was at Telluride in 1894, where they were operating a small mill, and testing various rebellious ores of the San Juan region. The mill was abandoned the same year, I believe. At the time I investigated the process carefully, especially in regard to the air-tight roasting feature. It struck me forcibly at the time (and I have since had no cause to change my opinion) that if the Messrs. Beam could indeed save 125% of the assay value they had a good thing, because 25% is good profit. I took to their mill some ore to be tested; the results were unsatisfactory, and they frankly told me so. I was a public assayer but they would not allow me in their assay office, where the "milting" was done, but they courteously allowed me to inspect their mill outside of this department. It seems that they first dried their ore, then pulverized in a dry stamp battery to 40-mesh, mixed the ore with salt and sawdust and placed in the air-tight furnace. I could not witness this stage of the process, as the furnace was "air-tight," therefore of invisible interior, so I took their word for it that the roast was cherry red and that the gases generated were not "strong enough to support and carry off particles of gold." The next stage of the process consisted in transferring the roasted ore to pan amalgamators where I was told the gold and silver were amalgamated and the copper subsequently removed by chemicals from the amalgamator tailings. I did not see this operation actually carried out, but they showed me some handsome gold retorts and bright copper nuggets which were kept in a bottle in the assay office.

It impressed me that a process consisting of so many stages of procedure must be rather a costly one to apply to the treatment of low-grade ores, but then I suddenly remembered that their 125% extraction left Messrs. Beam a safe margin to operate in and still compete with the smelters.

I also distinctly remember that I left Telluride wondering what good was accomplished in roasting an ore in an air-tight furnace when afterward the cherry-red ore was drawn from the furnace and left to the mercy of air currents upon the cooling floor. However, mystification is an important feature in most all new processes, especially when a possible backer views the operation.

I should like to hear how much Mr. Stevenson's ore was worth per ton. I should also like to hear from Mr. Beam what it costs him to treat a ton of refractory ore by his improved method and whether or not he gives his customers the benefit of his 125% extraction. I have some ore that needs just that kind of treatment.

SILVERTON, COLO., Dec. 12, 1896.

PERCY WILLIAMS.

The Nobel Estate.—The estate of the late Alfred Nobel, the dynamite maker, which comprises property in Sweden, England, Scotland, France, Italy, Germany, Austria and Norway, is estimated at 33,233,792 kroner. The debts amount to 1,644,589 kroner, leaving a sum of 31,587,202 kroner, or about \$8,750,000. It will be remembered that Mr. Nobel left his large fortune for a number of scholarships and prizes, but several members of the family have entered protests against recent proceedings in Sweden in connection with the will.

Native Iron in the Coal Measures of Missouri.—Three occurrences of the native iron, in as many different counties, are described by Mr. E. T. Allen in a recent paper. It was found in each instance in drilling through the coal measure sandstone, at depths of 35, 37 and 51 ft. The iron appears to occur in more or less continuous masses in the solid rock, offering great resistance to the drill, and the samples obtained consist chiefly of fragments detached from these masses in drilling. The analyses show: Iron, 97.10 to 99.39; silica (originally from the sandstone), 0.31 to 1.65; phosphorus, 0.13 to 0.207, and traces of carbon. These irons are undoubtedly of terrestrial origin, and were certainly not derived from the drills. They are characterized by exceptional softness, and are attributed to the reducing action of the carbonaceous matter of the enclosing formation. The complete absence of nickel, so characteristic of meteoric irons, confirms this theory of their origin.

Georgia Phosphates.—A preliminary report on a part of the phosphates and marls of the State has just been published by State Geologist W. S. Yates. The report has been prepared by the Assistant State Geologist, S. W. McCallie. The conclusions of the document are as follows: The result of our investigations in the various countries lying along the Georgia-Florida State line demonstrates to a considerable degree of certainty two very important economic facts. First, that there do not exist anywhere along the State line, with the exception, probably, of Thomas County, any deposits of phosphate of sufficient extent and purity to be mined with profit for the manufacture of commercial fertilizer at its present market value. Second, that all these countries contain more or less extensive beds of marl, or low-grade phosphate, a valuable natural fertilizer that might be used to a great extent in replacing the more costly manures. There can be little doubt that the deposits of marl are extensive and equal in many respects the greensand beds of New Jersey. In only a few instances have they been tried on growing crops, but in all cases they are reported to have produced beneficial results.

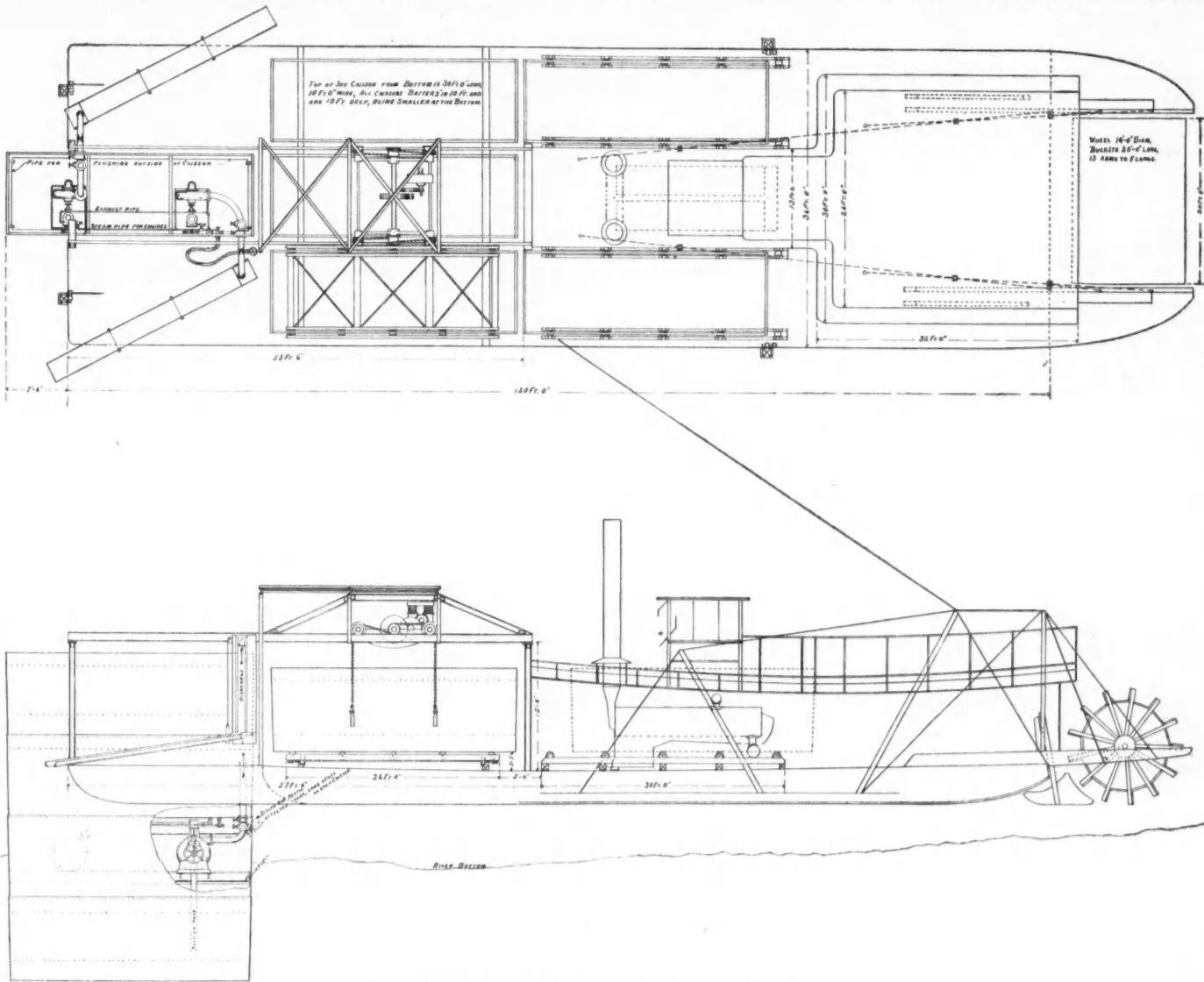
A NEW FORM OF DREDGE FOR RIVER-BED PLACERS.

Written for the Engineering and Mining Journal by Jno. M. Sweeney.

For the recovery of gold deposits on the bedrock below the sands and gravels composing the beds of streams in regions where gold-bearing gravels are found, two leading methods of dredging have been employed. One is the bucket dredge, having buckets attached to an endless chain traveling over wheels in a frame, the end of which is lowered down into the gravel, and is similar to the method employed for sand dredging in many streams. The other consists in dropping the suction pipe of a centrifugal sand pump down into the sand or gravel, and causing it to ascend through the suction pipe of the centrifugal pump. These methods have succeeded in lifting only a part of the gold with the sand and gravel from the river beds. The methods of separating the gold from the sand, gravel and water, after it is lifted from its bed, need not be referred to, as they are common to all. It is believed that in none of the methods employed has it been possible to clean up the bedrock, for the reason that coarse stones or large boulders usually lie on the bedrock where the gold is deposited, and these stones and boulders prevent the buckets

caissons are made of steel plate braced to give them sufficient strength for the purpose.

Upon the boat is erected a hoisting device capable of lifting the sections of the caisson. The sections of the caisson may be brought under the lifting device on rollers or trucks. The lifting device, mounted on a trolley running upon an elevated track, which is carried by suitable bracing from the hull of the boat, carries the caisson over the recess in the boat and lowers it through the recess to the gravel on the bed of the stream. In case the water is deeper than one section of caisson, the first section is held up by a suitable mechanism connected to the hull of the boat, after being lowered sufficiently to allow a second section to be placed on top of it by the lifting device, and these sections being clamped together are then lowered, until they reach the gravel bed of the stream. In deep water as many sections as may be required are used. The method employed for connecting the sections of caisson together is very simple, consisting of cam levers or links, which, when thrown over, pull the joints of the caisson together, making them water-tight; the joints are as readily released when the caisson is removed by reversing the position of the lever. So soon as the lower caisson rests upon the sand in the bed of the river, the removal of the sand and water inside of the caisson is commenced



PUMP DREDGE FOR WORKING RIVER BED PLACERS.

from approaching within, say, a couple of feet of the bedrock itself, and so prevent the gold from being taken up by them. It is impossible to cause the buckets to approach close enough to the bedrock to gather up the gold, and in most places where the bedrock is rough the gold is apt to sink to the lowest points and work down into the crevices or cracks where it could not be hoped that the buckets would secure any of it. No better result is secured in fact with the suction pipe of the centrifugal pump; and although some plants now working employ a diver to go down to the end of the suction pipe, such attempts are not largely successful, and add but little to the gold lifted by the pump.

In order to overcome the objections to the old methods for reaching and cleaning up the bedrock of such streams the method herein shown is proposed and can be used, if desired, for any deposit of gravel or sand, whether in the bed of a stream or not. In the case of stream beds a boat is employed of fitting dimensions, which may have its own propelling machinery if desired. In the illustration herewith the forward end of the dredge boat has an opening 12 ft. wide and 20 ft. long, in order to allow the passage through it of a caisson 10 ft. wide and 30 ft. long, the end of the caisson when in position projecting beyond the bow of the boat. On board of the boat itself a number of sections of caisson may be carried. In the plan herewith the boat would carry six sections, each of the dimensions given and 10 ft. deep. Other sections may be carried as needed upon an auxiliary boat to be attached to the propelling boat. The

and the caisson sunk through the sand as rapidly as may be; additional sections may be added as required, until the bedrock is reached. In this way, the entire material included inside of the caisson can be removed, and the bedrock swept away by hand, if desired, perfectly clean.

It will be understood that the boat is provided with the usual spuds for maintaining its position in the current, and until the caisson is sufficiently imbedded in the sand, the boat may be used to hold the caisson in position. As soon as the bedrock exposed by the removal of the material from the inside of the caisson has been thoroughly cleaned, the caisson is withdrawn, the position of the boat changed and the caisson sunk again as rapidly as possible. The material removed from inside the caisson is deposited in a riffle or sluice-box which separates the gold from the sand and water, allowing the tailings to run off into the stream or other dumping ground. Any speedy method may be used for removing the material within the caisson; only two plans are here shown, one in which one or more centrifugal sand pumps are placed inside of the caisson—preferably in the upper section, and the steam taken from boilers on the boat for their operation. Stones too large to pass through the suction pipe may be removed by any convenient hoisting tackle, or left within the caisson, and moved so that the bedrock may be cleaned up around them.

Where pumps are used for removing the material an arrangement of

pipings is provided, making joints as the caissons are connected, a valve is placed in each section of the caisson, the opening of which admits water from the outside into the inside of the caisson. The quantity can be so regulated by the valves as to enable the pumps to carry the largest volume of sand with this water, which is discharged upon the riffle or sluice box. The preferable method for operating the sand pumps is by a direct connected engine, placed within the caisson itself, and in order to enable the operation of these pumps to be continuous during the placing of the sections of the caisson, the steam, exhaust and discharge pipes from the pumps are arranged with a by-pass system so that connection may be made to any of these pipes while the pump is still in operation and without diminishing its output.

The other method for removing the material from the inside of the caisson is by the use of an ordinary grapple manipulated by a derrick or other lifting device placed upon the deck of the boat in a position where it may not only extract the material from the inside of the caisson, but also be swung into position for placing the successive sections of the caisson in place as they are required. The grapple deposits its load of material in the upper end of a sluice-box or riffle, as described for the centrifugal pump, but the water to carry these deposits over the riffle is supplied by a pump taking water from the stream and discharging it on the high end of the riffle. The crane or derrick is used during the moving of the boat from place to place instead of a hog chain to hold up and sustain the forward end of the boat. This is accomplished by attaching the tackle of the crane to the forward end and on each side of the recess described, and putting the necessary strain upon the tackle of the crane, after which the spuds are lifted from their position, so that the boat is free to move. When placing the boat again for work the spuds are put down on the bottom before the strain from the crane is released. This attachment is not absolutely necessary, as the boat is capable of carrying her load, whether the crane is attached to the head of the boat or not, but without it the head of the boat might break down in time.

In order to assist in the sinking of the caisson through the sand or gravel two or more D-shaped pipes are placed in each section of the caisson and attached inside. These pipes completely surround the inside of the caisson in a horizontal plane, one above the other, divided vertically over the surface of the caisson, and the interior of these D-shaped pipes opens through the side of the caisson by jet openings, pointed upward at an angle of 45°, but leaving the outside of the caisson smooth. So soon as the caisson enters the sand, and when the orifices described are in the sand, water is pumped through the orifices for the purpose of loosening and washing the sand from the outside of the caisson and allowing it to settle more readily. Water may be forced through the orifices also, in order to free the caisson from the clamp of the surrounding gravel, when it is desired to remove it from its place. In order to assist the removal of the caissons from place after the material within them has been removed and the bedrock cleaned up, as the lower edges of the sections are made smaller than the next succeeding one, so that the whole caisson when sunk is tapering, the smaller end being down. To lift the caisson from its bed and to control its ascent, plates are provided, which can be lowered into the caisson and bolted in place near the bottom of the lower section, making a water-tight bottom. Through these plates a valve is provided, which can be manipulated from the top of the caisson. When the bottom plates are in place, the pump is stopped and the water allowed to pass through the valve and fill up the inside of the caisson as high as may be necessary; the valve in the bottom is then closed and a sufficient amount of water is removed from the inside of the caisson, so that the buoyancy thereby obtained in addition to the lifting force of the crane, which in the meantime has been attached to the top section of the caisson, is sufficient to start the whole structure from its bed. By the proper manipulation of the pump and the floor valve, the lifting force may be regulated to prevent the too sudden starting of the caisson, when it has begun to release itself.

It will be readily understood that the caisson may be cylindrical as well as rectangular, if that form should be preferred.

GRAPHITE IN SIBERIA.

Written for the Engineering and Mining Journal by E. Helmacker.

Graphite was discovered in Siberia in 1842 by Aliber, a Finnish merchant, who found an outcrop of this valuable mineral on the Bogodol galec, situated in the mountains of Toonkinsk, a range of the Saian Mountains of Alpine proportions and aspect, between the headwaters of the Bogodol Creek and the sources of the Bezimiannaia, in the government of Irkutsk. The outcrop is in the vicinity of the summit, on the watershed of the Angara, an affluent of the Yenissei River. The Bogodol Mountain is 2,240 meters above the level of the sea, located about 52½° north latitude and on the meridian of 70½° east of St. Petersburg. Its northern flanks are of granite; on the southern side crystalline slate and crystalline limestone are abundant. The Mariinski mine, on the summit of the mountain, which is covered with a forest of larch trees, is situated at a distance of 210 to 215 km. from the main Siberian post road. But communication with this highway is, owing to the total absence of wagon-roads, very difficult; the journey is made by a bridle-path through deep valleys and swamps and over difficult hills.

The geological relations of the graphite deposit are difficult to explain. The deposit presents several large vein-like pockets in a heavy bedded granite, also in syenite and in crystalline limestone. The pockets of graphite are sometimes 25 m. thick. Numerous folds and faults complicate the topography of the deposit, which is proved by many quartz seams accompanying the pockets of the mineral.

The mine opened by Aliber has been operated since 1856 under the name of the Mariinski mine; from the indistinctly defined graphite body about 1,650 tons have been prepared for working. The shipments from the mine supplied some factories of lead-pencils abroad, particularly those of Faber. The bodies of graphite first found were worked out, and as few attempts were made to search for other deposits, and the explorations made had no satisfactory results, the claim was not deemed worthy of further investigation and the mine was closed. The property then came into the possession of Mrs. F. T. Volkov. The present limited out-

put is sold to crucible manufacturers in Irkutsk, who take yearly about 300 pounds for graphite crucibles, which are used in the state laboratories at Irkutsk and at Tomsk, by gold and silversmiths, and by brass-melters. Besides this, 120 to 150 pounds are shipped yearly to Moscow to the lead-pencil manufactory of Karnatz. The mine itself is not worked, but lumps of the mineral are picked up by hand from the old workings and separated into two qualities. The hand picking is not expensive, but the cost of transport over the rough trails increases the price. It may be possible to discover new deposits by prospecting, but the transport hindrances will still remain, because there is no settlement near except the small Russian boundary fort of Norin-Khoroi, which has no communication by road, and probably never will have any, with the mine. It is near the Chinese (Mongolian) frontier, and to the southeast of the mine.

The Aliber graphite from the Bogodol Mountain shows, according to Pouzirevsky and Koutorga, in St. Petersburg, from 84 to 90% carbon with from 10 to 15% silicious ash.

Another rich graphite deposit is known in the northern portion of the government of Yenisseisk, in the district of Tourookhansk, a small town situated on the bank of the Yenissei. Although rough in surface, the country, being a forest region, is fit for settlement for mining purposes, but is accessible only by water and by that means during less than half the year. There are scattered over the district numerous valuable graphite deposits, which can be excelled by few others in the world. These were discovered in the years 1859-63 by Scadorov, a merchant and later state counselor. The water routes are by tributaries of the Yenissei; the Neejnaia Toungouska, which is navigable for light-draft vessels. The Kooreika River is also navigable; its waters are exceedingly clear. The Bakhta is a large river, and its banks are partly forest and partly level, swampy plains called *toundras*; it is also navigable.

The first discoveries of mineral wealth in this nearly uninhabited country were made in the past century, but no mining operations were carried on. There were beds of coal known in various localities along the banks of the Neejnaia Toungouska and its affluents up to 200 or 400 km. above its junction with the Yenissei River. These coal seams of 1 to 2 m. thickness are probably of Jurassic age, as is the case in many other places in Siberia. But graphite outcrops also, located at distances of from 200 to 500 km. from the mouth of this river, had been discovered imbedded in clay slate. They show a slaty or radiated texture, and it is probable that the layers of graphite are in some places the result of the alteration by heat of the coal of the Jurassic formation. The metamorphosis of Jurassic coal into graphite by a process of alteration in this rough and remote country is demonstrated in a location at a distance of 190 km. from the mouth of the Neejnaia Toungouska. At this place the coal has undergone a process of change into anthracite, but being imbedded in a series of strata disturbed in its position and dislocated by intrusive rock (trap), they are altered in some places into graphite.

In 1861, when the deposit on the Kooreika was discovered, 70,000 pounds of graphite were extracted. The European markets were tried with the samples then mined, and for this purpose the trial output was exported. But hindrances were interposed by the government officers, and before the promoter could obtain a reply to his application to St. Petersburg, and thus secure the right to ship the mineral, the graphite stored on the northern *tundra*—on the banks of the Little Taz River, in north latitude 65½° and east longitude 52½°—was partly disintegrated and spoiled. To market it, it was possible to transport the mineral on a straight but difficult road, never before traveled, nearly along the 66th north parallel through the *tundra* on the backs of reindeers, passing Obdorsk, the most northern place on the Obi, to the Pechora River. Thus, in 1863-64, about 500 pounds were shipped to London. Another lot of 5,000 pounds was shipped down the Taz to its mouth in the Gulf of Obi, from there again to Obdorsk and to the Pechora River, on the west side of the Oural Mountains, likewise on reindeer backs and sledges. About 7,000 pounds were shipped up the Yenissei to Yenisseisk and on the post-road to Tomsk, from thence by water, following the Obi, Irtysh, and Tobol, to the town of Tumen, and crossing the Oural Mountains to the state steel works of Perm, the steel-gun manufactory of Motovilikha. In the same way 1,000 pounds were sent to St. Petersburg and 200 pounds to Germany.

Any reference to the shipment of such quantities, however, would be incomplete without making mention of the transport difficulties. To make it possible to bring the samples to Europe, the load of graphite was towed in boats of shallow draft up the Tourookhan—a tributary of the Yenissei, joining it at Tourookhansk—and further portaged on reindeer backs, or at points impassable in summer in sledges drawn by reindeer, to the Little Taz River, until it reached a place in 65½° north latitude and 52½° east longitude from St. Petersburg, where it was stored. The next step was to transport it by way of Obdorsk over the Oural Mountains, which were crossed at 67° north latitude. A route was further selected on the Oosa, a right-hand tributary of the Pechora, from which it could be brought by water to the Northern Ocean. From the deposits on the shores of the Neejnaia Toungouska 2,000 pounds were in 1877 exported, and a mining company, organized after the death of Scadorov, took out from this location in the year 1891 about 10,000 pounds.

The value of the graphite samples was recognized abroad, as well as in Russia, and it has been found of a quality good enough to compete with the mineral found in other famous localities. In England it attracted a good deal of attention, and was thought to be equal in quality to the Cumberland graphite; in the United States it was rated higher in quality than the Ceylon graphite.

At the beginning of work on the great Siberian Railroad, attempts at prospecting and mining were made, generally in places where a road or waterway connection with the railroad was available. At present prospecting is being done on the tributaries of the Yenissei for coal as well as for graphite, and several outcrops have been found. Besides the principal deposits mentioned in the governments of Irkutsk and Yenisseisk, there is another location in the eastern part of the Kirghiz steppes, in the foothills of the Tarbagatai, where in three places, in the district of Kokpetiysk, at Sergiopol in the government of Semipalatinsk, and at Semirichinsk, good outcrops exist. The mineral taken out was tested by the Perm steel works, but at present the mine proprietors are doing nothing. In spite of these valuable deposits of graphite, which rank among the richest and most promising in the world, the production is variable. Some years there is no shipment. The greatest production took place in 1875, when 18,500 pounds (303,030 kgs.) were exported.

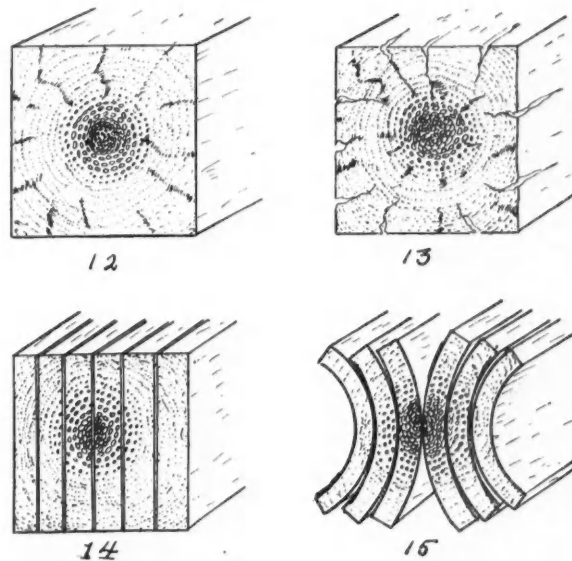
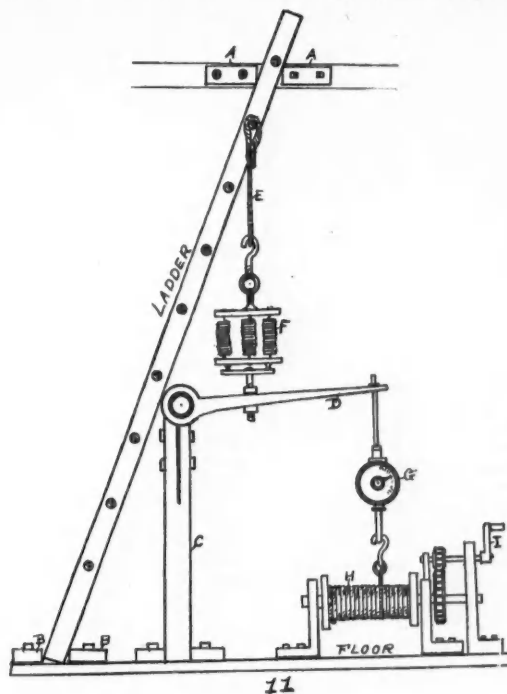
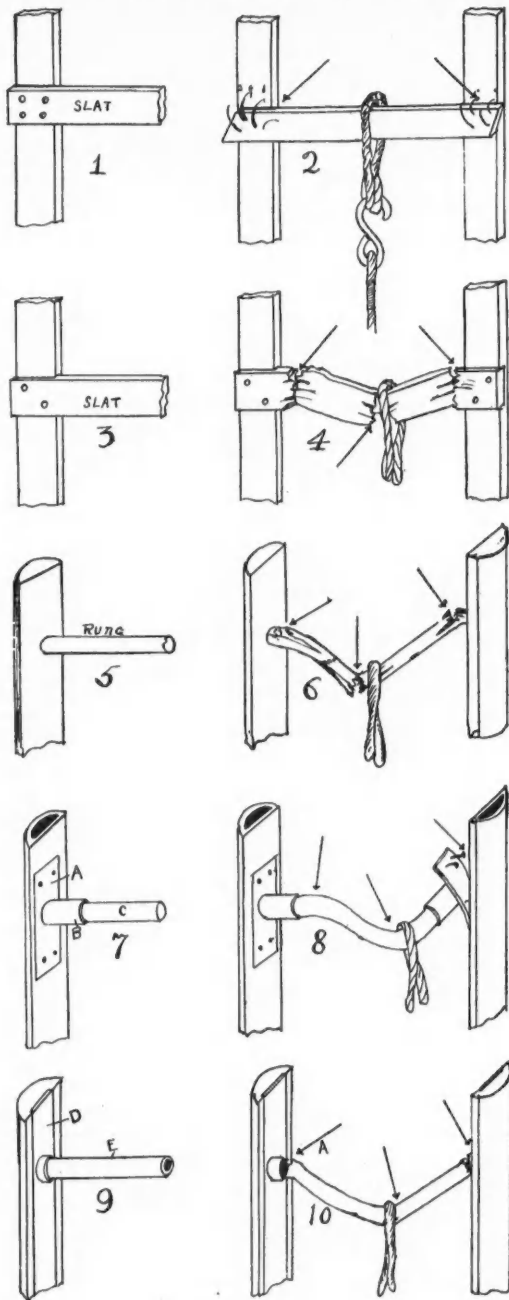
TESTS OF LADDERS.

Written for the Engineering and Mining Journal by George D. Rice.

The following tests of the strength of ladders were recently made by the writer. Fig. 1 is a section of a common black pine ladder, sides $2 \times 3\frac{1}{2}$ in., slat $1 \times 3\frac{1}{2}$ in., wire nailed and not notched. Four wire nails were used in each end of the slat, and slightly clinched. Placed at an angle of 45° and subjected to a strain such as would be applied when mounting, this form of slat connection was pulled off, as in Fig. 2, under a pull of 1,245 lbs. A ladder of the same proportions and same kind of wood was then tested with the slats notched into the sides, as in Fig. 3. The slats were also wire nailed as before. In this shape the several slats tested broke after the manner shown in Fig. 4 under a pull of 1,300 lbs. Several bull pine ladders of the type shown in Fig. 5 were next tested. These

Five patterns of what are termed aluminum ladders were also put through the tests. The make-up of these ladders is shown in Fig. 9, in which it can be seen that the only portions of aluminum are a flat piece *D*, which is sunk into the wood side the length of the ladder. The rungs *E* are hollow aluminum tubes, fixed to the flat pieces by means of a shoulder. Like the paper ladders, these are about one-third lighter than the same size wooden ladder. They are neat in appearance, the rungs very smooth, etc. But a testing machine will always play havoc with new things. A pull of only 745 lbs. wrecked a rung the first trial, and this rung was supposed to be able to stand a strain of 1,000 lbs. Fig. 10 shows the way it broke. The worst fracture is at *A*, where the rung separated from the shoulder. However, with a little more material in the shoulders, stronger rungs, and one or two other alterations, these ladders may yet come to the front.

The design of testing machine employed in these experiments was made by the writer and is shown in Fig. 11, consisting of a wooden



EXPERIMENTS ON THE STRENGTH OF LADDERS.

were of the usual pattern of round sides and provided with rungs. Size of sides $3\frac{1}{2}$ in. on flat sides, lumber fairly clear, rungs $1\frac{1}{4}$ in. diameter in center and 1 1/2 in. apart.

Fig. 6 illustrates the form of breakage of the majority of the rungs when strained to 1,225 lbs. The next type of ladder to test was of paper pulp, compressed into a hollow form of sides to which the wood rungs were connected by means of aluminum sockets, as in Fig. 7. Here *B* indicates the socket, *A* its flange and *C* the wood rung. The flange part is notched into the wall of the paper side and riveted. The feature of these paper ladders is the reduced weight, which is about 38 per cent. less than wood, for the same size and, it is claimed, also strength. The tests did not appear to quite bear out the latter claim, for when put to a strain of only 845 lbs. a ladder proportioned to be the same strength as wood, was pulled into the condition shown in Fig. 8. The breaking of the wood rung was promptly followed by the pulling out of the rivets connecting the aluminum socket to one side. This occurred in several repeated tests. Possibly a ladder of this kind made only 12 or 15% lighter than wood would prove very efficient.

stand *C* to which is studded the lever *D*. The ladder to be tested is placed at an angle of about 45° and braced at *A* and *B*. A rope is attached to a rung and connected to the hook *E*. This hook is attached to the spring ease-off and the latter to the lever *D*. The drum *H* is turned by the handle and crank at *I* and the rope which connects with the recording dial *G* is wound upon it. This pulls down the lever *D* and the resistance exerted just before the rung breaks is registered on the dial.

In the above kinds of ladders, and in a number of other newly invented ladders, it was noticed that the failure of a certain part was due to shrinkage of the wood. The wood sides of the aluminum ladder were slightly warped, and undoubtedly affected the tests. Inventors of new forms of ladders should bear in mind that when the capillary tubes of wood are deprived of moisture they shrink. Those tubes on the outer portion dry out first, causing the interior of the wood to expand, resulting in cracking of the outer portions, as shown in the early stages in Fig. 12 and the latter stages in Fig. 13. If split up in sections, as in Fig. 14, and then dried, the tendency will be for the pieces to dry out and warp as in Fig. 15. Boring out the center of the tree usually over-

comes this warping, for then the tubes can dry equally from either side. This warping tendency of wood, which is graduated from the center of the tree, as in Fig. 15, should be understood by ladder builders and for that reason is given in this connection.*

THE MICHIPICOTON MINING DISTRICT IN ONTARIO.

Written for the Engineering and Mining Journal by Wilson B. Coo.

Michipicoton as a mining country has only been in existence for a few months, although it was familiar ground to the *coureur du bois* of a 100 years ago. Its name is of Indian derivation, and means a clear, cloudless sky. The region is part of a belt of land extending along the north shore of Lake Superior, which is rich in mineral. In June last the first discovery of gold was made there on the shores of Lake Wawa, a body of clear water six miles long and two miles wide. An Indian named Thady made the find, and he gave the information to a newspaper man in North Bay. The latter took up several claims for himself and induced some of his townspeople to interest themselves in the matter. They in turn brought the country to the notice of Montreal capitalists.

In the meantime news of the discovery had reached Sault Ste. Marie and numbers left that place to take up locations. In a couple of months nearly the whole country in the vicinity of Lake Wawa had been surveyed. The men who went in were for the most part speculators and boomers of the most pronounced type, and they sent glowing reports of their finds back to their homes. Then followed the reported discovery of placer gold, which resulted in a rush into the district.

How or by whom the placer gold canard was started is not known, but it was evidently the work of interested parties, aided by unscrupulous or careless newspaper correspondents. It was regarded as genuine at first, for men who had been through the country knew that the river valleys were filled with gravel, and several geologists of known standing gave it as their opinion that the surface indications were favorable to the existence of placer gold. It was not until the middle of September that the myth was finally exploded and the gravel beds were proven to be of glacial origin, in places over 100 ft. in depth.

On September 9th, 1897, an Order in Council of the Ontario government declared the district a mining division, embracing an area of about 51,500 square miles "limited upon its east side by the meridian of the east end of Dog Lake, or say 84° west from Greenwich, on the south side by the latitude of Cape Gargantua, say 47° 30', on the north side by the latitude 48° 30', and between the westerly ends of these lines of latitude, where they touch Lake Superior, by the shore line of said lake." The greatest length of the division, that of the northern boundary, is a little more than 100 miles. Its greatest width is about 65 miles.

There are three routes into the country. The one more generally adopted is by Sault Ste. Marie, from which port a steamer sailing two or three times a week lands passengers and freight at Little Gros Cap harbor on Lake Superior, distant 125 miles. A prospector taking this route will have to purchase his supplies before leaving Sault Ste. Marie.

Missanabie, a station on the Canadian Pacific Railroad, is the seat of a Hudson's Bay Company post, where the necessary supplies can be obtained. It is situated on the north side of Dog Lake, the head waters of the Michipicoton River, and is used by many as a starting point. It is a convenient place at which to outfit, as from it diverge several canoe routes.

Grasett, a station 35 miles west of Missanabie, can also be used as a starting point, but no supplies are to be had there. It is three miles from that point to the Magpie River, the nearest stream navigable for canoes.

The rocks of Michipicoton belong to the Huronian and Laurentian systems. Of the latter the rock is almost universally a fine-grained gray gneiss. In some localities it is thoroughly granitic in character, and in other places it is found to be coarser grained. It is usually dull gray in color, but occasionally red feldspar is found. Small areas of syenite also exist. The Huronian is most common in massive diorites, disabases and hornblende and chloritic schists. Slates, quartz porphyries, felsites, quartzites and sericitic schists occur less frequently. Of still less frequency is the occurrence of conglomerates. At the contact between the two formations, it would appear that the Laurentian gneiss had been erupted into the Huronian rock and consequently is later in age. The schists strike in various directions depending on their relation to the intrusive granites. They are nearly always vertical. Dykes of diorite occur frequently in both formations. In structure and in composition the rocks bear a very close resemblance to those of the Lake of the Woods country.

The river valleys are choked with glacial debris, near Lake Superior. The morainic material runs from coarse sand to immense boulders. Much of it is well rounded, showing that it has been carried long distances.

The district will, from present indications, be in time a producer of minerals. Gold, of course, has been the most sought for, but discoveries of silver, nickel, iron and copper have also been made. The number of quartz veins is large and many are very wide. The quartz generally is white and seldom carries any large amount of sulphides. Free gold occurs frequently, sometimes in fine particles scattered through the quartz and not infrequently in nuggets the size of a grain of wheat. Galena and pyrrhotite are occasionally found in the quartz, but iron and copper pyrites are the chief minerals. The veins are usually of the bedded variety and follow the strike of the schists, which is, as a rule, northeast and southwest. Assays of samples of the quartz have gone high in gold, although most of the ore is of a low grade. In no case thus far has any of the ore from Michipicoton been found to be refractory when tested, and experts have pronounced it free milling.

The most promising finds were made in the vicinity of Wawa Lake and on the shores of Manitowik Lake. But a very small part of the mineral bearing belt has been gone over, and this in a very indifferent way. The shores of Dog Lake, the "tote" road east from Manitowik Lake,

the areas lying between the north end of Manitowik Lake and the Magpie River, and the Magpie from its mouth to within 25 miles of the railway, are all known to be in the Huronian. The coast of Lake Superior, west of Michipicoton River would probably repay investigation, as there are areas of eruptive granite, Laurentian and Huronian, and experience shows that the richest veins often occur near lines of contact.

The mining regulations in force in the division were given in the *Engineering and Mining Journal* for September 25th, 1897, page 369. They authorize any person who has taken out a miner's license to stake out a claim of 15 chains square with north and south and east and west boundaries, and to occupy it under a tenure of working. The license-holder may, however, stake out additional claims upon other veins, paying for each an annual fee equal to the license fee, which is \$10, and to hold them upon the same terms. In all cases discovery of a valuable ore or mineral must precede the staking out of a claim, and the claim must be recorded with the inspector of the division within 30 days. As the winters are severe in this part of Ontario, the holder of a claim is not required to work it during the four months from December 1st to April 1st. Failure to work it during the remaining eight months incurs forfeiture unless reason for non-working is given to the satisfaction of the inspector.

Actual exploration was not carried on for more than two months this year when work was interrupted by the setting in of winter. During that short period nearly 200 claims were staked out and recorded, and in each case an affidavit of discovery of valuable mineral was made. Several parties have remained in the field and will continue operations during the winter. A number of companies are being organized to begin work upon other claims as soon as the season opens up next spring.

Michipicoton Post, the headquarters of the inspector of the division, occupies a fine situation half a mile from the mouth of the river. A little above it, at the junction of the Michipicoton and Magpie rivers, an enterprising syndicate of Toronto capitalists has surveyed a town site. The old lake terraces which rise in succession one above another to the base of a mountain, which from its resemblance to the eminence back of Montreal has been called Mount Royal, are admirably adapted for the platting out and building up of a picturesque town.

Canoes are indispensable for prospecting work. The old Indian hunters and trappers employed by the Hudson's Bay Company long years ago connected the lakes with portage trails which are still in a passable condition. They can be followed in almost every direction. To walk over the country with any degree of speed is an impossibility. Tangles of fallen trees and steep bluffs confront the pedestrian. The district presents innumerable obstacles to the prospector. It is rough and devoid of population. A hundred yards from the rails of the Canadian Pacific, which passes through its northern extremity, it is in its primeval condition. There are probably 50 white men in the district, and this number is made up of railway employees, Hudson's Bay Company officials and a very few hunters and fishermen on the Lake Superior coast line. Its surface is dotted over with lakes varying in extent from one acre to 50 square miles. Rocky ravines, with steep, precipitous walls, cut through the country every few hundred yards. About one-half of the area is burnt over, leaving a mesh of fallen and charred timber. In the unburned parts the undergrowth is very thick. Added to this the rocks are clothed with a mantle of moss from 6 to 12 in. deep, which has to be scraped away before the surface can be examined. The only thorough way in which prospecting can be prosecuted on the tablelands is to crosscut this moss, a slow and laborious work. The method most generally adopted by prospectors is to follow along the base of the escarpments, which are frequently perpendicular and neither hidden by moss nor timber, and when quartz is discovered to ascend to the plateau above, remove the moss and so follow the course of the vein. In several instances the faces of escarpments were found to be wholly composed of quartz.

The prospecting done last season was of the most superficial character. Of the hundreds of people who entered the country only a small percentage had any knowledge of mining. Many had never been in the bush before. Many could not tell quartz from country rock, or distinguish between gold and pyrites.

To get mining machinery into Michipicoton ought not to prove a difficult task. It can be landed at Little Gros Cap Harbor by boat or at Missanabie or Grasett by rail. From these points winter roads could be constructed with comparative ease and cheapness, following as far as possible the water courses. During the construction of the Canadian Pacific the materials and supplies were shipped inland from Little Gros Cap by way of "tote" roads, which are yet in a good condition, save that the bridges have rotted away and the road-beds are covered with young brush. From little Gros Cap the main "tote" road runs northeast to Lake Wawa. From the east end of Wawa one road goes north to Grasett station, 38 miles as the crow flies. Another road goes northeast 24 miles to Manitowik Lake. At the northeast end of Manitowik two miles of road connects that body of water with Dog Lake. At the same end of Manitowik Lake another road 20 miles long extends to Dalton station, on the Canadian Pacific. In the construction days small steamers ran on Dog, Manitowik and Wawa lakes, so connecting the roads in the summer time. In the winter the teams crossed over on the ice.

There are ample supplies of pulp wood. Fully one-half of the country is timbered with poplar, birch, spruce, jack pine, tamarack and balsam. Isolated patches of white and red pine occur, and in the valleys some cedar. Waterfalls of 10, 15, 20 and 25 ft. are common, while falls of a much greater height are met with on the Michipicoton and Magpie rivers. The Michipicoton River falls over 400 ft. in 60 miles. The Magpie has a fall of nearly 500 ft. in the same distance, fully one-half of the whole fall being within three miles of its mouth. If these waterfalls were properly utilized they would afford practically unlimited power.

Hunting and fishing are the only occupations of the inhabitants of Michipicoton. The former is carried on by the Indians, but not with much success, as a century and a half continuous trapping for the Hudson's Bay Company has pretty well exterminated the game animals. The Indians, too, are few in number. Formerly there was a Hudson's Bay post at the mouth of the Michipicoton River, but it was closed two or three years ago, and now only the post at Missanabie remains. It is at Missanabie that the canoe route to James' Bay begins, crossing the short and low divide to Missanabie Lake and thence down the river of the same name to Moose River, and so on to James' Bay.

* See also paper on "Strength of Ladders," by Robert Gilman Brown, in *Engineering and Mining Journal* for June 12th, 1897, page 602.

IRON MINING BY STEAM SHOVEL.

The method of open-cut mining by steam shovel, which is in use at some of the mines of the Mesabi Range in Minnesota, has been frequently referred to. At these mines, after the stripping of the surface soil is completed, steam shovels are run in, making a cut through the ore-body, and the ore is at once transferred to cars, which are brought up on temporary sidings. The shovel works on the face of ore and dumps directly into the ore-car, which is brought up alongside of it. In this way, a very low cost of mining has been attained in the deposits where open-cut working is possible.

The accompanying illustration is from a photograph of a steam shovel at work in one of the mines of the Oliver Mining Company, on the Mesabi Range, near Virginia, Minn. It is one of three owned by the company, all of them built by the Vulcan Iron Works Company at Toledo, O.

The shovel here shown is mounted on a car frame 35 ft. long and 10 ft. wide, about the size of a large gondola, and carried on special trucks. The frame is entirely of steel, I-beams, channels and plates being used in its construction. The hoisting engines are a pair with cylinders 13 in. diameter and 15 in. stroke. The swinging engines, which control the movements of the shovel arm, are duplex, with cylinders 7 in. diameter and 9 in. stroke. The crane engines, which are used in forcing the dipper into the ore to be lifted, are also duplex, with cylinders 6 in. diameter and 9 in. stroke. This shovel during the month of June last handled 170,000 gross tons of ore from the bank and loaded on cars, and for the working season just closed has a record of about 700,000 tons of ore handled, which is probably the best work of this class ever reported.

A Vulcan shovel of the same type is at work in the open-cut mine ad-

two hills north of Farinole. Manganese, though not worked, is met with at several places on the island. The antimony mines are the only ones of real importance. These are three concessions, the ore consisting of antimony sulphide. The output of the three mines has fluctuated considerably during the last 15 years. Since 1890 the mean yearly output has exceeded 1,500 tons of marketable ore.

Oil Wells Under the Sea.—According to local papers the Enterprise Oil and Mining Company, of Santa Barbara, Cal., which was incorporated November 20th, 1897, will begin operations on a large scale. This company has acquired oil property in Summerland, and it is the intention to use it for a double purpose. The company will build a wharf, not only to be used in the shipment of oil by water to San Francisco, but also for sinking wells out at sea. Oil will be shipped to San Francisco by tank steamers, and it is claimed that it can be delivered at a very low price.

Petroleum in Newfoundland.—According to Canadian authorities the petroleum producing district of Newfoundland appears to extend over an area of about 250 square miles, and in geological formation consists of limestone and conglomerates thereof, shales and sandstones. An analysis of the crude oil, gathered from the surface depressions, gave the following results: Illuminating oil, 14.5%; lubricating oil, 82.5; solid residue, 3.0; sulphur, 0.098. The oil obtained from a depth of 1,000 ft. was much lighter, and yielded a higher percentage of illuminating oil. The crude oil was dark olive green in color of aromatic odor, and had a specific gravity of .844 at 60° F. On distillation it yielded:



VULCAN STEAM SHOVEL AT THE VIRGINIA MINE, MINNESOTA.

joining the Edison Concentrating Works at Edison, N. J.; its work consists almost entirely in handling blasted rock, and it has been, up to date, operating in a very satisfactory way.

Coal Production in Belgium.—The total output of the Belgian collieries in the first half of 1897 was 10,583,250 metric tons, an increase of 197,750 tons over the first half of last year.

Manganese Ore in Japan.—A British consular report gives the production of manganese ore at the Kunni mines in Japan in 1896 at 478 tons only. The exports from Hakodate were 1,591 tons, the difference having been made up from the surplus stocks.

Coal Exports of Great Britain.—The exports of coal from the United Kingdom during the 11 completed months of the present year amounted to 34,122,046 tons, compared with 31,696,884 tons in the corresponding period of 1896, and 30,643,268 tons in the first 11 months of 1895. Values reported this year are \$2.15 per ton on an average, against \$2.12 in 1896 and \$2.24 in 1895.

A Clay Curbstone in Germany.—In Germany a mixture for the manufacture of clay curbstone, gutters, drains, etc., consists of the following: Clay, 91½ parts; iron filings, 3 parts; common salt, 2 parts; potash, 1½ parts; ash of elder or willow wood, 2 parts. Directions for coloring the mass are: Violet brown color, two parts of pyrolusite to 100 parts of the mass; violet, 1 part of pyrolusite; green, 1 part of copper scales; blue, 1 part of oxide of cobalt; yellow, 2 parts of oxide of antimony.

Minerals of Corsica.—There is but one iron ore mine in Corsica, that of Farinole and Olmeta, which has long been idle. The ore is magnetite, occurring in lenticular masses in the pre-Silurian serpentine that forms the

Naphtha, 7%; illuminating oil, 56; lubricating oil, 34; coke, 3. The products of distillation have a pleasant odor, and are very easy to refine. The illuminating oil is water white, of high flashing point, and burns with a brilliant flame. The crude oil is very free from grit and other foreign substance, and consequently the heavy oil, after suitable treatment, makes a very good lubricant. The quality of the oil compares very favorably with the best American oils. All the wells hitherto sunk belong, with one exception, to the Newfoundland Oil Company, with whom an English company is stated to be negotiating for the acquisition of the property. These wells are close to the sea, and only 6 to 10 miles of pipe will be required to convey the oil to the water.

Coal in Portugal.—In a note on the coal and limestone of Cabo Mondego, Portugal, to the Hainaut Engineers' Society, M. Sylva Cattier observes that granite predominates almost entirely in that country, at any rate on the north of the Tagus; and from the outcrops of stratified deposits it must be concluded that deposits of mineral fuel are very rare. Excepting an anthracite deposit of considerable extent along the course of the Douro—containing too much iron, however, to afford good fuel—one hears but little of any others than an anthracite mine near Porto and the Mondego deposit. In this latter case, what chiefly attracts attention is its relatively recent position in the series of sedimentary deposits, the special qualities of the coal which it contains, and the allied limestone strata. The coal measures begin by a few beds of black limestone, overlaid by a group of six small coal-seams, with intercalations of blackish schistose limestone; and the uppermost seam is separated by a limestone bed from the sandstones forming the roof of this first coal group, being overlaid by fine and compact limestone of great thickness, alternating at some places with argillaceous strata and impure coal bands. Various explorations and investigations have led Senhor Carlos Ribeiro to conclude that the deposit of carbonaceous matters diminishes toward the east, while the purity and increasing thickness of the formation show that the sedimentary phenomena were accomplished with greater intensity toward the west. He also considers that the major portion of the Mondego coal deposit lies under the shores of the Atlantic, a supposition that appears to be confirmed by the results acquired in actual working.

COOKING IN A BEE-HIVE OVEN.—II.

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

(Continued from Page 726.)

A second oven was charged with a similar coal on the same day, and was operated for 96-hour coke. Weight of dry coal charged, 11,024 lbs., the coal containing 5% of moisture. The yield of dry coke over a 1½-in. fork was 6,350 lbs., or 57.51% of the dry coal, or 54.86% of the coal as charged. Time of watering, 20 minutes; time of drawing, one man, 1 hour 57 minutes; weight of breeze and ashes, dry, 240 lbs. or 2.17% of the dry coal charged. The analysis on the dry basis was:

	Coal.	Coke.	Breeze and ashes.
Vol. and combust. matter	32.46	1.06	2.68
Fixed carbon	60.86	89.73	69.79
Ash	6.68	9.31	27.53
	100.00	100.00	100.00
Sulphur	1.89	1.34	1.23

Over a 1-in. screen there was recovered from the breeze and ashes 14 lbs. (= 5.8%) of material of the following composition, dry: Volatile and combustible matter, 1.56; fixed carbon, 86.55; ash, 11.89. The sulphur was 1.20%. The material passing the 1-in. screen was not analyzed.

A third oven was charged on the same day with a similar coal, and operated for 72-hour coke. Time of watering, 17 minutes; time of drawing, two men, 55 minutes; weight of dry coal charged, 11,024 lbs., or with 5% moisture, coal charged, 11,575 lbs.; weight of dry coke, 6,590 lbs., over a 1½-in. fork, or 59.77% by weight of the dry coal and 56.93% of the coal as charged; weight of breeze and ashes, 285 lbs. dry, or 2.58% of the weight of the dry coal charged and 4.33% of the weight of the coke over a 1½-in. fork. The analysis was as follows:

	Coal.	Coke.	Breeze and ashes.
Vol. and combust. matter	32.55	1.71	1.09
Fixed carbon	60.64	88.35	79.97
Ash	6.81	9.94	18.94
	100.00	100.00	100.00
Sulphur	1.93	1.31	1.21

The composition of the black ends of the coke, the so-called "black-jack," was: Volatile and combustible matter, 2.26; fixed carbon, 86.52; ash, 11.22. The sulphur was 1.28%.

Screening the breeze and ashes over a 1-in. screen gave 34 lbs. (11.9%) of material of the following composition, dry: Volatile and combustible matter, 0.80; fixed carbon, 87.64; ash, 11.56. The sulphur was 1.28%. The material passing the 1-in. screen was of the following composition, dry: Volatile and combustible matter, 1.00; fixed carbon, 69.90; ash, 29.10. The sulphur was 1.10%.

The coal used in these three ovens was the same, washed slack, and was of practically the same composition. Each buggy of coal was sampled as it was discharging into the oven.

In the following table, which embodies the results, the composition of the coal is the average of the three analyses, and all the calculations are based on dry material:

TABLE I.
SHOWING CHEMICAL CHANGES FROM COAL TO COKE. PROXIMATE ANALYSES.

	Vol. and combust. matter.		Fixed carbon.		Ash.		Sulphur.		Yield of dry coal in coke.		Yield of breeze and ashes.		Increase of carbon from coal to coke.		Increase of ash from coal to coke.		Decrease of volatile matter from coal to coke.		Decrease of sulphur from coal to coke.		
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	
Coal.	32.48	60.80	6.72	1.91																	
48-hr. coke.	1.51	88.90	9.59	1.37	58.78	2.92	46.21	42.71	85.35	28.27											
72-hr. coke.	1.71	88.35	9.94	1.31	59.77	2.58	45.31	48.51	91.73	31.41											
96-hr. coke.	1.06	89.63	9.31	1.34	57.51	2.17	47.41	38.54	96.73	29.84											

The average yield of dry coke over a 1½-in. fork, from dry coal, was 58.69%. The average increase of the fixed carbon was 46.31% and of the ash 43.25%. The average decrease of the volatile matter was 95.94%, and of the sulphur 29.84%.

As a further contribution to this study, I give the ultimate analyses of the coal and of the coke, averaged dry basis:

TABLE II.
ULTIMATE ANALYSES OF COAL AND COKE.

	Coal.	Dense coke.	"Needle" coke.
Carbon	78.23	84.55	97.55
Hydrogen	1.51	1.33	1.12
Oxygen	8.98	4.33	1.23
Nitrogen	1.56	0.18	0.00
Ash	6.72	9.61	0.10
	100.00	100.00	100.00
Sulphur	1.90	1.31	0.27

The analysis of the needle coke will be commented upon later.

By comparing the proximate composition of the coal and of the coke with the ultimate composition several very interesting things are observable. What is termed "fixed carbon" in the proximate analysis of coal is a very different thing from the carbon obtained on combustion, being in the one case 60.80% and in the other 78.23%. In the proximate analysis the fixed carbon is the difference between the sum of the volatile matter and the ash and 100, on a dry basis. If the volatile matter is 32.48, and the ash 6.72, the fixed carbon is 100 - (32.48 + 6.72) = 60.80. But in drawing off the volatile matter, even in a covered platinum crucible enclosed within another covered crucible, there is a serious loss of carbon because the volatile matter itself is largely

composed of gaseous hydrocarbons together with more or less solid carbon going off in the smoke. The soot is not pure carbon, but contains some hydrocarbon compounds whose nature varies according to circumstances, such as the rapidity of the heating, the duration of the heating and the nature of the coal itself. But the question at once arises, Can any of these volatile hydrocarbons, reckoned as such in the ordinary proximate analysis, be used in the coke oven, during the coking process, as a source of carbon? The answer to this depends upon the nature of the hydrocarbons, the temperature of the oven and the thickness of the bed of coke over the still burning coal.

It is well known that certain hydrocarbon gases evolved from coal at a comparatively low temperature are decomposed at a higher temperature with deposition of carbon; for example, olefiant gas, C₂H₄, and acetylene, C₂H₂, this latter gas, indeed, decomposing, under certain conditions, at ordinary temperatures. But olefiant gas and acetylene do not occur in the destructive distillation of coal beyond a few tenths of 1%, as was shown by Dr. Fyfe several years ago in the *Journal of Gaslighting*, and Ebelmen found that after being in the oven 7½ hours coal gave only 1.667% of carburetted hydrogen in the gases collected. It is possible that reactions going on within the mass of burning coal and the mass of red-hot coke are of such a nature as to allow some of the hydrocarbons evolved to deposit carbon; but it is almost impossible to calculate just how much of this deposited carbon there is in any one oven of coke. The very bright silvery needles and blades of coke found on bee-hive coke are composed of almost pure carbon, the combustion giving 97.55%. But these blades and needles form an insignificant proportion of the coke, and a very thin coating of this silvery deposited carbon serves to improve the appearance of the coke. Deposited carbon may and probably does increase the yield of the coke, but to a very slight extent, and appears to enhance the appearance of the coke without adding much to its weight. Some time ago I had an opportunity of securing some very fine specimens of deposited carbon from a bee-hive oven. Some large lumps of limestone were thrown in on top of a charge to make lime. When the coke was ready to water these lumps were taken out before the water touched them. I examined them closely and found that in the cracks of the larger lumps, and indeed upon the surface of some of the smaller pieces, which, however, may have come from the larger lumps, there were sheets of almost pure carbon, the analysis giving about 98%. The sheets were as thick as ordinary letter paper, and were somewhat flexible. There were countless little globules of bright, silvery carbon scattered all over the sheets, and under a ¼-in. objective these globules were seen to be covered with a network of fine lines, running hither and thither. On illuminating these globules with a focussing glass in bright sunlight, they presented a most beautiful appearance under the microscope, resembling great globes of silver floating in blackness. I have never seen a more beautiful sight than they exhibited.

It is a curious circumstance that the appearance presented by these globules under the microscope closely resembles that given by botryoidal limonite. There is the same network of fine lines, dividing the surface into many irregularly shaped patches. Hair coke, the so-called "whiskers" of the coke burner, is also composed of almost pure carbon, and under a ½-in. objective are often found to be covered with little globules, adhering to the sides of the "hair" and looking like pearls strung on a silver wire.

Percy (*Metallurgy, Fuel, Etc.*, pp. 421-422) speaks of the hair-like form of coke and gives an explanation of its origin, through deposition of carbon in the inner surface of carbon tubes blown out by escaping gas. The hairs are sometimes completely filled with carbon, but at other times are hollow, as I have myself observed.

A study of this hair-coke by a competent microscopist would certainly be interesting. Now and then the hairs are covered with little curved projections, while again they resemble a thread partially untwisted so that the separate strands are visible. Occasionally they are pierced through by minute holes, a high magnifying power showing several holes in line across the hair.

I have amused myself mounting many specimens of coke deposited, carbon, hair-coke, etc., for the microscope and in observing their peculiarities of structure and their exceeding beauty when finely illuminated. Dull and uninteresting as coke may seem to the naked eye, when properly mounted in balsam and the balsam from the upper part removed with gasoline there are few objects more beautiful under a ¼ in. objective, or even a ½-in.

It might be that a microscopic study of coke, and especially of the various forms of deposited carbon found on coke, would give us some valuable information, and I did begin such a study, but the pressure of other matters forced me to abandon the investigation at the time, and since then I have been unable to resume it.

My excuse for this digression must be that in these forms of carbon, whether sheets, or blades, or needles, or hair, we seem to have nearly pure forms of deposited carbon.

Percy (*ut supra*) has more or less to say about deposited carbon, and Fulton in his excellent book on *Coke* also speaks of it. But although all authorities agree that such action may and probably does take place in a coke oven the amount of carbon thus gained is not and cannot be stated with accuracy. As before remarked, a very thin coating of bright silvery carbon may serve to better the appearance of the coke without adding materially to the weight. This subject, however, will be taken up in the next article, in which the changes that go on inside the bee-hive oven will be discussed from the standpoint of the results reached in the cases under observation.

(To be concluded.)

Coal Production of Prussia.—For the nine months ending September 30th, the total coal production of Prussia was 61,882,234 metric tons an increase of 3,792,422 tons over last year. There were 268 collieries in operation this year, of which 166 were in the Dortmund District and 69 in the Breslau District. The output of brown coal (lignite) was 17,063,819 tons, showing a gain of 1,323,202 tons over 1896. The brown coal workings are evidently on a smaller scale than the coal mines, for there were in operation 369 of the latter, giving an average output of 16,257 tons brown coal per colliery, against 230,903 tons of coal per colliery per year.

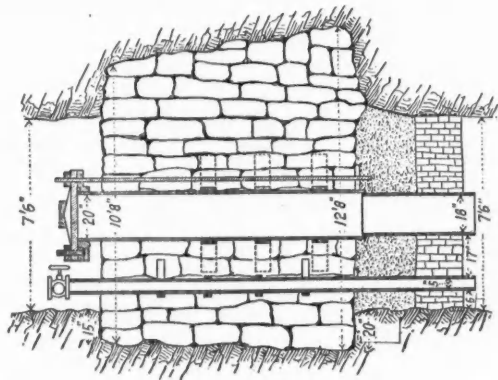
A MASONRY DAM IN A MINE.*

By William Kelly.

An exploring drift on the bottom level of the Curry mine, at Norway, Mich., on the Menominee Range, cut a stream of water, which increased considerably the expense of pumping. The hope that the supply would drain off was not realized. It was decided to build a dam in the exploring drift, as it was estimated that the cost would be recovered by the saving in fuel in less than two months.

The eighth and lowest level of the mine is 780 ft. below the surface. The exploring work had started north from the shaft at right angles across a slate to a jasper formation parallel to that which contains the principal ore body. In this north jasper several hundred feet of drifts had been opened in different directions. The dam was located in the slate near the jasper. The drift at this point is 6 ft. wide and 7½ ft. high. The amount of water inclosed by the dam would be less if it had been built nearer the face of the openings; but the jasper, though hard to drill, is not firm, while the slates, though softer, are dense and solid, and the impermeability and strength of the adjoining measures were of commanding importance.

The dam was built of local sandstone in the shape of an arch upon its side, with a radius of 6 ft. and a thickness of 10 ft. The mortar was made of one part Hilton cement and two parts sharp sand. The abutments were formed by cutting out the sides of the drift in line with the center of the curve of the arch, but leaving the rock rough. The floor was excavated 15 to 20 in. below the bottom of the drift, and the top was made 2 ft. higher in front and 5 ft. higher at the back. In laying the masonry the front courses of stone were cut to fit the arch and care was taken, particularly at the top, to leave no crevices. Two openings were left through the dam: one, a 5-in. pipe to carry off the water, fitted with a gate-valve at the outer end; and the other, a man-way of 20-in.



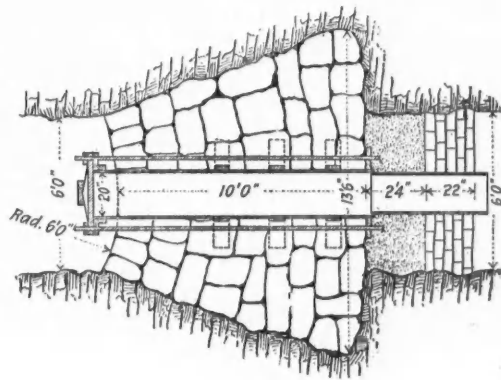
Longitudinal Section.

pumps for six days showed that the mine was making 115 gals. of water per minute, a decrease of 295 gals. The cost of the dam was as follows: Stone, brick and sand at top of shaft, \$41; cement, \$152; pipes, valves and gauge, \$95; labor, sending down materials, \$17; labor, breaking stone for concrete, \$18; labor, cutting out drift, \$21; labor, building dam, \$141; total, \$484. The stone was taken from an old foundation, and the cost of quarrying is not included.

Consumption of Foreign Copper in Germany.—For the 10 months ending October 31st the imports of copper into Germany were 59,587 metric tons and the exports 7,749 tons. This shows that 51,838 tons were either consumed or added to stocks; but no considerable increase in copper on hand is reported. The increase in approximate consumption was 10,279 tons, or 24 7%, over last year.

A Large Oil Tank Steamer.—The Birgsung Engineering Company, Stockholm, has secured an order for the largest steamer ever built in Sweden. It is intended to carry petroleum, and is of 1,800 tons burden, having been ordered by an Armenian merchant for the Caspian Sea trade. The length is 280 ft., the engines are to be of 1,200 H. P. and the contract speed 10½ knots. The price is to be about \$135,000 and the time of delivery next May.

New French Iron Works.—Important works extensions are being carried out in France. Thy-le-Château has started upon the erection of a steelworks about midway between the blast furnaces at Wez-Saint-Martin and the Midi de Charleroi. A Siemens-Martin plant is also being laid down at the Espérance Works at Marchienne. A second puddling plant has been laid down at the blast furnaces at Hormes, and business is active in every branch.



Plan.

DAM IN CURRY MINE, NORWAY, MICHIGAN.

steel pipe, plain at the inside end, and with a heavy flange shrunk on at the other, to which a heavily ribbed blind flange, 2½ in. thick was bolted. A small pipe tapped into the blind flange carried a hydraulic pressure-gauge. The 20-in. pipe was anchored in the masonry by three clamps, and the flanges were bolted to three long rods passing through the wall with washers inside. The 5-in. pipe, with a flange on the inside end, was also anchored by three clamps, the arms of which radiated in different directions. As it is nearly 800 ft. below the surface, and the source of the water was unknown, the pipe and fittings were designed to withstand a pressure of 350 lbs. to the square inch.

The water was shut off about 4:30 p. m., May 13th, 1897, and a little before noon the next day the pressure was 100 lbs., rising to 215 lbs. at 3:30 and 240 lbs. three-quarters of an hour later. The dam leaked about 30 gals. a minute, the quantity increasing with the pressure. This condition was not satisfactory and the water was let off. In two hours the pressure fell to 45 lbs. and the water rose at the shaft about 1 ft. over the floor. A high pressure was produced by a small quantity of water, showing that part of the water course was very small.

The closing of the dam seems to have increased the flow. For the 30 days previous the record of the pumping gave an average of 370 gals. per minute. After opening the dam the average for 14 days was 413 gals.

To put in an impervious stratum, a brick wall 23 in. thick was built 2 ft. 2 in. from the inside of the dam and the space between was filled with concrete. This was made by mixing four parts of limestone, broken to egg-size, with three parts of cement mortar. A short length was added on the inside to the 5-in. pipe, and a piece of old smokestack, 18 in. in diameter, was used for lining the extension of the man-way. Owing to the increase in the water after the dam was opened, there was some delay in draining the mine, and it was 17 days before the addition to the dam was completed. Before closing it three loads of horse-manure were put against the brickwork and held there by a plank partition.

The water was shut off the second time on June 1st at 9:30 a. m. While the water was accumulating in the drifts the pressure increased slowly. The readings of the gauge taken every two hours, beginning eight hours after the dam was closed rose gradually for 26 hours, from 5 lbs. to 273 lbs., the latter being equivalent to a head of 630 ft. of water. On June 8th the pressure was 277 lbs., equal to a head of 640 ft., and the total pressure against the dam was over 800 tons. The leakage through the dam was very small. The water which came through the dam trickled out in eight or ten different places, most of them near the top on one side. The water was milky and left a heavy calcareous deposit on the face of the dam and in the ditch. After the dam was closed, the record of the

Melting Metals with Acetylene.—A note is given in *Dingler's Polytechnisches Journal* on some experiments made in melting metals by means of acetylene gas. The results are said to be very satisfactory, temperatures of 2,700° Fahr. being easily obtained. A batch of nickel was melted in 30 minutes, or in less than one-half the usual time required, and a Bunsen burner arranged specially for the gas could melt a small quantity of copper in a minute.

Lighting by Acetylene Gas.—The small town of Totis, in Hungary, according to *Engineering*, claims being the first town which has introduced municipal lighting by acetylene gas. Not only streets and squares are being lighted in this manner, but also several houses, and on the occasion of the recent visit of the German Emperor the park of the royal shooting-box, the effect being excellent. Among other places, Vienna is contemplating making experiments with acetylene gas lighting on one or two of the large squares.

A High-Pressure Steam Boiler.—A steam boiler carrying a pressure of 3,000 lbs. per square inch was shown at the Stockholm exhibition by Mr. De Laval, the inventor of the steam turbine. The boiler is described as being merely a long concentric spiral tube, less than 1 in. in diameter, through which the water is pumped, escaping as steam at the end, where it is used to propel a steam turbine. The water supply is automatically regulated by the demand for steam, as is also the air supply to the furnace. Notwithstanding the extremely high pressure, the boiler is believed to be a very safe construction on account of the small diameter of the pipe and of the fact that if an explosion should take place it would involve only a small portion of the length of the pipe and a small quantity of water.

Mineral Exports and Imports of Spain.—The exports of minerals from Spain for the 10 months ending with October are given by the *Revista Minera* as below, in metric tons:

	1896.	1897.
Iron ore.....	5,521,797	5,791,619
Copper ore.....	566,933	704,131
Zinc ore.....	30,593	36,084
Lead ore.....	5,792	6,973
Salt.....	225,365	200,140

Exports of metals for the 10 months were 34,952 tons pig iron, an increase of 18,335 tons; 3,132 tons of copper, an increase of 5,521 tons; 142,363 tons lead, an increase of 9,293 tons. Imports of iron and steel included 1,518 tons wrought iron, 11,737 tons pig and castings, 19,872 tons rails and 831 tons tin plates. Imports of fuel included 1,369,776 tons coal and 189,832 tons coke.

*Abstract of paper read at the Lake Superior meeting of the American Institute of Mining Engineers.

PERSONAL.

Mr. J. A. MURRAY, of Butte, is looking over the Utah mining field.

Mr. H. R. ELLIS, of San Francisco, is spending the holidays in Salt Lake.

Mr. C. R. CORNING, who has recently been in Nevada and Utah, sailed for Europe this week.

Mr. W. F. PARKER, of Rosslund, B. C., passed through New York this week on his way to London.

Mr. D. W. BRUNTON returned to Colorado a week ago from a business trip in Montana and Utah.

Mr. HUGH PARK, of Muskegon, Mich., recently spent a fortnight looking over his Utah mining interests.

Mr. SEWELL W. DAVIS is the new manager of the Montana Smelting Company, at Twin Bridges, Montana.

Mr. HOMER J. LINDSAY, formerly special agent of the Carnegie Steel Company, Limited, has been promoted to the position of assistant to President Schwab.

HERR H. VERHOFF, a mining engineer of Berlin, has been examining the mines of the West Kootenay district, B. C.

Mr. ERNEST KENNEDY, of Rosslund, B. C., an extensive operator of West Kootenay mines, has gone to England on mining business.

Mr. R. K. SHELDEN, representing a syndicate preparing to launch a large mining project in Idaho, is in Salt Lake on his way East.

PRESIDENT GATES and a party of directors of the Illinois Steel Company recently visited a number of iron mines in Northern Michigan.

Mr. T. H. TRETHERWAY, of Goderich, Ont., is examining mining properties in the Western Ontario goldfields for prominent Canadian capitalists.

Mr. A. H. S. BIRD, who is examining gold properties in California and Nevada for intending purchasers, was last week at Eagleville, Churchill County, Nevada.

Mr. T. H. OXNAM, superintendent of the Nevada De La Mar mine, was in Salt Lake several days last week; the first time he has been away from De Lamar for over a year.

Mr. P. J. SOMERS, of Milwaukee, Wis., is visiting the properties of the San Juan Gold Mining Company, of Telluride, Colo. Mr. Somers is vice-president of the company.

Mr. GEO. H. FISHER, formerly manager of the Eagle Iron and Steel Company, Ironton, O., has become manager of the Olive Foundry and Machine Works at that place.

Mr. FREDERICK F. SHARPLESS has taken charge of the new stamp mill that the California Exploration Company, Limited, is erecting at the Virginia mine, Coulterville, Cal.

Mr. CHARLES GEORGE KING, JR., of Cleveland, O., one of the prime movers in the company which is to supply the De La Mar Mercur mill and mine with electric power, has returned to Salt Lake.

Mr. JOHN FULTON, mining engineer, of Johnstown, Pa., has been on the Mesabi Range looking up properties that have not yet been taken up for active working. His visit was in the interests of the Cambria Iron Company.

Mr. J. W. CORKINS, of Sedalia, Mo., who has been in the Yaqui District, Mexico, has returned. He says that the country is exceedingly rich in free milling ore, but the placer mines which have been located are not so rich as at first reported.

Mr. ROBERT LAIDLAW, of the Laidlaw, Dunn, Gordon Company, of Cincinnati, has returned from a trip to England. In an interview he said that his firm had secured a number of contracts for hydraulic machinery, including some very large contracts from Russia.

Mr. R. A. WOOD, representing Mr. F. L. Gardner, of London and Paris, has completed a very thorough examination of the Mercur gold region. It is his opinion that next Christmas will find twice as many cyaniding plants in operation there. He sails for Europe immediately after New Years.

RICHARD M. ATWATER, JR., from the staff of the Exploration Company, Limited of London, England, has accepted the position of General Manager of the Ludlow Gold Mining Company at Coolgardie, West Australia, and arrived in New York on the steamer *Paris*, December 18th on his way to the mine.

Mr. CHARLES KAUFMAN, late consulting engineer of the London & Globe Company, has been appointed to a similar position with the West Australian Market Trust, of London. His former position with the London & Globe Company is taken by Mr. HENRY CLAY CALLAHAN, formerly of California, but recently manager of the Lake View Consols mine in Western Australia.

OBITUARY.

DAVID A. PRESTON, Secretary of the Picker Lead Company, died at Chicago December 11th.

SILVANUS MILLER, a civil engineer of Puerto Barrios, Guatemala, Central America, died recently of pneumonia at the St. Cloud Hotel in New York City. He was a member of the American Society of Civil Engineers, and was a contributor to the technical press.

DAVID W. KIRKPATRICK, a well-known civil engineer, died at Pittsburg, on December 6th, aged 40 years. He went with a party to Cuba in 1883 to represent the Juragua Iron Company, Limited, of Philadelphia, in opening ore mines and building railroads and was afterward superintendent of some of the company's property.

JOHN W. VANDEROOT, of Pittsburg, Pa., died at Pasadena, Cal., December 16th, in the 61st year of his age. He was a member of the original firm of Carnegie, Kloman & Co., and kept his interest in the Carnegie Company till his death. He was actively engaged in the iron business at Pittsburg until 1885 as general manager of the Union Iron Mills and treasurer of the Keystone Bridge Company.

SOCIETIES AND TECHNICAL SCHOOLS.

WEST VIRGINIA SOCIETY OF CIVIL ENGINEERS AND ARCHITECTS.—The third annual meeting of the society will be held at Morgantown, W. Va., January 26th and 27th, 1898.

AUSTRALASIAN INSTITUTE OF MINING ENGINEERS.—The annual meeting of the society will be held at the society's rooms in Melbourne on January 14th. The first ordinary meeting will be at Launceston during Easter-time; the exact date is to be fixed. Contributors to this meeting are requested to send in papers before the end of January.

AMERICAN CHEMICAL SOCIETY.—The 16th annual meeting of the society will be held in Washington, D. C. on December 29th and 30th, at the Columbian University. The mornings will be given to reading papers and discussion, the afternoons and the day after the meeting to visits and excursions. President McKinley will probably give a special reception.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—The annual meeting of the Society will be held at its House in New York on January 19th and 20th, 1898. Messrs. E. E. Olcott, S. L. F. Deyo, W. E. Belknap and A. S. Tuttle have been appointed a special committee to prepare a programme. Members are requested to notify the secretary if they intend to be present.

COLUMBIA UNIVERSITY.—The Edward P. Allis Company, of Milwaukee, has just received from President Seth Low his acceptance of an offer by the company to equip a steam laboratory in the department of engineering. The laboratory is to be known as the Edward P. Allis Memorial. The gift of the Allis Company consists of a model triple expansion steam engine and an air compressor. The two are worth \$15,000. The engine will be put in operation to illustrate its workings, but will not be used to operate any plant.

ENGINEERING ASSOCIATION OF THE SOUTH.—The principal paper at the December meeting was by Mr. Rob. L. Lund, of Vanderbilt University, on "An Investigation of Some Tennessee Cement Materials." He described the composition of the clay limestones best suited for cement making, and gave at length the precautions used to get reliable results in a test of specimens taken from various places in Tennessee. As the results obtained he said all the examples gave evidence of hydraulicity. None after six months setting were at all really hard, all were quick setting, and, with one exception, very light in color from an excess of magnesium. All the samples were unsuited for the manufacture of cement.

MONTANA SOCIETY OF CIVIL ENGINEERS.—At the last meeting held at Helena, December 11th, the application of Milo S. Ketchum, of Butte, was favorably considered. The Nominating Committee, F. L. Sizer, John Heron and E. H. Wilson, reported the following list of candidates selected: James M. Page, of Twin Bridges, president; Maurice S. Parker, of Great Falls, first vice-president; Forrest J. Smith, of Helena, second vice-president; Albert S. Hovey, of Helena, secretary and librarian; James S. Keerl, of Helena, treasurer and member of the Board of Managers of the Association of Engineering Societies, and Edward R. McNeill, of Boulder, trustee for three years. The annual meeting will be at Butte January 8th.

SOCIETY OF CHEMICAL INDUSTRY.—The New York section of the Society met on December 17th in Havemeyer Hall of Columbia University. An audience of 300 was present. Allerton S. Cushman read his paper on "Recent Investigations of the Atomic Weights of Nickel and Cobalt." In the discussion which followed Dr. Schieffelin reported some of the interviews he had had with Kruss, who, in work similar to that of Cushman, thought he had discovered a new element.

Professor Chandler then delivered his address,

in which he gave the history of the School of Mines from its start up to its present position. The Havemeyer family donated \$650,000 to erect a hall in memory of Christian Friedrich Havemeyer, the founder of the family.

After the address the new laboratories of the university were inspected. Every room is fitted up with every possible convenience of the modern laboratory. Yet nothing is perfect, and much remains to be done before the laboratory reaches the state of perfection the University desires.

INDUSTRIAL NOTES.

The Belfont Nail Mill, at Ironton, O., has resumed operations.

Furnace No. 3 of the Colorado Fuel and Iron Company, Pueblo, Colo., has been put in blast.

The puddling, scrap and knobbing furnaces of the Canonsburg, Pa., Iron and Steel Company have resumed operations.

Among other improvements, the Du Bois, Pa., Iron Works is to add three large cranes, driven by compressed air, to its plant.

The National Tube Works Company, McKeesport, Pa., has declared the regular quarterly dividend of 1% on the preferred stock.

The Crane Iron Company, Catasauqua, Pa., is to blow in another furnace soon. Muirkirk Furnace, at Muirkirk, Md., has gone out of blast.

The Anniston Pipe Foundry Company, of Anniston, Ala., is to erect a new steel mill to cost \$50,000. The mill will be 450 ft. long and 80 ft. wide.

The Buffalo Furnace Company, which advanced the wages of its employees 5% in October, has given notice of a further advance of 5% to take effect January 1st.

The great rolling mill at Sheffield, Ala., is rapidly nearing completion. It will give regular employment to 800 people. The plant was removed from Roanoke, Va.

It is stated that if the second half of 1897 proves as good as the first the earnings of the Consolidated Steel and Wire Company will be about 27% on its capital of \$4,000,000.

The Reading Iron Company will erect four new Massicks & Crooke's patent firebrick hot-blast stoves at its new furnace plant. The stoves will be of the three-pass type with latest improvements.

At its recent annual meeting the following were elected officers of the Central Iron Works, Harrisburg, Pa.: Chas. L. Bailey, president; James M. Cameron, vice-president; G. M. McCauley, treasurer and general manager; S. B. Baude, secretary.

Messrs. Woodward, Wight & Company, Limited, of New Orleans, La., have taken the Southern agency of the Lidgerwood Manufacturing Company, and are filling all orders for hoists, cableways and carrying devices for contractors or mining men.

In preparation for next year's ore tonnage, President J. H. Reed, of the Pittsburg, Bessemer & Lake Erie road, has ordered 13 locomotives to have a train tonnage of 1,500 tons each. Two of the locomotives will be of the consolidation type and the remainder moguls.

The Alexandria Fertilizer Company, of Alexandria, Va., is about to erect a factory and laboratory for the manufacture of such acids as are used in the manufacture of fertilizers. The company already has an extensive plant for the manufacture, storage and shipment of fertilizers.

The Carnegie Steel Company has secured another tract of land in Braddock, Pa., for a further extension of its interests. It has a river frontage of 156 ft. The land will be used for a universal plate mill, to be the largest ever designed. It will be pushed to completion as rapidly as possible.

Messrs. Sargent & Company, dealers in drugs and chemicals, whose stock was recently destroyed by fire, are prepared to fill all orders at their temporary location, 690 Wabash avenue, Chicago. Contracts for a new building have been placed and the firm look forward to increased business.

Two of the compressed air locomotives to be used by the Cambria Iron Company in its collieries have been ordered from H. K. Porter & Co., Pittsburg. They will weigh 27,000 lbs. each and will have two air tanks giving a working pressure of 700 lbs. The engines are expected to haul heavy trains at least two miles with one change of air.

On December 15th one of the largest coal contracts known in the West was made by the Southern Pacific with the Pleasant Valley Coal Company, for coal from its Scofield, Utah, mines. It calls for 175 cars per week, to be delivered at Ogden for an indefinite period, which amount is now being supplied. This is an index of the increased traffic in the far West, which has been steadily growing for several months.

The Atlantic Chemical Company was recently chartered in Norfolk, Va., for the purpose of manufacturing fertilizers and carrying on a lighterage, wharfage and general storage business. The capital stock is \$100,000, to be increased to \$500,000.

in shares of \$100 each. The principal office will be at Norfolk, Va. The officers are: F. S. Royster, president and treasurer, and C. F. Burroughs, secretary. These, with Charles E. Williams, C. A. Johnson and J. A. Gill, constitute the board of directors.

The Lackawanna Iron and Steel Company, of Scranton, Pa., has leased the Bird Coleman and North Cornwall iron furnaces at Cornwall, and they will be blown in during January. The operation of the furnaces will mean an output of about 700 tons of iron a day, giving employment to several hundred men. The Bird Coleman furnaces were blown out in July, 1893, and the North Cornwall furnaces have been idle since 1886. The force of workmen will be increased at the Cornwall ore banks and the Anville limestone quarries.

The Jackson & Woodin Manufacturing Company, of Berwick, Pa., is extending its foundry building by an addition which covers practically one-half the ground of the original foundry. The construction of the new portion will be similar to that of the present building, having steel trusses supporting the roof and carrying the trolleys for transporting material over the foundry floor. They have given the contract for furnishing and erecting the steel work to the Berlin Iron Bridge Company, of East Berlin, Conn.

It is said that the Home Iron Company, besides paying \$29,000 for the Bristol, Tenn., furnace in advance of the sale, bought claims against the property to the amount of \$85,000. The furnace and appurtenances, including ore, coke, coal and limestone on the ground, is estimated to be worth upwards of \$400,000. The Home Company is composed of Major J. J. Gordon, of Cincinnati; Col. E. J. Sanford, of Knoxville; Col. C. M. McGehee, of New York, and Major A. D. Reynolds, Benj. L. Dulaney and John H. Caldwell, of Bristol.

A feat of engineering resembling the recent moving of the Pennsylvania bridge over the Schuylkill has been undertaken by the Northern Pacific. The east pier of the great Missouri bridge at Bismark, N. D., has slid several feet from its original position owing to the shifting of the sand beneath the foundation. A new foundation 70 ft. beneath the river level is under construction, and when finished the entire pier, weighing 1,000 tons, will be moved from the old to the new foundation. The bridge is to be supported by a temporary trestle work and no delay to traffic is anticipated.

The Dunbar Furnace Company, Dunbar, Pa., is preparing to build an electric power plant at its Semet-Solvay plant of coke ovens to utilize the great amount of gas set at liberty by the by-product method of making coke. The electricity is to be sold to manufacturing plants within a radius of 10 miles of Dunbar. The original plant is to cost \$50,000 and will be increased as the demand for the power increases. At present the gas that will produce the power is entirely wasted and as there are many manufacturing plants and coke works that could use electricity thus produced, it was decided to make the experiment.

TRADE CATALOGUES.

The Jeffrey Manufacturing Company, Columbus, O., issues a neat folder giving a condensed description and illustrations of the Jeffrey Robinson Coal Washing System. It is accompanied by a list of the mines at which this system is in use.

The Vulcan Iron Works, San Francisco, have published a pamphlet describing their refrigerating plants and ice-making machinery. The descriptions are very full and are well illustrated, and the catalogue gives specifications and estimates of costs for plants of different sizes—something which is often neglected in catalogues.

Messrs. Chas. E. Billin & Company, of Chicago, have begun the issue of a "Reference Book of Machinery and Supplies for Mines and Mills," which is intended to serve as a general index to catalogues of manufacturers. The idea is an excellent one and the publication may be made exceedingly useful to buyers. It will be issued monthly.

The pencils made by the Joseph Dixon Crucible Company are so well known everywhere that no catalogue of them is necessary; but the company sends us a most acceptable present in the shape of a box filled with specimens of pencils of every kind—we cannot say of every quality, because all of them are good. They form a very neat reminder of an important branch of the company's business which is growing, as it deserves to do.

NEW PATENTS.

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 one of these will be mailed by the Scientific Publishing Company upon receipt of 25 cents.

WEEK ENDING DECEMBER 14TH, 1897.

595,319. PROCESS OF MANUFACTURING STEEL. Caudido De Esteve Llatas, Paris, France. The method con-

sists in varying the proportions of carbon, manganese and silicon according to the grade of steel required; the proportion of the manganese being diminished 0.02% and that of the silicon being increased 0.02% for each increase of 0.05% in the proportion of the carbon.

595,357. MACHINE FOR WORKING CLAY, ETC. George E. Taylor, Austin, Minn., Assignor of one-half to Fay H. Smith, same place. The machine comprises a plurality of grate-rings, a shaft located within the rings, a plurality of cutters carried by the shaft, each cutter having a portion adapted to work between the rings and an incline face for imparting longitudinal movement to the clay, a hopper at one end of the machine, and a discharge gate at the opposite end.

595,393. PROCESS OF ANNEALING IRON CASTINGS. Richard King, Belleville, Ill. Assignor, by mesne assignments, to the King Annealing Process Company, same place. The process consists in embedding the iron castings in a packing containing metallic manganese or an alloy thereof, and refractory material such as sand, mill-scale or the like, and subjecting the whole to sufficient heat to anneal the casting.

595,429. AIR OR GAS PUMP OR COMPRESSOR. Louis R. Alberger, New York, N. Y. Assignor to the Henry R. Worthington, Elizabeth, N. J. The pump is provided with means for securing communication between the opposite ends of the respective cylinders at the end of each stroke, and for admitting fluid to the cylinders from another source to increase the pressure in front of the plungers above the suction pressure at or near the commencement of each compression stroke.

595,435. ELASTIC FLUID TURBINE. Charles G. Curtis, New York, N. Y. Assignor to the Curtis Company, same place. The turbine is provided with controllable passages whereby the elastic fluid may be caused to act upon movable vanes a greater or less number of times in succession so as to secure different rates of speed economically.

595,451. ACETYLENE GAS GENERATOR. Charles P. Choquette and Antoine M. Merin, St. Hyacinthe, Canada. Patented in England June 13th, 1896, No. 13,115; in France June 20th, 1896, No. 244,818, and in Canada February 12th, 1897, No. 51,976. Combination of an outer tank to contain water in the bottom, means for introducing this water, a small rod surmounted by a larger rod or stopper having its point of junction with the rod conical in shape, means for regulating the length of the whole, and secured to its bottom, and means for regulating the amount of rise of the inner tank with an inward tank or holder having its top formed by means of a tank or chamber to contain the pulverized or granulated carbide of calcium, and having a funnel-shaped bottom provided with an opening at its lower extremity, of just sufficient size to freely slide over the rod or stopper, means of introducing the carbide of calcium into the funnel-shaped chamber, means for the escape of the gas to the point of consumption, and means to guide the inward tank or holder into the outward tank.

595,457. SYSTEM OF MINING GOLD-BEARING PLACERS. William F. Lay, New York, N. Y. Combination of a pit excavated in the placer to the bed-rock and a sump therein formed in the bed-rock, with one or more disintegrating nozzles for disintegrating the placer material and washing it along the surface of the bed-rock into the sump, a force pump or pumps for supplying water under pressure to the nozzle or nozzles, a suction pipe opening in the sump, a centrifugal pump connected with the suction-pipe for elevating the mixed water and placer material from the sump, and means for supplying water to the pit independently of the disintegrating nozzles.

595,513. METHOD OF PREPARING ZINC ORES AND ZINKEFEROUS ORES FOR SMELTING. Edgar A. Ashcroft, Grays, England. The improved method consists in leaching the finely-ground ore with a hot solution of ferric sulphate, thereby dissolving out the zinc and precipitating the iron as ferric hydrate in the residue to serve as a flux in the smelting operation.

595,572. ROLLING-MILL. Julian Kennedy, Pittsburg, Pa. The combination with a series of sets of rolls arranged in tandem, of driving mechanism arranged to drive the sets at different speeds, each set having adjusting mechanism and the adjusting mechanism having connections arranged to operate the same to different amounts corresponding to the different speeds of the sets of rolls.

595,595. MINER'S CAP. John Beck, Carnegie, Pa. In combination with a cap, a disk adapted to be secured to the crown thereof by stitching, a strap hinged to the disk, a frame hinged to the strap, a netting secured to the frame, the strap and frame being adapted to fold within the cap.

595,616. METALLURGICAL FURNACE. Niven McConnell, Munhall, Pa. A water-cooling device for furnace flues, comprising a T-shaped plate or casing, the legs of which are provided with communicating chambers, two of the legs having water passages at their ends and the third having means for providing a water circulation therein.

595,631. STAMP MILL. Edwin Reynolds and Edward Cheshire, Milwaukee, Wis. Combination of a pair of cylinders containing reciprocative pistons, a steam-chest, a rocker valve operated in the steam chest to control passages communicating with the lower ends of the cylinders, a double lever having rigid connection midway of its length with the valve-stem, jointed links having extremities thereof coupled to the ends of the lever and provided at their other extremities with covered sockets, tappet-bars provided with end flanges having sliding play in the sockets, levers coupled to the tappet-bars, and pivotal lever-guides connected to rods extending from the pistons.

595,658. CARBURIZER. Nathaniel Z. Seitz, Washington, D. C. Combination with a suitable tank provided with vertical partitions into its interior to divide the same into a number of communicating compartments, the communicating passages between the compartments being on different planes, a series of horizontal screens of varying degrees of fineness arranged between the vertical partitions, an inlet-pipe leading into the first one of the compartments, and an outlet-pipe leading from the last compartment.

595,668. ACETYLENE GAS MACHINE. Henry Bryant, Aransas Pass, Tex. In combination a generator adapted to form gas from a carbide and water, and provided with a service-pipe, with two tanks, connecting with such generator and pipe, one adapted to expand and contract to accommodate variations between the generation and use of the gas, and the other adapted to receive and feed the excesses of gas at varying pressures, and with four valves, two turn-valves with means for operating them from excess of gas in the

charging-tank, adapted one to control the admission of gas to such tank and the other of water to the generator, and two check-valves adapted to prevent outlet of gas from the generator by the water-passage, and from the gas-holder to the generator.

GENERAL MINING NEWS.

At a joint convention of the miners and operators of the Pittsburg District, on December 21st, it was decided to postpone the matter of fixing a local rate for mining coal, and to arrange for an interstate convention, which should fix a uniform rate for Pennsylvania, Indiana, Ohio and Illinois. A committee composed of operators F. L. Robinson, F. M. Osborne and Alexander Dempster, and M. D. Ratchford, W. C. Pearce and Edward McKay, of the Miners' Association, was appointed to arrange the details for the convention. The convention will be held at Columbus, O., some time in January.

ALASKA.

The various transportation companies have agreed upon a uniform rate of \$300 from San Francisco to Dawson City by way of St. Michaels.

Placer ground near Dyea caused a stampede from the town. Claims to the number of 300 have been staked off. The dirt is reported to be very rich in places.

Arthur St. Cyr has made a survey of the Hootalinqua River for the Canadian government, and has established the fact that the river is navigable for river steamers till into October from Teslin Lake to the Lewis River.

Major J. L. Ruscker, of the Fourth Cavalry, is about to go to Dyea to make a preliminary examination, accompanied by Lieut. L. P. Field of the Fourteenth Infantry. They will be followed by 50 enlisted men who will take the relief stores over the trail to Dawson.

The sum of \$200,000 has been appropriated by Act of Congress to be spent under the direction of Secretary Alger in carrying relief to the Klondike district. The secretary has asked W. A. Kjellman, the reindeer herdsman now in Norway, how soon 600 reindeer can be shipped to this country. It is proposed to transport a very large amount of supplies to Dawson, but the secretary's plan of using reindeer is said to be impracticable by some prospectors.

ARIZONA.

PIMA COUNTY.

OLD GLORY.—The mine, with its 30-stamp mill, is running with a full force of men under Superintendent Hale, who has lately taken charge.

ORO.—This company, with Mr. Gould superintending, has been running its old-fashioned 10-stamp mill for some time on good ore, and has cross-cut such a large body of ore lately that it now contemplates the erection of a new 30-stamp mill.

YAVAPAI COUNTY.

JEROME MINING COMPANY.—G. S. Mulkey, secretary of the company, who has been in Denver buying machinery, says that the company's workings are now down over 600 ft. and a tunnel 1,000 ft. long will probably be driven to cut the ore at water level. The property adjoins the United Verde.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

AMERICAN GOLD MINING COMPANY.—This company has filed articles of incorporation. Capital stock, \$50,000. Directors: W. C. Myself, F. B. Myself, W. J. Myself, W. T. Jones and Sarah Gobenzelf. The company will develop the American mine, six miles east of Sutter Creek.

POTAZUBA.—At this mine, at Sutter Creek, drifts are being run on the ledge at the 500-ft. level, both north and south, and a milling test will soon be made. At the last monthly meeting the 15th call was made for 3c. a share on the subscribed stock.

RANCHERIA.—At this cement gravel mine, five miles northwest of Volcano, bonded by Dennis & Colpe, a 10-stamp mill is being erected and crumpling will soon begin. This gravel can be crushed at the rate of 60 tons per day, and will average \$3.50 per ton.

BUTTE COUNTY.

RED HILL.—C. B. Zeke, who has been president and manager of the above company, has resigned in favor of Henry Eudey, who has become interested in the property with a view to increasing the plant and output.

(From Our Special Correspondent.)

The Alaska Trade Committee has got up an interesting exhibit showing the mode of living in the Klondike. This exhibit has been open to the public here and will go East in charge of a special committee to Chicago, with stops on the way at important points.

The committee in charge of the Golden Jubilee is receiving hearty support in its efforts to make an imposing display at the fiftieth anniversary of the discovery of gold. Various societies, including the Society of California Pioneers, have promised financial aid, and many subscriptions have been received from private individuals.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

MOUNTAIN KING.—This mine, together with the Big Seven and Homestead, have been bonded by

Eastern parties, and work will begin at an early date. All these properties are developed to a considerable extent, the Mountain King shaft being down 270 ft., the Big Seven 110 ft. with a tunnel, while the Homestead has three tunnels in 275, 65 and 40 ft., respectively.

HUMBOLDT COUNTY.

(From Our Special Correspondent.)

The black sand plant located at the mouth of the Little River, was wrecked on the 10th inst. during a severe storm. The damage to the water wheels, piping and buildings is estimated at \$1,500.

KERN COUNTY.

(From Our Special Correspondent.)

ANNEX.—At this mine, adjoining the Nancy Hank and Big Horse, a good ledge has been encountered at a depth of 18 ft. which mills over \$40 per ton.

LITTLE ANGEL.—This mine, known as the Warrington, one mile west of Havilah, is now owned by an Eastern company, that has erected a 10-stamp mill and has 20 men employed. The vein is from 2 to 8 ft. in width and dips 70° east in granite. The ore is said to mill very high.

NEVADA COUNTY.

(From Our Special Correspondent.)

BELLE FONTAINE.—This mine is located in the Willow Valley district, on Deer Creek, three miles east of Nevada City. At a recent clean-up from a 50-ton mill run \$1,250 was realized.

MISTLETOE.—This mine, one mile west of Rough and Ready, shows some very rich ore in the drifts on the 50 ft. level. Assays average over \$90 per ton. The vein is from 3 to 8 ft. in width. Only a small force of men are employed.

PLACER COUNTY.

(From Our Special Correspondent.)

HERMAN.—This mine, on the upper Forest Hill divide, six miles north of Deadwood, has been in operation for the past two years. The ore is high grade. In the spring a tunnel 3,000 ft. in length is to be run to tap the vein at a depth of 1,700 ft. San Francisco parties own the property.

HIDDEN TREASURE.—This drift mine, at Sunny South, 4 miles north of Michigan Bluff, is probably operated upon the most extensive scale of any drift mine in the United States. The company has lately installed an electric plant and has substituted an electric motor for hauling cars from the breasts, a distance of 4,000 ft. Four hundred cars containing 400 tons of gravel are delivered every 24 hours. Not more than 150 cars could be moved with horses.

RED POINT.—This mine, about a mile southeast of Damascus, which is owned by the Golden River Mining Company of Paris, France, is paying good dividends. The gravel is hauled out of the 11,000-ft. tunnel by horses. About 60 men are employed. Ventilation is furnished by a blower driven by a water-wheel.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

About two miles from Hedges, on the road from Ogilby, pay dirt has been discovered that pans out over 50c. a pan. Peter Burke, deputy sheriff of this county, is said to have employed the party making the discovery, and later reports are that locations have been staked out for miles around. This section is very accessible, being only a few miles from the railroad.

HELVETIA.—This mine, $1\frac{1}{2}$ miles southeast of Julian, formerly owned by the Pacific Bank, of San Francisco, has been pumped out by the new management down to the 220-ft. level. Enough ore has been taken out to pay the running expenses. After the remaining 70 ft. of water has been taken out development work on a large scale will begin.

NORTH STAR.—This mine, $1\frac{1}{2}$ miles southeast of Banner, at an elevation of 3,200 ft., is being developed by W. R. Farnsworth. There are two veins, both of which show very rich ore. A mill is to be erected.

SHASTA COUNTY.

(From Our Special Correspondent.)

VANDEVERE & BULLARD.—This mine, on Flat Creek, two and one half miles southwest of Copley, is now under lease to C. H. Castle, of Colorado. The old works and tunnels have been cleaned out and a tunnel run in an easterly direction a distance of 80 ft. This tunnel will be continued until the ledge is struck. The old mill has been started up on ore left on the dump by the former owners.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

DISTLERHORST DREDGER.—This is now working about a half mile from Horse Creek, and good pay gravel is reported. This dredge has been in constant operation for a long time.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

BLACK OAK MINING COMPANY.—This company has erected an electric light plant at its mines large enough to light the town of Soulsbyville, besides supplying the mines with all the power needed.

COLUMBIA MARBLE QUARRIES.—These quarries, which have been worked continuously for the past three years, have been leased to Prince Poniatowski and T. S. Bullock. The Sierra Railway, in which

these gentlemen are interested, will be extended to the works in a very short time. The marble, which is white, gray, banded and rose mottled, is remarkable for its evenness of grain and its elasticity. Most of it is used locally.

HANGMAN'S GULCH.—Preparations are being made to mine in this gulch, which was found to be so very rich in early days. Some virgin ground is said to have been discovered.

COLORADO.

BOULDER COUNTY.

ANTIETAM.—Mr. J. J. Smith, of Milwaukee, Wis., has taken a bond and lease on this and the Independent on the El Dorado Mountain, from Nicholson, Currihan & Co., for \$30,000. He has also rented the Jack Pot mill, near Nederland, and will treat the ore there. The present equipment of 10 stamps will be supplemented by two Wilfley tables. The mill is less than three miles from the mines, with a down grade the entire distance. Mr. Smith will have charge of the mill, while Mr. C. E. Hayden will be the mine superintendent.

COLORADO.—John Rice, of Ward, has leased and bonded this claim to Ex-Senator Tabor.

DOLPHIN.—Some of the officials of the Colorado Northwestern Railway Company have taken a bond and lease on the Dolphin mine. They have just completed a shaft house and have begun active operations.

PENNSYLVANIA.—An Eastern syndicate has secured a lease and bond on the Pennsylvania group at Sunnyside, owned by Sargent and McDonald. The bond calls for \$25,000, a portion of which has already been paid. The vein is shown up by drifts and a shaft 150 ft. deep. The ore body is 3 ft. thick—iron pyrites. Contracts for development have been let.

UTICA.—A good strike of high grade pyritic ore was made in this mine at ward recently, on the 750 level. The property is owned by a close corporation who do not give very full particulars. G. A. Davis is manager.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

ASHLAND GROUP.—C. H. Dow, of Denver, and T. Johns Rigby, of Philadelphia, have begun work on this property, located on Seaton Mountain, and last week let contracts for the extension of adits and sinking the shaft.

CROWN POINT-VIRGINIA.—The court has not yet appointed a successor to Michael Spangler, late receiver of the mine. The mine is operated by the court because of heavy obligations. Big bodies of ore are found, but work has not been carried on wisely.

DENVER TUNNELING AND MINING COMPANY.—This is a new organization at Empire, having for its object the cutting of lodges lying to the north of the station. The company has applied for 53 patents in one group. It is one of the largest groups ever patented at one time in this county.

KILTON GOLD REDUCTION COMPANY.—The sampling works at Idaho Springs operated by Dewey Bros. has been bought by this company and possession has been given. Sampling and purchase of smelting ores will be carried on. This company has works at Boulder, Breckenridge, Denver, Victor and Florence.

MAYFLOWER.—The Eastern owners of this property at Idaho Springs have finally taken possession and have let contracts for sinking the shaft and drifting.

MILLER GROUP.—D. K. Lee, of the Golden Fleece mine at Lake City, is reported to have bought this group of claims on Spring Gulch, at Idaho Springs.

SPECIE PAYMENT COMPANY.—The Eastern people who recently secured this property on Bellview Mountain have been spending considerable money in development without having made the showing they ought. The ore bodies are found in the mine, and in fact there is no pinch of the rich streak which runs in copper and gold, but the men in charge do not appear to be getting the work out of the investment. It is for this reason and no other that there are failures in that section on properties which show large bodies of high-grade ore.

EL PASO COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

CRIPPLE CREEK GOLD HILL TUNNEL.—This is now in Gold Hill 2,710 ft. F. L. Davis has completed his contract. It is expected the Baltimore owners of the property will authorize another contract to put the tunnel in to 3,000 ft. This will put it in shape to connect with the Anchoria-Leland shaft. It is the longest tunnel in the camp.

CORIOLANUS.—This is a full claim on Battle Mountain owned by parties in Saginaw, Mich. On the north end a shaft is down 300 ft., and at the 20-ft. level a drift 110 ft. north show up two intersecting veins of ore of good value. Ground on the northeast part of the claim has been leased to a man named Mason, who has struck ore in paying quantities from \$70 to \$80 per ton at 18 ft. His lease extends to a depth of 100 ft. only. A drift in a southeasterly direction from the intersection of the two veins mentioned before will open up this ground 250 ft. below Mason's ground. On the south end of the property a shaft sunk 170 ft. cuts an ore chute about 35 ft. wide of good grade sylvanite ore. The south end of this claim is in granite and the north

in porphyry. In a short time large shipments may be looked for. James Kline is in charge.

EL PASO COMPANY.—A special meeting of the stockholders was called to consider the advisability of absorbing the Fannie B. Mining and Milling Company. The directors were authorized to increase the capital stock of the company from 650,000 to 900,000 shares, 270,000 shares to be issued to the Fannie B. Company for their property and all their right, title and interest in it. This will leave 89,750 shares in the treasury.

FORT WILCOX.—This joins the Flourine claim on the west and south. Two carloads of ore were sent out last week and more will follow. The ore seems identical with that on the Flourine and is apparently a portion of the great overflow, or whatever it may be, that is found in that property. It is worked from an open cut. These developments on Copper Mountain are giving a great stimulus to prospecting on that and adjacent mountains, especially Rhyolite and Mineral Hill.

GOLD COIN.—The output for November was 2,983 tons, aggregating in round numbers \$100,000. This property is shipping an average of 100 tons per day this month and no special effort is made.

GOLDEN CYCLE COMPANY.—The company has just paid a dividend of \$10,000, which is at the rate of 5c. per share. The capitalization of the company is \$1,000,000 in 200,000 shares of \$5 per share.

KILTON GOLD REDUCTION COMPANY.—The company has just finished its new plant at Florence. The plant is on land purchased from the United Oil Company, and is on the Coal Creek branch of the Denver & Rio Grande Railroad, about a mile south of the town. The crushing building is 130 ft. x 62 ft. and 45 ft. high. The chlorination building in the rear of this is 44 ft. x 49 ft. and 52 ft. high. The ore, which is sampled at the company's sampler at Goldfield, is unloaded into chutes. It is carried to the 27-ft. cylindrical dryer, and when thoroughly dried it passes to another elevator which takes it to the first screen. All that passes through this screen is carried to the roaster, and the residue goes to the fine crushing rolls to be again screened. The fine goes to the roaster and the coarser portion is again crushed and passes to screen No. 3. The fine goes to the roaster and the residue to the rolls till finally all reaches the roaster. This is a 38-ft. Pearce revolving turret pattern with a 7-ft. open hearth. When thoroughly roasted the ore passes through the automatic cooler. The roasted pulp is then carried to the top floor of the chlorination building. The barrel is a revolving one holding 12 tons. When the gold is dissolved, the liquid is drawn off through sand filters and passes to the settling tanks, three in number, with a capacity of 9,000 gallons each. From here it goes to the pressure tank and from there to the two precipitating tanks on the second floor. These tanks also have a capacity of 9,000 gallons each. The gold is precipitated as a sulphide, which is filtered, dried and roasted in a muffle furnace. The roasted precipitate is then smelted and cast into bars. The main building contains two storage bins; an 80-H. P. boiler and an 11 x 15 engine which runs all the machinery. In connection with the roaster is a dust chamber 20 ft. long by 10 ft. wide and 12 ft. high. So far as possible all operations are performed automatically. Petroleum is used for fuel.

MOON ANCHOR.—The shipments for November amounted to \$35,072 net, and the expenses of mining to \$14,140, leaving a profit on the ore of \$20,932; from this must be taken the amount paid in dividends \$15,000, and for surface improvement \$1,058, leaving \$4,874 to be carried to the reserve fund, which is now about \$100,000.

STRONG.—Shipments are large this month, being on an average of 100 tons per day. It is coming to the front as one of the big properties of the camp. The ore is all sent to the smelters and averages between 2 or 3 oz. per ton.

GILPIN COUNTY.

(From Our Special Correspondent.)

BOBTAIL.—At this mill it is the intention of the Eastern syndicate now operating it in connection with the Gregory-Bobtail property, to put in 30 more rapid dropping stamps. The stamps will drop nearly 100 times per minute, and will alone treat over 75 tons of ore every 24 hours.

EAST CENTENNIAL.—This Russell Gulch property is now shipping some very good ore. The last smelting ore gave returns of 12.91 oz. gold, 8.29 oz. silver and 8% copper per ton for first-class, while the second class ran 3.64 oz. gold, 7 oz. silver and 7% copper per ton, some surface quartz running 1.84 oz. gold and 3.50 oz. silver. C. Hesselbine is working the property.

FIRST CENTENNIAL.—The new owners from Colorado Springs have deeded this property to the Seventy-Six Gold Mining Company. A force of 35 or 40 men are at work on the stopes and a proportionate number are at work on development. The property will ship daily from 30 to 40 tons of mill ore, besides a fair percentage of smelting ore. The shaft below the adit level will be repaired and connections made with surface, where the 80 H. P. engine will be installed soon. This property will also ship in the future over the tramway lines.

FRISK.—Leasers have recently gone to work above the 300 levels and have opened up a large block of ground showing fair grade mill and smelting ores. The shaft-house is being enlarged for the new 80-

H. P. hoister. The present working force numbers over 40 men.

FORFAR.—A larger plant of machinery will be installed on this Russell Gulch property this week, the present plant being inadequate for handling the output. Collins Bros. are working the mine.

GOLDEN CLOUD.—This Russell Gulch property shipped ore this week, the best grade of which runs \$125 per ton. Preparations are being made to sink the main shaft another lift of 100 ft.

GOLDEN STAR.—Ground has been broken for the new 50-ton mill to be erected near Wide Awake, by Prof. E. C. Lindermann, of Denver. The mill will be 155 ft. long by 24 ft. The roasting muffles will be of the Beam process, but the mill is to be a dry stamp one and automatic throughout. The professor intends to dry the ore before crushing. From the dryer the ore will be conveyed to the stamp mill, afterward being forced to dust chambers by blowers, and thence to the roasters. After roasting, it will go into cooler vats where it will be leached and the copper precipitated by electricity. The pulp will go to the re-grinder and amalgamator. Professor Lindermann believes that the new plant will be a success, and that it will treat at a margin \$300 ores. The improvements and mill will cost \$32,000, the machinery having been ordered from Hendrie & Bolthoff, of Denver.

GOMER.—A small shaft-house is being erected over this property for the Dominion Explorers, Limited, of London, and general developments will be kept up all winter.

HIDDEN TREASURE MILL.—At this mill, up North Clear Creek, the present 75 stamps will be increased by 10 patterned after the Perigo stamps with a drop of 90 times a minute. Instead of the usual second row of bumping tables Manager Collins intends to put in below the new stamps Fraser and Chalmers frue vanners, which are expected to give better results on certain grades of ores, which do not require fine crushing. A new Corliss engine has also been ordered for the mill.

MABEL.—In running levels at a depth of 110 ft. below the tunnel level on this property, a good body of smelting iron has been opened up, of an average value of \$50 per ton.

NEWFOUNDLAND.—Preparations are about completed for resuming work on this property near Central City. Considerable dead work, such as re-timbering, will be necessary, as the mine has been idle for some time.

NEW YORK.—All treatment of ores at this mill has stopped, in order to change the present 75 slow-drop stamps to 75 fast drop. This will double its capacity and new ore crushers will be put in, the management intending to crush all the ore in future before it is fed to the stamps.

OLD KENTUCKY.—Drifting is going on in the 400 east level with three shifts, and the operators, Messrs. Lesseur Bros., of Denver, intend to soon commence sinking below the present depth of 535 ft.

OPHIR-BURROUGHS.—This Quartz Hill property is giving employment to between 50 and 60 men, mostly on the leasing system. It is a heavy shipper both of mill and smelting ores, which are of good grade. It is operated by a local pool of conservative mining men.

PEDERSON.—This property, on Bobtail Hill, is numbered among the dozen heaviest shippers of this county, its daily shipments running from 40 to 50 tons of mill and smelting ore. Employment is given to 30 men. The depth of the property is only 180 ft.

PITTSBURG-MEEKER.—Cleveland parties, who recently took hold of this mining property, are so well pleased with the showing made by past developments that they have ordered a new plant of machinery which will be installed at an early date.

SUCCESS.—This mine commenced making shipments to the local sampling works this week, the ore showing considerable yellow copper and lead.

TOPEKA.—From a shipment made during the past week of 7 sacks of ore weighing 326 lbs., returns of nearly \$3,000 were received by Manager Lowe, the ore being worth \$8.64 per lb. and carrying values at the rate of \$17,289.46 per ton in gold. The ore was treated at the assay office of E. E. Burlingame in Denver, and during the next few days another shipment of about one ton will be made of equally high grade ore. The rich free gold pay streak opened up in this mine within the past month is now from 4 to 7 in. wide. Alongside this pay streak there is from 4 to 6 ft. of first-class mill ore, which runs 11 oz. gold per cord at the mills. Daily shipments of from 30 to 35 tons of mill ore are being shipped over the tramway lines.

YANKEE HILL.—Small shipments of smelting ore are being received at the sampling works in Black Hawk from this camp, the ore being of a satisfactory grade. With the introduction of capital this young camp should come to the front, as the ore values are there.

LAKE COUNTY.

(From Our Special Correspondent.)

BOSTON CAPITAL.—Mr. N. M. Estey, who has spent the past few months in New York and Boston, returned home this week and was seen by your correspondent. While not caring to be interviewed he admitted that he had virtually closed several big mining deals which will bring prominent Massa-

chusetts capitalists into this field on a number of important propositions early next year.

HERMANN.—Capt. W. A. Johnson, who has been east several times seeking to secure capital to prosecute work on the Hermann shaft has, it is understood, been successful, and has formed a company with a capital stock of \$100,000 which will soon begin work. The shaft is now down over 450 ft., is to be sent down to contact, and drifts and development work will then, it is thought, open up valuable ore bodies.

LADY ALICE.—There would appear to be no doubt but what this mine is a steady shipper. The big ore body opened up recently is improving, and while shipments are not very heavy at the present time they will be increased in the near future. The first shipment from the new strike, it is understood, 1.3 oz. gold, 2½ oz. silver and 50% excess.

MAHALA MINING COMPANY.—Shipments of over 150 tons per day are being kept up from this big producer, the ore being of a very good grade. The sensational reports sent out concerning the finding of very rich mineral at the 1,500-ft. by a diamond drill are flatly denied by the management. They claim that while the outlook is encouraging no rich find has been made up to this time.

MINE MANAGERS' ASSOCIATION.—The leading mine managers of the camp returned the last of the week from Denver, where they took part in forming the Association, as announced in the *Engineering and Mining Journal* last week. The Leadville Mine Managers' Association was virtually the originator of this idea, and the gentlemen are delighted with the results. A number of them express the belief that the Association should be made a national one, and it is believed that steps in that direction will be taken at an early day.

NIL DESPERANDUM.—It is understood that important operations are to be conducted here during the next few months. The finding of a rich chute in this ground some months ago created considerable excitement at the time but it proved to be not the main ore body. At this time a contract recently made for 300 ft. exploration work is being carried forward vigorously. It is thought this will open up the original rich body of mineral.

WESTON PASS.—This district will come rapidly to the front from now on. The new road has been completed and will enable people to ship their ores without the disadvantages which have heretofore existed. The Ruby is the shipper of the district at this time, and is now sending out about two loads a day. Several other shafts are being sent down as fast as possible, and next spring will see an immense amount of work carried on in this section.

LA PLATA COUNTY.

SOUTHERN BOY.—A sensational find of gold ore is reported at this property. A thin streak of calveite carries fabulous values of free gold. The total width of the vein inclosing the streak is 12 in. C. H. Webber, of Durango, owns the property.

PITKIN COUNTY.

In the United States Court of Appeals at St. Louis on December 13th judgment was given for the appellee in the case of the Aspen Mining and Smelting Company, appellant, and Jerome B. Wheeler, appellant, vs. James O. Wood, appellee. The suit was brought on July 30th, 1896, by Margaret Billings, widow of James O. Wood, vs. Jerome B. Wheeler and the Aspen Company, on a judgment to recover \$195,252 and interest from July 16th, 1894, from J. B. Wheeler, and \$209,328 from the Aspen Company, with interest from July 16th, 1894. The lower court ordered an execution against the property of the Aspen Company to satisfy the judgment. Mr. Wheeler and the Aspen Company appealed from the order. The judgment of the lower court is affirmed.

SAN JUAN COUNTY.

OCCIDENTAL MINING COMPANY.—The tunnel on this company's group, on Cement Creek, is being pushed ahead as rapidly as possible. About 325 ft. additional must be run to cut the Black Hawk lead.

RIDGWAY.—This property is shipping 20 to 30 tons a week of high-grade ore with a force of but 15 men.

ROYAL TIGER.—The output is a carload a day which goes to the Iowa mill.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

ANGLO CONTINENTAL GOLD SYNDICATE, LIMITED.—This company, which recently purchased the Terrible & Butterfly group, near San Bernardo station, for \$190,000, the deeds being placed in escrow in the First National Bank of Silverton, is having a 30-stamp mill erected. The ore will be treated by simple amalgamation and concentration. The Terrible vein is from 5 to 15 ft. wide, thoroughly mineralized, and the company intend to concentrate the entire vein matter. The ore runs in silver and gold, and a large streak of it is good enough to ship in its crude state to smelters. Harry B. Adsit, general manager of the property, says the syndicate has placed \$80,000 at his disposal to be expended for improvements, and that the group will, in the course of a few months, lie among the best equipped mines in Colorado.

HECTOR MINING COMPANY.—The Cimarron 30-stamp mill in Marshall basin, will be in operation again in a few days treating ore belonging to F. G. Wilson. Mr. Wilson was formerly superintendent of the company, and last summer secured a lease on some of the workings of the Cimarron mine. He has succeeded, it is said, in blocking

out considerable areas of good gold ore, enough to keep the mill running all winter. The Ophir tunnel, starting just above the Cimarron mill, is in a distance of over 1,500 ft., and is expected to reach the Montana lead the first of the year.

JAPAN MINES COMPANY.—Work of sinking the 135-ft. shaft from the main level of the Japan has been resumed. Manager Walter Beam intends to sink it 500 ft. deeper this winter. The Japan concentrating plant is now running only 12 hours a day on account of the lack of water. The Mikado cross-cut is in the mountain 1,900 ft. and is expected to break into a western extension of the Tom Boy vein soon. The lead will be intersected 1,600 ft. below the outcrop and 170 ft. below the new lower workings of the Tom Boy. There is only one claim, the Mountain Chief, between the Mikado properties and the Tom Boy.

MELDRUM TUNNEL AND MINING COMPANY.—The compressor machinery is being put in as rapidly as possible and will doubtless be in operation before long. It will furnish air for driving four Leyner rock drills. As projected, this tunnel will be driven through the mountains from Pandora to Ironton, a distance of 24,640 ft., principally for the purpose of intersecting the rich ore deposits known to exist in its course. Work on the Ironton side will be prosecuted by hand drilling this winter.

MOUNT WILSON GOLD AND SILVER MINING COMPANY.—This company's 10-stamp concentrating plant, connected with the Silver Pick group, on the northern slope of Mt. Wilson, by a bucket tramway over 5,000 ft. in length, is running constantly, treating 40 tons of ore and turning out 8 to 10 tons of concentrates every 24 hours. The concentrates average \$200 per ton, 90% of which is gold, the silver and copper values paying the freight and smelting charges. The sixth and seventh levels of the mines, 200 ft. apart, were recently connected by a winze, and the treatment of ore from above the seventh will soon begin.

NORTH AMERICAN EXPLORATION COMPANY.—Forty stamps of the telluride Power Transmission Company's 120-stamp mill, in Bear Creek, are dropping on ore from the Nellie and Ella mines. Eighty tons daily are transported to the mill over a bucket tramway, one mile long. The gross output of these mines is now from \$25,000 to \$30,000 in gold per month. The force at the mines numbers 50 men, the large majority of whom are employed on development.

TOM BOY GOLD MINES COMPANY.—Forty-five men are at work in the lower levels. Four machine drills are at work and the last drift is going ahead at the rate of 200 ft. per month. Stopping ground is being blocked out very rapidly and there are reasons for believing the mill will start soon.

GEORGIA.

TWIGGS COUNTY.

The Chickamauga Coal and Coke Company, of Durham, fired up 50 new coke ovens December 6th. In this starting up of a new industry a brief and interesting history is not out of place. When the mines were first opened at Durham it was discovered that they contained veins of a good quality of steam coal; in fact, this Durham coal contains such a small per cent. of sulphur that in burning it creates little smoke, and rivals the Pocahontas coal of Virginia. About a year ago the company above mentioned concluded to make some tests and satisfy itself as to the excellence of the product of its mines. A few coke ovens were built and a number of tons of coke burned. This coke was subsequently tested at the Chattanooga Plow Works, Cahill Iron Works, Wheland's Foundry and several other iron-working plants in Chattanooga, and the results were excellent. The company, therefore, immediately began work on the construction of the fifty stone coke ovens, which are now being successfully operated.

IDAHO.

OSTER COUNTY.

BIG BASIN.—This copper mine is under option by Eastern parties. Col. J. N. Sharp is handling the negotiations.

MONTANA PLACER MINING COMPANY.—It is reported that 19 days' work in Kelly gulch the past season gave a clean up of \$4,000 and 20 days' sluicing in Joe's gulch yielded \$3,000.

ELMORE COUNTY.

DAISY.—This property, owned by Andreas Brothers & Cannan, is promising well. It is worked by a small force of men under F. P. Andreas.

PINE GROVE DISTRICT.—This district comprises both placer and lode claims. It is situated on the South Boise River, a mile south of the town of Pine.

FRANKLIN.—This group of claims at Pine Grove has been sold to a Spokane company. The property includes three claims and a mill. The company is called the Franklin Gold Mining Company. L. K. Armstrong is president; W. Davies, vice-president; L. C. Barton, secretary; A. E. Severance, treasurer; G. P. Mulcahy, manager, and J. T. Walsh, superintendent.

GOLD KING.—At this group of mines Manager Reber is at work erecting a cyanide plant. A large boiler is on the ground and teams are hauling machinery and lumber to the mines from the railroad.

JUMBO.—This property, about 7 miles east from the claims described, is owned by G. McCormick and J. Cowan, of Mountain Home. A body of ore 10 to 12 ft. wide has been shown, with a pay streak 4 ft. wide that has yielded \$40 per ton by mill test,

The country rock is gray granite, with numerous basaltic dykes. The gold is free and in sulphides. Concentrators are necessary to save all the value. This is true of all the properties in the district.

MAGPIE.—This mine has given a steady output for a 10-stamp mill during the past season. A new mill will probably be erected in the spring. The ore is said to run from \$12 to \$20 per ton in gold.

MOUNTAIN VIEW.—This property, owned by G. Campbell and J. Donahue, of Rocky Bar, shows a large vein that assays \$40 to \$25 per ton.

OWYHEE COUNTY.

LE LAMAR MINING COMPANY, LIMITED.—The returns for November show that the total amount of ore crushed during the month was 4,350 tons, total value of bullion produced at mill, \$40,450; revenue from other sources, \$500; total produce, \$40,950. The total expenses were \$38,270, leaving a profit of \$2,680.

SHOSHONE COUNTY.

CEUR D'ALENE DEVELOPMENT COMPANY.—A bond on Amy group of claims, on Pine Creek, about six miles below Wardner Junction, has been taken by this company. A contract is let for extending the lower tunnel 200 ft. The company's enterprises are under the management of Charles Biesel, for years connected with the Helena-Frisco Mining Company, of Gem. The company is partly composed of Ceur d'Alene mining men, but is said to be backed by Eastern capitalists.

INDIANA.

MONROE COUNTY.

An important deal in the oolitic stone belt was closed December 16th, through W. W. Wicks. What is known as the Perry, Matthews & Buskirk quarry was sold to Eastern capitalists for \$300,000. The new company is headed by General Thomas, of the Monon Railway. The original cost of the quarry was about \$60,000, half of which was made by dividends after the quarry was opened.

INDIAN TERRITORY.

Fire in the coal mines at Gowan and Hartshorne has resulted in the death of two miners, and caused serious loss to the mine company.

IOWA.

MARION COUNTY.

O. K. COAL MINING COMPANY.—This company is opening one of the best equipped mines in the State. The shaft is sunk and the machinery in place. The mine is located between Hamilton and Bussey, and will give employment to 150 men before long. J. A. J. Powers is general manager.

KENTUCKY.

LEXINGTON & CARTER COUNTY MINING COMPANY.—In the Common Pleas Court at Lexington, on December 16th, the company was judged insolvent and its property, some 1,067 acres of land in Carter County, was ordered sold. Wallace W. Hill was appointed special commissioner to conduct the sale. The First National Bank of Lexington was given judgment for \$38,633. The property is to be sold as a whole with \$26,000 as lowest bid to be received. Any balance left after paying creditors is to be distributed to the stockholders.

MAINE.

WASHINGTON COUNTY.

WEST LUKE LEAD MINES.—A force of men is at work pumping out shaft No. 8 and getting the debris out of the shaft and tunnel. Mining will begin later.

MARYLAND.

CECIL COUNTY.

MARYLAND CLAY COMPANY.—This company has purchased additional land near North East in order to extend its plant.

MICHIGAN.

COPPER.

ATLANTIC.—The shaft on the recently acquired Smith property shows up well, and the four cars of rock a day, which are sent to the mill, are said to be better than the average of the old workings.

BALTIC.—At No. 1 pit the two crosscuts show the vein to be about 50 ft. wide. The exact width is hard to determine as the trap footwall carries considerable copper. Pits to the north and south show copper from 30 to 40 ft. The exact length of the ore body will not be known for some time. The drift overlying bedrock is deep and the weather will make test pitting rather slow work. Drifting from No. 1 to No. 2 will soon begin and arrangements will be completed for systematic mining. The dip of the lode is about 73° north west.

CENTENNIAL.—The mill is running steadily and the machinery is all under cover.

FRANKLIN JUNIOR.—About one-third of the rock now treated at the old Franklin mill comes from this property.

WOLVERINE.—Hoisting of copper rock from No. 4 shaft is in progress. Power for the drills in the mine is furnished by a Rand compound compressor of the latest type.

(From Our Special Correspondent.)

MICHIGAN MINING COMPANY.—This company has been organized by Capt. Jos. Sellwood (vice-president of the Minnesota Iron Company), John McKinley (discoverer of the McKinley mine on the Mesabi), and Everett Ball, of Marquette, to operate the old Belt Copper Mine in Ontonagon County, Mich., idle

for a score of years. Mr. Ball secured possession of the mine at tax title for \$350, and has been confirmed in his ownership by the courts, and it is now the intention to open and develop the old mine, which can probably be done at a profit by the new methods and at the present prices of copper. Captain Sellwood is president of the new company.

IRON—MARQUETTE RANGE.

There is little probability of a strike, as the miners' union has not received much support and the operators will probably announce an advance of wages by January 1st.

LILLIE.—This mine has stopped work temporarily owing to a breakdown of the hoisting plant.

CLEVELAND-CLIFFS.—At the Cliff's shaft the great bailer is in position and slowly but steadily lowering the water. Mr. James H. Rough, for the past four years mine inspector of Marquette County, will have charge of operations after January 1st.

IRON—MENOMINEE RANGE.

ARAGON.—About 500 men are at work, nearly 200 more than a short time ago. From 13 to 15 cars a day are being sent out by rail.

Considerable ore will probably go forward by rail during the winter. The Chapin is sending out 18 cars a day, and the Cundy is shipping 6 or 7 cars.

MINNESOTA.

(From Our Special Correspondent.)

The last ore vessel to move on Lake Superior was the steel ship *Empire City*, that went from Duluth to Two Harbors last Friday after a cargo of Sparta ore in the docks there, which will remain stored in the vessel here till spring, it being very bad practice to let the ore remain in the pockets at the docks if the latter are to put into use at any early date in the spring.

It is interesting to note the increase in the size of vessels in the ore trade over a year ago. The records of the docks show that cargoes this year average more than 700 tons greater than a year ago, or about 27%. The maximum cargo loaded out at Two Harbors for the year was that of the *Empire City*, owned at Duluth, which took 5,622 gross tons. This was 1,104 tons greater than the maximum tonnage in the ore trade in 1896.

The contract for the ore dock extension of the Duluth, Misabe & Northern road at Duluth has been let to the Barnett & Record Company of Minneapolis for about \$100,000, that company already having work at Two Harbors at about \$200,000. The extension for the Superior ore docks, referred to by local papers as the biggest thing in the world, will be let next week, and will amount to about \$50,000.

Diamond drill operations are to be carried on at the discoveries recently made on the hillside back of Duluth, where the finders affect to believe they have a large deposit.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

FAYAL IRON COMPANY.—At present 460 men are at work at the location, mining and sinking No. 3 shaft; their main energy is devoted to opening new ground and stocking ore, and the stockpiles are lengthening at a very rapid rate. The company now has a complete electric light plant of 500 incandescent lamps in operation on surface and underground, and covers 400 acres of land.

LAKE SUPERIOR MINES.—Stocking is going on rapidly at the mines of this company at Hibbing.

(From Our Special Correspondent.)

IRON—VERMILION RANGE.

PIONEER IRON COMPANY.—Affairs at this mine are in the same condition as a week ago, except that those who thought its declared intention of suspending work a bluff are of the contrary opinion now, for the pumps are pulled, the trams taken up, the shops boarded up and the machinery painted. The lessees say they cannot operate economically unless they can mine more than the probable amount to be allotted them in the next pool. They have now on surface 200,000 tons, while their allotment will not be likely to be over 250,000 tons. They want an extension of the lease and a sliding scale of royalty, neither of which will be given by the freeholders. It may be a long shut down.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

JOPLIN ORE MARKET.—The bad weather during the past week interfered materially with mining operations, and the result is shown in the decreased output of ore. Outdoor operations were practically suspended, and operators who clean on lead jigs all made light turn-ins. Zinc ore dropped 50c., selling at \$24 per ton for the top grades, but lead ore remained the same, selling at \$23.25 per 1,000 lbs. As compared with the preceding week the sales were less by 962,880 lbs. of zinc ore and 586,010 lbs. of lead ore and the value was less by \$25,637. For the corresponding week last year zinc ore brought \$25 per ton and lead ore \$16 per 1,000 lbs. and the shipments were greater than the past week by 326,530 lbs. of zinc ore and 255,140 lbs. of lead ore but the value was \$3,150 less. There is very little surplus of zinc ore in the entire district and about 500,000 lbs. of lead ore. Following are the sales of zinc and lead ores from the different camps in the district for the week ending December 18th, 1897: Joplin, zinc, 918,550 lbs.; lead, 168,490 lbs.; value,

\$14,252. Carterville, zinc, 1,053,800 lbs.; lead, 196,340 lbs.; value, \$15,621; Webb City, zinc, 394,510 lbs.; lead, 26,920 lbs.; value, \$4,494. Oronogo, zinc, 322,590 lbs.; lead, 4,930 lbs.; value, \$3,748. Galena, zinc, 2,750,000 lbs.; lead, 296,430 lbs.; value, \$35,767. Aurora, zinc, 630,000 lbs.; lead, 25,000 lbs.; value, \$5,607. Mt. Vernon, zinc, 331,070 lbs.; value, \$3,973. Alba, zinc, 87,450 lbs.; value, \$962. Springfield, zinc, 44,000 lbs.; value, \$506. Belleville, zinc, 56,150 lbs.; value, \$618. Carthage, zinc, 44,000 lbs.; value, \$484. District totals for last week: Zinc, 6,632,120 lbs.; lead, 718,110 lbs.; value, \$86,032. District totals for 51 weeks: Zinc, 342,680,400 lbs.; lead, 57,192,960 lbs.; value, \$4,442,294.

CRAWFISH MINING COMPANY.—On the L. B. Jones land, south of the Rex land, this company has developed a big lead prospect. The men made over 500 lbs. of lead ore in 2 hours Saturday.

CROSS, MARTINDALE & COMPANY.—The soft white dirt taken from the company's shaft on the Cross, Martindale & Reece lease, in St. Joe Hollow, East Joplin, proves to be zinc bloom, and is composed of carbonate and oxide of zinc and water. Some of this mineral is gray and some yellow, on account of the oxides of lead and iron contained in it. It is found at about 12 ft. below the surface in open ground.

MABEL P. MINING COMPANY.—This company, in Leadville, has finally broke through the hard cap rock at 110 ft., and has opened up a 10 ft. face of lead and zinc ore. The men use an Ingersoll steam drill to break the ground.

MCADAMS & COMPANY.—On the Gramby land, in Lone Eden, this company turned in 4,800 lbs. of lead ore from 2½ days' work, and when the drift is opened up will increase the output.

MCKINLEY MINING COMPANY.—This company has just put in a new 100-H. P. boiler purchased in Oil City, Pa. The steam concentrating plant has been overhauled, and will start this week.

MONTANA.

JEFFERSON COUNTY.

(From Our Regular Correspondent.)

A new mining camp is being opened up on the headwaters of Warm Spring Creek (Middle Fork), which bids fair to be one of the big producers of the State. Early in 1896 the first locations were made. Since then development work has gone quietly forward, with the result that several properties have become shippers. The country is an altered granite with intrusive dykes of eruptive rock along which is found the mineral. Some of the ores are heavy in lead, while others are mostly iron sulphides. All carry a fair gold value—1 to 2½ oz. gold and 12 to 30 oz. silver—as shown by shipping results. The ores all carry a small per cent. of copper, which will probably increase with depth. The camp is very accessible, being only six miles from the railroad and 20 miles from the smelter at East Helena.

B. & G. GROUP.—This has shipped about \$5,000 worth net. The shaft is 55 ft. deep, showing 11 in. of ore in the bottom. Various openings on the surface along the vein for a distance of 1,500 ft. show ore. The last two cars gave smelter returns of \$1,600.

COPPER JACK GROUP.—This has recently been sold to Chicago parties who have organized the Gold Nugget Mining Company. This property has shipped about \$2,000 worth of ore. The shaft is 60 ft. deep. The company is preparing to sink to 200 ft., open the property extensively, erect an ore dressing plant.

HARTMAN.—The shaft is 20 ft. deep with a drift of 40 ft. Forty tons of ore shipped, gave smelter returns of \$20 per ton net.

LEGAL TENDER.—This old time producer after years of idleness has been leased. It was famous for its ruby silver ore, sufficiently rich to pay well for shipment by bull team to Corrin, Utah, a distance of 500 miles, and thence to Swansea, Wales. The three compartment shaft, 500 ft. deep, and the several thousand feet of levels are to be unwatered. This property is an asset of the defunct First National Bank of Helena.

MOCKING BRD.—This has the deepest shaft in the camp, 130 ft.; \$3,000 worth of ore has been shipped. This ore is an iron sulphide, carrying about 2 oz. gold, with little silver, some picked specimens assaying 27% copper. The claim is under bond to a Mr. Curtis, of New York, for \$10,000.

O'BRIEN.—This property is 40 ft. deep. A drift at the bottom of the shaft passed through 40 ft. of ore. There is about 10 tons of ore on the dump, which samples well in lead. An option for \$10,000 has just been given on this property.

RUBY.—At a recent meeting the following officers were elected: President, Maitland E. Graves; vice-president, Gov. R. B. Smith; secretary and treasurer, Levi P. Wild; foreman, Martin Buckley.

SUMMIT.—This shaft is 75 ft. deep. About 40 tons of ore are on the dump awaiting shipment. The property is worked under a bond for \$10,000. The ore is an iron oxide, sampling about 2½ oz. gold.

WAR EAGLE.—An adit tunnel passed through a 40-ft. chute of ore, a sample car load of which netted about \$20 per ton. The tunnel is now in 160 ft. This property is now under bond for \$7,500.

LEWIS AND CLARKE COUNTY.

MONTANA MINING COMPANY, LIMITED.—The total output for November was 3,140 oz. gold, and 15,990 oz. silver obtained from 6,300 tons of ore

crushed and 5,633 tons of tailings. The estimated realizable value of the ore is \$56,600, and of the tailings \$14,700, a total of \$71,300. The total expenses were \$52,700, leaving an estimated net profit of \$18,600.

SILVER BOW COUNTY.

ANACONDA MINING COMPANY.—This company is reported to be shipping to its smelter over the Butte, Anaconda & Pacific Railway 215 cars of ore a day. Each car is approximately loaded with 55,000 lbs. of ore, in round numbers 6,000 tons, taken from the mines each 24 hours.

COLUSA-PARROT MINING AND SMELTING COMPANY.—Articles of incorporation of this company recently filed state that the objects of the company are to conduct a mining, milling and smelting business in Montana, the principal office to be in Butte. The capital stock is \$1,000,000, divided into 10,000 shares of the par value of \$100 each, all of which has been subscribed and paid in. The life of the corporation is for 50 years.

The trustees of the company for the first six months are William A. Clark, Charles W. Clark, Alex. J. Johnson, A. H. Wethey and C. A. Mc-Boom. Alex. J. Johnson, of Butte, is agent. The property includes the Smelter placer claim, the Colusa-Parrot and Parks-Parrot lodes, the Butte Reduction Works, the Butte Ore Purchasing Company, with all improvements of every character connected with the properties. The entire capital stock has been paid in money. The outside office of the company is at the Traders' National Bank of Spokane, and the Butte office at the banking house of W. A. Clark & Bro.

A deed from William A. Clark and Charles W. Clark and wife conveys to the Colusa-Parrot Company all the property enumerated, the consideration being \$1,000,000.

NEVADA.

ELKO COUNTY.

(From Our Special Correspondent.)

DEXTER.—Weather has interfered with mill construction and other surface improvements. It is now expected that the new plant will be ready for work in February. Mr. A. M. Grant, of the Colorado Iron Works, has returned from Salt Lake and is pushing things. The yield of the mine for 1897 will exceed \$150,000, and some \$80,000 will have been expended in exploration and improvements by the time the mine is in full operation.

HUMBOLDT COUNTY.

(From Our Special Correspondent.)

BIG ANTELOPE COPPER.—Several months ago Alex. Hyslop secured a bond on the Big Antelope Copper group, in the Antelope district, for C. L. Dignowity, of Salt Lake, on which development is in progress. There are five or more perpendicular veins in slate which show a strong outcrop carrying good copper values and the other conditions are admirable for tunnel exploitation. Owing to Mr. Dignowity's absence in the East and other considerations, the bond, due December 17th, is extended to March 17th. The purchase price is said to be \$25,000, which includes a group in Humboldt mining district, where rich gold float occurs.

GOLCONDA.—The 100-ton concentrating mill is on its first trial run, particulars of which will be known next month. Manager Otto Stalmann is on the ground directing affairs. A Southern Pacific spur connects the mill with the main railroad. The mines, 12 miles distant, consist of several patented and other claims. Chief development is 250 ft. shaft, with two levels and crosscuts. Recently in building a road at the mines a side-hill cut exposed the vein and exploration is in progress at this uncovering, which shows to advantage. It is a copper proposition owned by the Glasgow and Western Exploration Company, Limited.

LANDER COUNTY.

(From Our Special Correspondent.)

AUSTIN.—Mill is running smoothly and December will show the best production for the year. Some 150 tons have been shipped since the first of the month, of which 50 tons were crude.

LINCOLN COUNTY.

(From Our Special Correspondent.)

APRIL FOOL.—Under ground the showing is better than 12 months ago. Main development is a tunnel on ore zone, from which crosscuts are driven. Values are won by a 10-stamp with plates, tailings from which are cyanided; total extraction is said to be 95% of ore contents; 60% on plates and 35% in cyanides. April Fool is an incorporated dividend-payer, which keeps its affairs from the public, though it is said the December distribution is larger than customary. Ground joins the De La Mar on the east. Frank Wilson, one of the owners, is superintendent.

DE LA MAR.—Both mine and mill have made another excellent record for 1897. Figures of tonnage treated are not obtainable, though for the past few months 9,000 tons per month were milled. The 1,300 level, the deepest working, is said to have recently opened rock of good value. At present time the proven ore reserves exposed show not less than \$5,500,000. During the year the mine has paid net \$120,000 to \$130,000 per month, of which 5% went to Manager Hartwig A. Cohen, and remainder to Capt. J. R. De La Mar. Total 1897 yield is semi-authoritatively given at \$2,147,000—if anything it was greater rather than less. Of the ore values over

80% are gold, the rest silver. The mine is equipped with the most complete cyaniding plant in the world—at least that is the statement of all visitors informed on this point—and the metallic extraction exceeds 98% of the gold. Some 250 men are employed under Superintendent T. H. Oxnam.

FERGUSON MINING DISTRICT.—Probably less is known of De La Mar—both town and camp—than any section of the United States of equal economic importance. Here more gold is being produced, twice over, than in the rest of Nevada and more than in all Utah. Most of this comes from the great De La Mar, which has been a notable mine for four years, and has given its name to the most important town in the Eastern half of the State, yet this town is not on any published map; even the latest large, revised map, issued by the Interior Department in 1896, fails to show the town. Few are aware this is the Ferguson Mining District, organized in 1892. Monkey Wrench was the first property, and Magnolia the first shipping mine. For the most part the country rock is quartzite and the ore is found in a hard vitreous quartz, next to a quartz porphyry dyke, said to be the best mineral for cyaniding known. The nucleus for the De La Mar mine was the Monitor and Jim Crow claims. By a special ruling of the Postal Department, the post-office is "Delamar", the town commonly is written De Lamar and the mine De La Mar. It is distant 162 miles from Milford, Utah, on the Oregon Short Line, and 51 miles southwest of Pioche. From 35 to 120 freight outfits ply between Milford and De Lamar at all seasons of the year. All told the district gives employment to 600 or more men, who receive the highest wages paid in the West and generally prosperity prevails.

FLAGSTAFF.—Main development is a tunnel about 780 ft., with several crosscuts. Exploration thus far has made a promising uncovering of mineral. Six men are at work under the direction of T. H. Oxnam.

GOLD CUP.—Frank P. Swindler is working the mine under a year's bond, and has opened quite a body of low-grade ore—probably the making of a favorable cyaniding proposition. Gold Cup joins De La Mar on the west and April Fool on the north.

MAGNOLIA.—Very little is at present being done under the bond, which is expected to lead to a sale soon. Ground is opened by tunnel, affording 350 ft. vertical depth on ledge, and a shaft connects with tunnel. There is considerable good ore on dump. Property is situate 1½ miles west from De La Mar. Charles Garrett is in charge.

LYON COUNTY.

BOSTON-NEVADA COPPER COMPANY.—O. B. Hardy has tendered his resignation as superintendent, and the works are now in charge of W. J. Nelson, president.

NYE COUNTY.

(From Our Special Correspondent.)

IONE.—About the first of the year it is expected the new 20-stamp mill will be operating, as the machinery is now nearly all in place. Besides stamps and plates, eight vanners of the 6-ft. pattern complete the plant. The realty consists of eight patented claims in a connected body through which run four parallel veins, with a general northwest and southwest strike. Deepest working is an incline 300 ft., though there is considerable development done. At present price of silver the gold values somewhat exceed those of the white metal. Ione is an old mine which has passed through numerous ups and downs. It is situated 50 miles southwest from Austin. Last summer a transfer of ownership took place, and the Nevada Company, incorporated under New Jersey laws—with \$200,000 capitalization, shares \$1,000—has systematically advanced exploration for several months. As indicated by par value of shares, it is emphatically a close corporation, of which J. G. Phelps-Stokes is president; John Sherman Hoyt, vice-president; J. W. McCulloch, treasurer-secretary, all of New York, with Philo T. Farnsworth, of Salt Lake, manager.

NORTH CAROLINA.

RANDOLPH COUNTY.

ST. HELENA GOLD MINING COMPANY.—A charter has been granted to this company by the State. The incorporators include M. O. Beaty, and the capital is \$10,000.

NEW MEXICO.

LINCOLN COUNTY.

(From an Occasional Correspondent.)

WHITE OAKS MINING DISTRICT.—This district is 80 miles east of San Antonio station on the Santa Fe Railroad and 160 miles east of El Paso, Tex. From El Paso the El Paso & North Eastern is now building a line to connect with the Rock Island system at Liberal, Kan. This is expected to reach White Oaks early the coming summer. When the railroad comes a great boom in mining is assured for the most overlooked and one of the most promising gold sections in the United States—according to the opinions of some of the best posted mining men and experts who have from time to time visited it.

The town of White Oaks lies in a narrow valley at an altitude of 6,200 ft. above sea level, and has about 600 population with good schools and churches three miles to the east are the Patis Mountains, having an altitude of 9,200 ft., where are the main

coal mines. The base of the mountains is lime, slate and shale; the summits are mainly trap, gneiss and porphyry. Two miles to the south lies Carrigo Mountain, the formation of which is trap, gneiss and porphyry. No pay mines have yet been found in this mountain, which rises to an altitude of over 12,000 ft. above sea level. Baxter Mountain lies one mile west of town, and is 8,500 ft. high. This is the mountain in which at present most of the pay mines are. It is composed of gneiss, schist and porphyry, the former predominating. The porphyry is in dykes from 2 ft. to 100 ft. thick, having a strike very nearly due north and south, and dipping to the east. The profitable gold-bearing veins are fissures in these dykes filled with quartz and carbonate and oxide of iron, and carrying free gold. The veins are all the way from a mere stain in the porphyry to 40 ft. in width. Sulphides have not yet been found to any extent. The most remarkable thing about these mines is that no water has been found in any of them, though the deepest, the North Homestake, is now down 1,060 ft. It is believed that the water will not be found above the level of the valley, which is over 500 ft. further down.

The North Homestake operates a 20-stamp improved mill, California pattern. The South Homestake is now down 650 ft. with its main shaft, and owns a 20-stamp modern mill, which is under the able management of Col. W. H. Weed. The Old Abe, John Y. Hewett superintendent, is now down 700 ft., with its new 800-ft. working shaft, and will reach the 800-ft. level, and begin hoisting ore before January 1st. As near as I am able to ascertain after considerable patient inquiry the ore milled in this camp will average \$20 per ton assay value.

Fully 90% of this value is saved on the plates and in the batteries. There are other good properties and prospects lying idle for the want of machinery. The fuel used is wood and coal, for there is an abundance of good timber here. Water for the mines at Baxter Mountain is pumped three-fourths of a mile from the valley where it is got, at from 14 to 60 ft. Ten miles north of White Oaks is the Jicorillo district, where there are at present 250 men working in the placers, and a few developing some of the veins. The formation there is mainly gneissic granite with porphyry in dykes and flow. Seventeen and a half miles south of White Oaks is the Nagal district, a free and concentrating gold camp. High silver and copper assays have been got there, and two large companies are operating mills. Nine miles south of Nagal is the Bonito District, where they claim to have a hill of porphyry ore which will average from \$5 to \$7 per ton.

PENNSYLVANIA.

ANTHRACITE COAL.

The Twin shaft of the Newton Coal Company is idle, owing to a strike of the runners for higher wages.

The Lehigh Coal and Navigation Company will discharge all boys under 12 years of age working in its Panther Creek Valley collieries.

The Lytle colliery at Primrose, one of the largest individual coal enterprises in Schuylkill County, will close down for two months. The object is to remodel the main slope and make other improvements.

It is stated that the Delaware, Lackawanna & Western coal department in order to lessen the risk of fire has ordered that all wooden shanties underground be demolished and replaced by stone structures. Similar action was taken by the Delaware & Hudson shortly after the fire in the Von Storch Slope.

NATALIE COAL COMPANY.—George C. Wilson, attorney for the Pittsburg Trust Company and receiver of the Natalie Company, has asked the court for permission to issue receiver's certificates to the value of \$30,000, to pay various expenses. Besides the mortgage, held by the Pittsburg Trust Company, of \$2,000,000, there are judgments by various parties outstanding, and the income from the property is not sufficient to pay the accounts and expenses noted.

BITUMINOUS COAL.

Recently 7,000 acres of Fayette coal lands in Luzerne and Redstone Townships were sold to Pittsburg, Philadelphia and New York parties at \$100 an acre. It will be reached by branches from the Pittsburg, Virginia & Charleston and the Pittsburg & Lake Erie Railroads.

PETROLEUM.

The southwest extension of the Elk Fork Pool continues to be promising territory, though two wells located south of the extension have discouraged further drilling in that direction.

A well drilled on the southwest in advance of the Hendershot Pool, in Wood County, has proved to be a duster. Interest now will turn to the west and northwest of the pool.

Judge Lambert, of Erie County, on December 17th decided litigation involving oil land in the Chipmunk Pool valued at \$100,000. The suit was brought by A. E. Darrow against the Devonian Oil Company. It involved a mortgage given some 30 years ago when the property was thought to be of value only for the timber. By Judge Lambert's decision the Devonian Company's title to the land is sustained.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

BLACK TAIL AND GARDEN CITY DISTRICTS.—About 450 tons of ore are being shipped each week from these two mining camps, principally from the Carroll group, Kicking Horse, Harrison Mine and the Penobscot. The cyanide plant will start up soon, which will cause an increase in production.

CARROLL GROUP.—Exploring work on the vein in Black Tail gulch is finished. The vein is 45 ft. wide and 16 ft. deep, and continues at least 800 ft. The ore assays very well. Active work of developing the mine will begin immediately.

CLINTON MINING COMPANY.—A vertical ledge of silicious ore on the Portland group about 3 ft. wide and 1 ft. thick carries horn silver. The finding of this in silicious ore is entirely new to mining men of the Black Hills.

DEADWOOD DEVELOPMENT COMPANY.—No work is being done at present on the property, as the mine is full of water. In all the Two Bit mines steam pumps, with not less than 200 gallons a minute capacity, are required to keep them dry.

GILT EDGE.—About five tons of ore are being shipped daily from this mine, in Strawberry Gulch, to the D. & D. smelter. The force of men will soon be increased. In the Dakota Maid mine, which is near the Gilt Edge, two drifts are being worked. The shaft on the Eureka mine, owned by the Union Hill Company, is down 40 ft.

GOLDEN HILL.—On this property, consisting of eight claims, across the gulch from the Hardin shaft, a contract has been let to Foley Brothers to sink a shaft to the 100-ft. level. Adequate hoisting machinery has been ordered that will sink to the 500-ft. level.

HARDIN COMPANY.—Double shifts are employed in the shaft where the pyritic ore was first discovered. The ore body has been crosscut 15 ft. in one direction and 40 in another and shows no sign of decreasing in value. The work of stoping will begin very soon. A general conference of the different Hardin companies has been held in regard to establishing a smelter in the gulch.

Ore has been struck in the Hardin shaft, north of the Hardin residence. It is an iron pyrites similar to that found in the main shaft. Water has been very bothersome. It is not believed that it is the main ore body, as it is not deep enough by several hundred feet.

HAWKEYE.—This property, owned by Lincoln, Neb., capitalists, is being well developed. The principal work is being done in a drift which has been extended 90 ft. The drift is being extended towards the Homestake property, which joins the Hawkeye. The new hoisting plant over the R. E. Lee shaft is nearly completed. The stamp mill at Pluma will be started up soon.

HERCULES MINING COMPANY.—The property is located about 2,500 ft. below the townsite of Two Bit and consists of the Ophir group of 11 claims, the Apex group of nine and the Creighton group of 11 claims, together with a number of individual claims, making about 350 acres of land. John Walker, superintendent of the Gates Iron Works, of Chicago, is president of the company. A hoisting plant is to be built with a capacity of lifting ore 2,000 ft. Two shifts of men will commence a four compartment shaft this month. It is expected that ore will be encountered at 250 ft. The formation is the same as that found in the Hardin property.

INCORPORATED.—Articles of incorporation have been filed for the Hill City Gold Quartz Mining Company, at Pactola, with a capital of \$5,000,000. Incorporators are: George D. Weston, S. A. Dinsmore, Theo. Gerrish, W. H. Gates, M. C. Foss, Boston; Francis Weeks, Bath, Me.; T. C. Brown, S. B. Horne, George W. Ward, Sioux Falls. For the Hardin Standard Gold Mining Company, of Deadwood; capital, \$1,000,000. Incorporators: B. L. Moreness, James DeLaney, Lafayette Briggs, R. T. Dabney, Morris Kohn, James Reddick, Albert Brown, George Wisnor, Chicago; Charles H. Hardin, Deadwood.

IRON CREEK.—Fair returns have been received from mines in this district, especially the Ah-Sar-Bin group of three claims. Samples of bluesilicious ore, taken from the discovery shaft, assay very well. The ore resembles that on Ragged Top.

LITTLE BLUE FRACTION.—A rich strike has been made on this property in Yellow Creek, in a drift from the main shift. The ore is silicious and is in a 5-ft. vein. The exact extent of the ore body is not yet known.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

HARNEY PEAK TIN COMPANY.—The Supreme Court of South Dakota has just handed down a decision which will affect several big mining companies in the Black Hills. For several years the Harney Peak Tin Company has not paid its taxes. Last summer the treasurer of Pennington County levied on the personal property of the company for the entire amount of the tax, amounting to about \$10,000. The case came before the Supreme Court, which decided that the taxes could be collected in full by the county. The disputed question in the case was whether property in the hands of a receiver, appointed by the United States Court, could be taxed, and whether the payment could be enforced.

HOLY TERROR.—For several months past the Holy Terror has been producing \$20 free-milling ore, and has been making a daily clean-up of \$1,000 from a 10 stamp mill. The new hoist has been finished and is in operation. Since the first of July, the mine has paid \$9,000 a month in dividends. When it is considered that there are only 40 men employed in the mine, and only a 10-stamp mill, this is without doubt the best paying mine in the Black Hills. The monthly dividend is a little over one-fourth of that paid by the Homestake, with its great mills and large force of men.

KEYSTONE DISTRICT.—The Keystone mine, at Keystone, has been purchased by a company composed of Chicago and Milwaukee men, who also have the principal stock in the Holy Terror, adjoining. The Keystone had been bonded for some time to an English syndicate, but the option had expired. The Keystone will be under the management of the Holy Terror. The price paid was \$225,000. This is considered the largest sale in the Southern Hills. The 40-stamp mill will be repaired and put in operation.

PLACER MINING.—Considerable placer mining is being done on Rapid and Castle creeks. These streams have been worked for years. Recently a Kansas City company put in some hoisting machinery and a Cornish pump, and are now operating the gravel to bedrock. A shaft has been sunk through 14 ft. of gravel in the bed of Castle Creek, which will average \$6 per cubic yard.

ST. ELMO.—The mine has been purchased by Captain Marsh, of Omaha. It is located at Hill City. The bismuth mill has also been purchased by the same person and will be moved to the mine. It is planned to erect a 10 stamp mill, with the necessary machinery, to save the concentrates.

TEXAS.

NAVARRO COUNTY.

CORSICANA OIL DISTRICT.—There are now 33 producing wells with an average daily product of 17 or 18 bbls. in the district, which is yet but little explored. Transportation facilities are lacking and about 6,000 bbls. of crude are stored at the wells in tanks. The oil is found in sandstone at about 1,025 ft., the oil-bearing zone being 25 to 30 ft. thick. The overlying formation is very soft and a drive pipe is put in to the bottom of the hole.

UTAH.

(From Our Special Correspondent.)

Winter, which began in earnest the first of the month, was marked by snow in most districts, till the 17th, when it turned clear and cold. These prevailing storms have hindered the shipments of many who thought to send forward considerable ore before the end of the year. This is specially true of Deep Creek, where the roads are reported in horrible condition. In other localities small producers, distant from rail communication, who had delayed their final consignments, will now be unable to ship. Already the ore supply is feeling the effect of the weather here. Silver's decline is a further cause of depression, which for a day was offset by lead's advance. All the smelters report matters moving as previously noted in this column, and count on keeping their stocks now in blast running for an indefinite period, in spite of present conditions.

There is some talk among mine owners of forming an association similar to that recently formed in Colorado, though the basis for which they will unite is by no means settled. Conditions are altogether different in the two States and it seems probable that nothing will be accomplished. A number of treatment contracts expire January 1st and several large producers believe better contracts can now be made. Each mine acts independently, so this, at least, is against such an organization.

On December 13th the Germania started one reverberatory on copper ore, handling 100 tons per diem. For more than two months no copper bullion has been shipped from this point and the year will show a marked falling off compared with 1896. This plant will begin the new year under brighter auspices, with fully 4,000 tons of good grade ore on hand besides matte from other smelters and larger ore consignments coming in than for many months. Hitherto Utah has not ranked particularly high as a copper producer, but to day it can be said that a marked improvement can be looked for soon. In this connection the editorial in these columns, issue of December 11th, on the need of the Geological survey investigating the Bingham region, is timely.

SHIPMENTS FROM SALT LAKE.—During the week ending December 18th there were sent East 32 cars or 1,144,980 lbs. lead-silver bullion; 29 cars or 1,201,910 lbs. lead-silver ore.

BEAVER COUNTY.

(From Our Special Correspondent.)

GALENA MINING COMPANY.—An ore chute is opened in Chloride ground, 12 miles northeast of the Horn Silver, which gives signs of proving one of the richest finds in the district. The shaft at 75 ft. cut a vein, hardly heeded at the time, which is just being explored. From the first 15 ft. 9,000 lbs. of ore were taken, carrying over 50% lead, 110 oz. silver. To-day the pay seam is 18 in. thick, and President A. S. Anderson counts on making a full carload shipment by New Year's.

HORN SILVER.—During 1897 the main shaft has been put down 400 ft., making total depth 1,600 ft., besides accomplishing fully 2,000 ft. of new development. Mine and mill now employ 175 men, and will

maintain present force. Concentrate products carry 45% to 53% lead with good silver values. 4½ tons being run into 1. Output is in excess of 1,000 tons per month; ½ crude and ½ concentrates. Mine is in excellent form. Interest is taken again in Horn Silver, due to the almost positive assurance of the company taking its place among the dividend payers in January. The last dividend was paid in January, 1896. Manager Farnsworth has gone to Salt Lake for the holidays.

CARBON COUNTY.

(From Our Special Correspondent.)

PLEASANT VALLEY COAL COMPANY.—For the past few days the production at the Winter Quarters mines is nearly double what it was at the beginning of December, and the increased tonnage will continue. Scofield is the shipping point for these mines and it is difficult to keep a supply of cars on hand. As previously stated in these notes, 1897 is the most prosperous year in the career of the Pleasant Valley Company. Previously 1895 held the record, when 319,000 tons of coal were marketed. Probably when the figures are known the past 12 months production will overtop this total by 70,000 tons of 2,000 lbs.

GRAND COUNTY.

(From Our Special Correspondent.)

LA SAL MOUNTAINS.—It is two years since attention was first directed to La Sal, due to favorable showings of copper ore, and even earlier prospectors had brought back good reports. The district has had a hard fight, but apparently its merits are now recognized. The Rio Grande Western Railroad has had the recent uncoverings of ore examined and the region investigated. A wagon road is being built to Cisco, the nearest rail point, and Colonel Dodge, the general manager of the Western, states if the shipments are as the forecast indicates that the new camp will have a railroad in the near future. La Sal and also the area of copper-bearing veins extend south from Grand County into San Juan County.

JUAB COUNTY.

(From Our Special Correspondent.)

AJAX.—Recently the force of three men at work—while the tangle over the control of the company is being snarled and unsnarled—has managed to ship another 100-ton lot carrying 28% copper, 5½ oz. silver, \$1.50 gold. It is to be hoped matters will soon be adjusted and needed exploration started.

BULLION-BECK.—An error was made in stating that the mill has resumed operations. It probably will not start again till some reduction process is added. Present handsome shipments are from 1,300 level, the lowest working, where the ore zone was recently uncovered.

CENTENNIAL EUREKA.—Assayer R. A. Brown is experimenting to win the values from these low grades, without resorting to amalgamation—preparatory work for the proposed mill. The report that this is another new-fangled process, which purposes to recover what is not in the original ore, is emphatically denied.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

DALTON & LARK.—A pyritic smelter, to be erected on the site of the old lead mill, below Binghamton on the Rio Grande Western, is under consideration. Management is now looking into details of cost, capacity, ore supply, etc., aided by the counsel of a consulting engineer.

STEWART No 2 SALE.—A transfer of Stewart No. 2, group of 40 acres, on Carr Fork, is just completed. The tract was owned by the Bevan Mining Company, whose shares were practically all held by George D. Haven. A. J. Bettles is the purchaser of record. This ground, Fanny Lee, La Grippe and Etna B. claims, 45 or more acres, it is understood, is acquired by the original Highland Boy promoters and will form the nucleus of another London company. F. B. Cook, of Salt Lake, secured options on these several tracts, making what is perhaps the most important deal in Bingham of the past year.

TOOELE COUNTY.

(From Our Special Correspondent.)

ALPHA GOLD MINING COMPANY.—Supt. C. E. Bradd has just arrived at Granite Mountain, and states he intends to push the exploration through the winter. There are two veins on the property, with a general north and south course; one silver-lead and the other gold-copper. The former is worked. Country rock is granite. This comparatively new camp is on the line between Tintic and Fish Springs, and will be crossed by the Salt Lake & Los Angeles Railroad, which the Oregon Short Line officials affirm, will be built within a year. At present the nearest rail point is 60 miles distant. All told 35 men will work on different claims during the winter. Messrs. Geo. W. E. Dorsey, W. W. Brown, W. H. Irving and W. A. Sherman are the moving spirits in the Alpha company.

GLADSTONE.—Colonel H. G. Heffron is proud of his water mine. The flow at present is 40,000 gals. per diem and he expects to double it soon. Hereafter there will be no danger of a short water supply in the Mercur region for milling and other needs.

INTRINSIC MINING AND MILLING COMPANY.—Incorporation articles were filed with the Secretary of State on December 18th. Capitalization \$7,500, shares 25c., with 10,000 shares in treasury; stock assessable, no single assessment to exceed 5% of

capitalization. Principal office, Salt Lake; annual meeting, last Thursday in June. Officers and directors are: J. H. Bennett, president-treasurer; Tim J. Driscoll, vice-president; Joseph Brinker, secretary; George W. Heintz, J. F. Evans, all of Salt Lake. Realty consists of Indiana, Michigan, Iowa, Illinois, Kansas, Texas, Nebraska and Oregon lode claims.

MALVERN.—An 18-months' lease and bond to P. J. Donohue insure the resuming of systematic exploration. In all likelihood this will lead to a transfer and the erection of a mill early next season.

MERCUR.—Both from mine and mill nothing but favorable reports are heard. This has been a great year for this pioneer gold property, and the prospect is even brighter for 1898. A rumor is abroad, said to be well founded, that a transfer is about arranged for the Cannon group of 83 acres joining Mercur territory on the East. Certainly this tract is worth more to the Mercur Company than to any one.

OVERLAND.—Indications are that the camp's next cyaniding plant will be to treat Overland ore. Gill S. Peyton has secured an option on the control and it is said the placing of the shares is arranged so as to provide a substantial development fund.

SACRAMENTO.—An experimental calcining furnace is about to be set up. It is probable all ores of the camp would leach better by this preliminary treatment.

WASHINGTON.

SNOHOMISH COUNTY.

Various reports are in circulation in regard to the Everett & Monte Cristo Railroad recently greatly damaged by floods. It is said that Mr. Rockefeller's losses have been so heavy and the mines have shown up so poorly that he will not rebuild the line. It is also said that the line will be rebuilt on a different location in the spring as there is much capital invested in Monte Cristo which will be a total loss without the road.

WHATCOM COUNTY.

(From Our Special Correspondent.)

Considerable excitement prevails about New Wharton owing to reported finds of rich placers on Skookum Creek, a branch of Nooksack River. Emery McGinniss and 13 other men have filed claims on over 200 acres of ground.

WEST VIRGINIA.

The Greenbrier Railroad Company, which was incorporated last month, held a meeting at Huntington, December 16th, and elected as president H. C. Simms, of Huntington; vice-president, Decatur Axtell, of Richmond; treasurer, C. E. Potts, Richmond; attorney, F. B. Enslow, Huntington. The new line is to be 80 miles in length and will penetrate coal-fields in Greenbrier and Pocahontas counties, connection being made with the Chesapeake & Ohio at White Sulphur.

DODDRIDGE COUNTY.

The Waverly Coal and Coke Company's mines, coke ovens, etc., at Smithton, have been sold to a syndicate of Eastern and Pittsburg capitalists for about \$450,000. The property includes 750 acres of land, and the new owners will extend operations, increasing the mine capacities, employing additional workmen, etc.

MARION COUNTY.

The oil well belonging to the South Penn Company, on the Moore farm, is making a great record. It started at 1,800 bbls. a day about November 1st, and is still doing better than 800.

MINGO COUNTY.

BRIAR HILL COAL AND COKE COMPANY.—It is reported that this company, which was recently incorporated, has purchased for \$32,000 a tract of more than 5,000 acres of land in this country and intends to develop the property thoroughly.

TYLER COUNTY.

The South Penn Oil Company's well, on Piney Fork, still shows enormous pressure. In a recent attempt to clear the casing the tools weighing over 3,000 lbs., the stem being 45 ft. long and 4½ in. through, were shot far over the top of the derrick. Enough gas is going to waste it is said to supply Pittsburg.

FOREIGN MINING NEWS.

AFRICA.

TRANSVAAL.

The production of the Witwatersrand mines for November again shows an increase, the total reported for the month being 297,124 oz. crude gold, which is a gain of 22,549 oz. over October, and of 95,981 oz. as compared with November, 1896. For the eleven months ending November 30th the total output was 2,723,962 oz. crude gold, which compares with 2,075,357 oz. last year, 2,099,207 oz. in 1895, and 1,842,955 oz. in 1894. At the usual valuation for Witwatersrand gold the production this year was equal to 2,233,650 oz. fine gold, or \$46,169,545.

AUSTRALASIA.

QUEENSLAND.

The gold yield of Queensland continues to increase in a manner which, if not so phenomenal as the expansion which has taken place in the output of Western Australia, is very satisfactory, says the *Australian Mining Standard*. October figures

show a total of 74,795 oz., as against 53,616 oz. in October last year. The quantity of quartz crushed was 80,997 tons, being an increase of 34,300 tons, and the yield 71,727 oz., being an increase of 9,180 oz. Alluvial is also looking up, owing probably, to the out-turn of the new field at Clermont. The October yield of alluvial was 3,248 oz., against only 1,556 oz. for the corresponding month of last year. The mineral wealth of the Northern colony is undoubted, but it needs capital and scientific knowledge to turn it to the best account.

VICTORIA.

This colony has its special coal troubles. The *Australian Mining Standard* says: "There is no question that the Victorian Minister for Railways is emphatically right in resisting the pressure under which it is sought to place him with respect to the local coal supply. The Korumburra miners are expressing great surprise and dissatisfaction because he has called for tenders for the supply of a certain quantity of Newcastle coal over a period of three years, and they say it is a breach of faith with them, because he promised them to take as much coal as they can produce, and pursuant to this, they even object to his receiving a part of his supplies from the Coal Creek mine. The minister distinctly denies entering into such an engagement with the Korumburra men, and says his promise was that if Victorian coal of sufficiently good quality could be supplied at a reasonable price, it would be taken. He alluded to the possibility of the Gippsland companies being able to meet all the demands of the department, but he bound himself in no way to support the companies apart from commercial considerations, which cannot be overlooked. He points out that the experience of the department has been that the local companies are unequal to meeting all requirements, and it would be most unwise to shut out the Newcastle coal, so as to leave the department entirely in their hands. The strikes which have taken place in both Victoria and New South Wales indicate the necessity of not relying wholly upon one source for supplies. Were he to do so, there is no question that in trying to avoid the New South Wales Scylla he would incur an imminent risk of running upon the Victorian Charybdis. Therefore his action in calling for tenders for the supply of a minimum quantity of 60,000 tons of Newcastle coal per annum for one, two, or three years, needs no apology, though it will rest with the Cabinet to decide exactly what course is to be followed on the receipt of tenders. Over and above the 60,000 tons of Newcastle coal, 150,000 tons will be required annually, and contracts with the local companies are still running on for that quantity. The need for having some contract for a supply from Newcastle is amply indicated by the fact that on several occasions lately the local companies have been unable to provide all the coal they have contracted for. As to the price paid for Korumburra coal the Minister states that he has received an assurance from the Commissioner that it pays the Department better to give 12s. per ton for Newcastle coal than 8s. 6d. for Korumburra coal, and while it is distinctly desirable for the Victorian government to encourage the development of the local coal measures, it would be an act of folly to leave itself entirely dependent upon a precarious and inferior, and an unnecessarily costly, supply. Besides, its experience of 1890 should have taught it to beware how it leaves itself at the mercy of any particular coal combination. There is much wisdom in keeping two strings for one bow."

WESTERN AUSTRALIA.

The exports of gold from the colony are reported at 75,845 oz. in November, an increase of 155 oz. over October; but the quantity compares with 39,874 oz. in November, 1896. For the eleven months ending November 30th the total exports were 692,581 oz. crude gold, against 251,610 oz. in 1896, and 213,623 oz. in 1895. At the values entered the total for the 11 months this year was equal to 533,136 oz. fine gold, or \$11,143,737.

CANADA.

BRITISH COLUMBIA.

(From Our Special Correspondent.)

A company called the "Wild Horse Gold Mining Company," registered in British Columbia and not formed under the English company law, is being introduced in London. The properties are on Wild Horse, Porcupine, Hidden Canyon and Quartz Creeks, which enter the Salmon River at Wild Horse Station on the Nelson & Fort Snepppard Railroad. There are 9 claims—Molly F., Big 2, Nebraska Girl, M. E. F., Iron King, Vermont, Red Lion, Whale and Commonwealth. It is not quite clear what class of ore is found, but from the table of the company it is presumably gold. It has been introduced in England by a syndicate of promoters who have hitherto been connected chiefly with Queensland and West Australia, but not with any striking success. The shares of the Wild Horse are \$1 each and are being introduced in London at 9d. The properties are merely claims and no development worth speaking of has been done, for the claims are not even crown-granted.

LILLOOET, FRAZER RIVER AND CARIBOO GOLD FIELDS.—This company is working two mines and several prospects in the upper country. The company has a registered capital of £120,000 in £1 shares. The Earl of Essex, Sir R. G. Head, Colonel Fluder, Mr. E. G. Goran, Hon. G. Hill Trevor, Admiral Sir H. F. Neelson, Major-General Barnard,

and Lieut.-Col. L. K. Scott, are said to be large stockholders.

MINING LAW AMENDMENTS.—Under the present laws the government mining recorder's office will receive money and issue receipts for location on the same claims half a dozen times over. Recently several local syndicates have been organized, and these have begun to locate groups of claims over previous locators, and are giving notice that they intend to apply for Crown grants. It is said that these syndicates do not, if they know it, locate against bona fide prospectors, but are on the track of many well-known professional stakers who have from time to time been making a business of staking claims and then selling them to speculators and others. In legitimate mining circles it is felt that the law should be amended in such a way as to make the occupation of those gentlemen a thing of the past.

BRITISH COLUMBIA—SLOCAN DIVISION.

(From Our Special Correspondent.)

ALAMO.—The concentrator at this mine was closed for repairs some time ago. Some new machinery has been introduced.

LE ROI SMELTER.—This establishment, at Northport, is approaching completion, though there is considerable work to be done on the furnaces. It will treat all the ore from the Le Roi mine.

NOBLE FIVE.—At the adjourned meeting of this company, recently held at Cody, an amendment to the by-laws authorizing a loan of \$150,000, to pay off an indebtedness of \$53,000 and to continue development work, was carried. It is stated that the bookkeeper has been ordered to wind up its affairs, however.

BRITISH COLUMBIA—TRAIL CREEK.

(From Our Special Correspondent.)

ORE SHIPMENTS.—The total of ore shipments from January 1st to December 14th is close to 74,000 tons. The shipments continue to average about 1,200 tons per week. It is likely that this average will be maintained during winter.

ORE SHIPMENTS, WEST KOOTENAY DISTRICT.—The total value of ore and matte shipped from West Kootenay mines and smelters from January 1st to December 14th amount to about \$7,500,000. The value of the matte is given at about \$4,200,000. These figures include Trail Creek mines and smelter.

IRON MASK.—The shipments of ore from this mine to December 14th amounted to a little over 3,000 tons. The ore shipped from November 15th to December 15th amounted to 300 tons. The management expects the ore shipments for 1897 to reach about 3,200 tons. The financial condition of this mine is stated on good authority to be excellent. The company is out of debt, expects a considerable increase in the output for 1898, and is also looking forward to dividends. The present manager of the mine is Mr. Samuel Hall, son of Captain Hall, of the Le Roi.

O. K.—The illness of Judge Drake has caused delay in liquidating the company's affairs. The appointment of Mr. Richard Plewman as liquidator has been gazetted and he will at once enter upon his duties.

RED EAGLE.—The property and plant of this company were sold by the Sheriff December 13th, to pay a judgment obtained for miners' wages and other expenses. The property is in the South Belt and adjoins the Mayflower. It has a fair showing, but has not been well managed. It has been purchased by Mr. J. W. Boyd for \$2,184.40.

TAMARACK.—This property has been purchased by a syndicate of Rossland mining men, the principal owners being Dabney & Parker, with Kennedy Bros. and Purgold and some others. A company is to be formed to float the stock. There are four mineral claims in the group, viz., the Tamarack, Dinner Bucket, Octopus and Ruston. The shaft is said to be down 46 ft. The chief value of the ore is in gold. The assays may be said to run from \$9.60 to \$65.50. The ore is said to be in a decomposed quartz. The consideration is stated to be \$60,000. The group is situated about 2 miles north of the Dundee mine.

NELSON DIVISION.

(From Our Special Correspondent.)

HALL MINES SMELTER.—It is expected that the lead furnace will blow in about January 15th. The management is making contracts for a steady supply of lead ores, though it is stated that not much headway has yet been made in the matter.

QUARTZ CREEK.—About 145 men are at work in the mines around Ymir. The pay roll is stated to be about \$18,000.

YMIER.—This company, the London and British Columbia Gold Fields, has 34 men at work.

WHITEWATER.—The company will, it is said, declare a dividend in a few days.

NOVA SCOTIA.

COCHRAN HILL GOLD MINE.—The mill at this mine was partially destroyed by fire on December 15th. The loss is about \$10,000. The mine is owned principally in Halifax, but negotiations have been going on to dispose of it to a Boston syndicate.

ONTARIO.

FRONTENAC LEAD MINE.—A Toronto syndicate has purchased this lead mine and the smelting works in Loughboro Township. Messrs. F. G. Bowen, A. Ritchie and D. G. Lorsch, who represent the syndicate, examined the property lately, and work is to begin at once.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, December 24.

Statement of shipments of anthracite coal (approximated) in tons of 2,240 lbs., for the week ending December 17th, 1897, compared with the corresponding period last year:

	1897.		1896.
	Week.	Year.	Year.
Pennsylvania Railroad.....	97,708	3,663,250	3,586,966

PRODUCTION OF BITUMINOUS COAL in tons of 2,000 lbs. for week ending December 17th, and for years from January 1st, 1897 and 1896.

	1897.		1896.
	Week.	Year.	Year.
Shipped East and North:			
Allegheny, Pa.....	53,198	2,404,241	3,641,952
Barclay, Pa.....	11,465	41,734	44,933
Beech Creek, Pa.....	2	3,527,845	2,905,414
Broad Top, Pa.....	12,220	456,724	368,424
Clearfield, Pa.....	95,074	2,812,246	4,234,774
Cumberland, Md.....	181,857	3,658,419	3,599,122
Kanawha, W. Va.....	198,402	3,739,147	3,598,414
Phila. & Erie.....	1,105	269,358	89,061
Pocahontas Flat Top.....	186,549	1,523,917	2,653,904
Totals.....	429,870	18,373,621	21,226,053

	1897.		1896.
	Week.	Year.	Year.
Shipped West:			
Monongahela, Pa.....	24,140	1,151,733	1,200,316
Pittsburg, Pa.....	38,572	1,887,662	1,821,513
Westmoreland, Pa.....	44,916	2,233,408	1,874,080
Totals.....	107,628	5,273,803	4,895,939

Grand totals.....	537,498	23,647,424	26,121,992
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Production of coke on line of Pennsylvania Railroad for the week ending December 17th, 1897, and year from January 1st, 1897, in tons of 2,000 lbs.: Week, 143,163 tons; year, 4,639,768; year to corresponding date in 1896, 3,667,866 tons.

* Returns not received.
† For week ending December 11th.
‡ For week ending December 14th.

Anthracite.

Much gossip has been caused by the announcement in the daily newspapers that Mr. J. Pierpont Morgan will undertake the establishment of a central selling agency for anthracite coal. The statement is made that on December 20th one of his numerous agents purchased a tract of land in Harlem for the Susquehanna & Western, in which his friends have a controlling interest. This road is probably the best situated of all to ship to pockets in Harlem, as it has a tunnel under the Palisades from a point near Hackensack to Edgewater, the latter point being nearly opposite the entrance to the Harlem Ship Canal, from which coal cars can be transported on floats to the coal pockets. The site in question would then be the most central point in New York City from which to retail coal. There is no doubt Mr. Morgan has taken a prominent part in the coal trade during the last two or three years, and at the present time it is understood that he has large interests in several of the more important companies. We have reviewed in the *Engineering and Mining Journal* the conditions which brought about the changes in the anthracite coal trade, and have at various times mentioned the plans of the late Mr. Gowan when president of the Reading and the later plans of Mr. A. A. McLeod as regards a central selling agency. Although many efforts have been made in the past to establish such an agency, the plans never materialized. Some 25 years ago all the leading coal companies had retail yards in Brooklyn and New York, which were abandoned, it is generally believed, because they interfered with some friends of the officers. Only a short time ago efforts were made by a gentleman identified with the central selling agency scheme to organize a company by which the plan could be carried out, but nothing has yet come of it. The arrangements for the working of such an agency look simple, and consist merely in each of the companies selling its entire product to a big agency and authorizing that agency to do all of its business, local and at tidewater. This company would fix its prices, and all the coal sold would have to go at these rates. There are a great many practical difficulties, however, and the consensus of opinion seems to be that the central selling agency plan, while it may seem feasible, cannot be accomplished until the anthracite interests are governed in about the same way as the oil trade, by buying up the properties or contracting for their output.

Concerning the business during the past week, we would say that there has been a material increase in the number of orders from some quarters, especially for the domestic sizes of coal. There is a shortage of pea coal with one large interest, and chestnut is rather heavy with several of the other companies. Perhaps the largest supplies consist of stove coal, and as the line trade is very quiet just now considerable coal of all sizes is being shipped to tidewater. Some companies, however, are well enough supplied with orders to take care of the coal coming forward. Quotations, according to grade, are: \$3.75 to \$4 per ton for egg, \$3.85 to \$4.10 for stove, \$3.60 to \$3.80 for chestnut, \$3.40 to \$3.50 for broken, \$1.65 to \$2.15 for No. 1 buckwheat and \$1.40 to \$1.70 for No. 2 buckwheat, all free on board.

NOTES OF THE WEEK.

The Retail Coal Exchange of New York City held its annual meeting on December 17th, President

Henry Breunich acting as chairman. In his annual report the secretary referred to the lack of interest in the association, attributing it principally to the dissatisfaction caused by the unfortunate condition of the coal trade during the past few years. He attributed the cause of the reduction of tonnage of the retail dealer for the past year to the use of gas, and believed that this will increase. The adjustment of weights to 2,000 lbs. per ton on all sales outside of cargo lots, he said, is meeting with success, thanks to the assistance of the Retail Protective Association. The law which went into effect on June 1st, 1897, in regard to the designation of scales for the weighing of coal at the request of the purchaser has been complied with by Mayor Strong and is now in full operation and with satisfaction to all. After the reading of the secretary's report the following officers were elected: President, Henry Breunich; first vice-president, G. D. Curtis; second vice-president, George Eltz; secretary, A. F. Kecheissen; treasurer, John Rodenburg. For members of the board of trustees, to serve for two years in place of Messrs. Farrell, Smoot and Pangburn, there were five candidates, but the retiring members were re-elected after a slight contest. Messrs. Davies, Brennan and Haaren hold over as members of the board and with the three newly-elected members and the five officers will constitute the managing body of the organization for the ensuing year.

Bituminous.

The seaboard trade along the Atlantic coast is quiet, notwithstanding the fact that a large business is being done and the pressure for coal continues to be fully up to the usual quantity for this time of the year. Some producers are reporting that they have a little more prompt business than they can attend to. The tonnages going forward with most of the consumers are about normal, and though vessels are scarce at all ports there is nevertheless considerable coal being moved. Already efforts are being made by some of the consumers to get the producers to contract for next year's supplies upon the basis of this year's prices, but generally without success. In one or two cases, however, contracts are said to have been taken at prevailing prices for delivery over 1898, but a verification of this statement is lacking. If it is so, the producer or middleman is taking all the chances owing to the uncertainty of the freight market. So far there have been no intimations of the rates that will rule in the coming year. There were rumors some weeks ago of a material advance in these rates, but it is hardly thought probable that the producers have through freight rates yet to base the price of their coal on for the coming year.

Trade in the far East is dull as regards new business. There are still shipments being made on old contracts, but new orders are very scarce. Sound business is active, and the demand for coal from this consuming territory is large. New York Harbor trade is good, and the demand is strong. All-rail trade shows a fairly large tonnage going forward. Transportation from mines to tide is slower than usual. It is said that the anthracite coal trade has been given the preference on those roads hauling this coal as well as bituminous, and this has interfered with deliveries. The car supply is fair, though nobody is suffering for the want of them. In the coastwise market, vessels are still in great demand, and very scarce. Some of the lighter class of vessels have laid up for the season, and the prevailing weather has interfered with the movement of the remainder to a more or less degree. We quote current rates of freight from Philadelphia as follows: To Boston, Salem, Portland and Portsmouth, 95c. @ \$1; Providence, Newport News and the Sound, 75c.; Wareham, \$1; Newburyport, \$1.05 @ \$1.10; Bath, \$1.05; Bangor, \$1.15. Ten to 15c. above these rates are asked to the further lower ports.

Birmingham, Ala.

Dec. 20.

(From Our Special Correspondent.)

The coal mining industry during the past week has maintained about the same conditions as since last September. The production for the month of November is nearly 500,000 tons. The probabilities are that during the present month this production will show a slight decrease because of Christmas week, during which a great number of the mines will be comparatively idle for the reason that the laboring class in the South especially, believe in celebrating that season to the fullest possible extent.

From information I have lately received Alabama coke manufactured from crushed and thoroughly washed coal is finding a market not only through the Southern States and Mexico, but also in California. The result of this will probably stimulate more coal miners to put in coke ovens and manufacture strictly 72-hour coke for the foundry trade. At present most of the coke manufactured in the State is used for fuel in the furnaces, but the coke made by the Standard Coal and Coke Company and the Jefferson Coal and Railroad Company from coal which has been crushed and washed in the Stein & Boericke coal washer is of such superior quality that it is in demand by the foundry trade, which promises to increase and open up a market in competition with the Pennsylvania and Virginia coke.

Buffalo.

Dec. 22.

(From Our Special Correspondent.)

There is a good demand for anthracite coal. The

weather is severe and fuel has become an absolute necessity. No changes in quotations.

Bituminous coal only fairly active, as buyers are not stocking up so near the close of the year. Demand for vessels having ceased, the prices are being shaded a little. The supply is more than adequate for trade requirements.

The Lake Carriers Association Committee, which met at Cleveland last week, will consider fully the question of fixing a minimum rate for coal freights the coming season and report thereon at the annual meeting to be held in January.

Superior will have the largest iron ore dock on Lake Superior next year, if the present ideas are carried out during the winter months.

The average daily rates of freight by lake on anthracite coal to Chicago and Milwaukee during 1897 were 29c. per net ton; average rate for 10 years, 53c. per net ton. To Duluth in 1897, average daily rates, 25c.; for 10 years, 35c. per net ton.

About 7,000 tons of coal were shipped to Chicago the beginning of last week, the final movement for the season of 1897.

The average daily rates for freight on iron ore in 1897 were: Escanaba to Ohio ports, 45c.; head of Lake Superior to Ohio ports, 57c.; Marquette to Ohio ports, 54c.; for the past 10 years, Escanaba to Ohio ports, 72c.; head of Lake Superior to Ohio ports, \$1.02; Marquette to Ohio ports, 90c.

Cleveland, O.

Nov. 21.

(From Our Special Correspondent.)

Perhaps the approach of the Christmas holidays has attracted the eyes of investors from the mining stocks; perhaps it may be the advent of a New Year, whose smiling face will soon be seen peeping over the Eastern horizon. Anyway, the rooms of the stock brokers during the past week have resembled sepulchers and almost the only sounds heard were the sighs of the brokers, who long for a resumption of business on the lakes when the products of the mines is en route to the consumer and dividends are declared. No sales of importance were reported during the week. Chandler stock is a little more popular with prospective investors, as will be seen in the quotations. Those who desire to acquire Cleveland-Cliffs stock offer \$1 for it, while the owners ask \$1 more.

Pittsburg.

Dec. 22.

(From Our Special Correspondent.)

Coal.—Mining is now employing more men than for a long while. Several mines have been started up, and nearly all the surplus labor given work. All of the miners striking against the cut in the rate for the third pool have returned to work. The coal product is exceedingly heavy, as a result of the resumption. Old mines that have not been run for several years and mines newly opened are in operation. Much loaded coal is lying in the river awaiting a higher stage, which is now assured. The import rate in the pools of the Monongahela cannot be enforced at this time. The futile efforts of the delegate convention at Monongahela City to accomplish anything and the refusal of the other pool miners to co-operate with the Third Pool was a disastrous blow to the miners' interest. Practically no differential is in force. The men are scarcely earning living wages at some points. The miners will probably ask an advance in January. A conservative estimate places the coal tonnage from the Pittsburg district just closed at 5,500,000 tons, being an increase over last year, notwithstanding the 65 day strike.

The Citizens' Coal and Coke Company, of Cincinnati, will be capitalized at \$12,500,000, of which \$1,250,000 is preferred stock. A great many Pittsburg coal operators are of the opinion that the combine has not been nor will be a success.

Connellsville Coke.—Trade continues to boom, the demand is brisk, and only car shortage prevents a still better showing. Of 18,508 ovens, 3,506 were inactive; several plants, including Hekla, Juniata and Cochran interests, increased working time. Estimated production 156,834 tons. December will probably close the highest of the year, showing a gradual climb since January. Shipments like production reached high-water mark. The scarcity of cars still helps to keep down shipments to a certain extent, although that feature is not so noticeable as it was a short time ago. So long as the trade continues to increase, be it ever so little, there is no ground for complaint.

In the running order of the ovens in blast, 5,956 ovens made six days, 9,120 ovens five days and 50 ovens—the Semet-Solvay by-product plant—seven days, an average of 5.30 days—a gain over the preceding week. The H. C. Frick Coke Company made an even five days' run at all its 27 plants. The McClure Coke Company made an even five days' run at its eight plants. The Cochran made six days at all its plants. The shipments were as follows: To Pittsburg, 3,237 cars; sent West, 4,510 cars; sent East, 1,235 cars; total, 8,982 cars. Prices unchanged.

Shanghai, China.

Nov. 5.

(Special Report of Wheelock & Co.)

Coal.—There has been an improved demand for Japan coal. The taking of Kiaochow by the Germans may possibly have a good effect on the market here. No doubt quantities of coal will be stored by them, and whether it be Cardiff or Japanese remains to be seen. Cardiff coal is held for higher prices, and no business has been done. Quotations are: American anthracite, 12 taels per ton; Welsh Cardiff, 16

taels; Australian Wallongong, 6'60@7 tael; Japan, 6'75@7 tael per ton. The arrivals during the fortnight aggregated 15,051 tons.

Kerosene Oil.—A very large business has been done in American oil; no doubt on account of speculators being unable to hold on to their purchases owing to the tightness of money. Large quantities have been forced on the market at declining rates until 1'60½ tael per case was reached; consequently the deliveries have been exceptionally large, being over two lakhs for the fortnight. The market closes steadier at 1'81 tael. Stocks in godowns are now 604,000 cases. In Batum very little business has been done, and deliveries compared with other brands have been very small, stocks are 429,000 cases. Langkat is getting a very strong hold on this market. The new cases being put out here seem to be inviting to the native, as a fairly large business has passed at good and steady rates, 1.50 tael being the highest. Stocks amount to 75,000 cases. We note an arrival with about 100,000 cases.

Quotations are: American Devoe's, 1'61 tael per case; Batum, Anchor chop, 1'56 tael; Horse chop, 1'51 tael per case, and bulk oil, 1'40 tael per two tins; Langkat, 1'50 tael per case.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Dec. 24, 1897.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From Jan., '96.	From Jan., '97.
	Dec. 25, 1896.	Dec. 24, 1897.		
Anthracite.	29	16,950	28	18,050
Coke.....	99	122,550	144	203,201
Charcoal...	20	5,250	19	5,200
Totals	148	144,750	191	226,450
			8,665,479	9,261,541

Reports from the iron trade are variable. In Pittsburgh and through the Central West generally there has been a good deal of activity and large transactions are reported in Bessemer pig and steel billets, for deliveries running over the first quarter of 1898. Beyond that there is still some hesitation about contracting, and also some uncertainty about prices. In the East business has been comparatively quiet and new contracts have not been numerous. For foundry iron the demand has been light and there is little new to report.

Prices are weaker rather than stronger. While Bessemer pig has held its own, there has been a disposition to shade on foundry grades, and Southern iron can be had at 25c. a ton less on all grades. The reason for this is not altogether clear, unless producers have made up their minds that the present large production of pig is a little ahead of demand. It may indicate also an intention on the part of Southern makers to compete still more actively for business and to hold their Eastern trade.

For finished material the demand is fair; in structural material it is good, and the prospects are for an excellent winter trade. There is some demand for bar iron from the car builders, and the locomotive builders, it is said, have some work in sight. The reports of new shipbuilding work seem to have been exaggerated.

There are no new developments with regard to the proposed wire trust. The work of organizing and appraising plants is going on, but there are all sorts of rumors about different concerns holding out. Most of these prove, on inquiry, to be unreliable.

Lake ore shipments are closed for the season. The stocks on Lake Erie docks are about 950,000 tons in excess of those reported at this time last year, and a sufficient supply of ore for the season seems to be assured. The settlement of ore prices for 1898 is still in the future.

The Leadville mines in Colorado will supply manganese ore for the steel works of the Colorado Fuel and Iron Company, as well as for those of the Illinois Steel Company. Contracts have been closed for the delivery of manganese ores at Pueblo next year.

New York. Dec. 24.

Except in structural material and plates the local market feels the effect of the general slackening of orders, that will probably continue till stocks have been examined and producers and consumers get together for the coming season's business. Business in most branches may be said to be pretty quiet.

In the export market there have been numerous inquiries for pipe and railroad material, including a good-sized order for steel rails from Mexico. Brazil has taken electrical machinery to the amount of \$33,000. Japan is in the market for tool steel, iron pipe and sheet iron, also electrical machinery to the value of \$11,000.

Pig Iron.—The holidays and approaching stock-taking make the local market very quiet. There is but a small amount of pig, and most buyers will wait till they form a better idea of the probable course of prices. Northern irons are shaded and Southern decidedly weaker. We quote: Northern brands No. 1 X foundry, \$12@12.25; No. 2 X foundry, \$11.50@11.75; No. 2 plain, \$10.75@11; gray forge, \$10.25@10.50. Southern brands, same delivery, No. 1 foundry, \$11@11.25; No. 2 foundry, \$10.50@10.75; No. 1 soft, \$10.75@11.25; No. 2 soft, \$10.75@11; No. 3 \$10.50@11; Basic, \$10.75@11.25.

Cast Iron Pipe.—Except for inquiries from abroad the local market is very quiet indeed, with but little going on. Quotations are \$18.50 per gross ton on dock, New York.

Plates.—In general there is a fair volume of business and some firms have more orders than for some time past. No large contracts are reported, but numerous small orders keep dealers busy. Quotations are, for steel plates at tidewater: 1'35@1'40c. for No. 10 to 16, and 1'18@1'20c. for heavier. Flange is 1'35@1'40c.; shell, 1'30@1'35c. Charcoal iron plates, 2'25c. for shell, 2'75c. for flange and 3'25c. for firebox. Rivets are 2'25@2'50c. for iron and 1'75@1'85c. for steel.

Structural Iron and Steel.—The contract for the Riverside viaduct, about 6 000 tons, will probably be let the coming week. There are other contracts under consideration, and the general condition of the local market is promising. Quotations are: Angles, 1'15c.; tees, 1'35c.; channels, 1'20c. Beams, in ordinary sizes, are 1'25c., New York delivery, in carload lots; 1'35c. for 20-in. and 1'45c. for 24-in.

Steel Rails.—Quotations are \$19 f. o. b. mills for standard sections. Orders are reported filed for \$18, while the actual price at which rails are selling in the export market would be a matter of interest.

Wrought Iron Pipe.—The market is very quiet except for what business is done by jobbers at cut prices. Manufacturers are making liberal concessions, but orders are few. Discounts are: Black, lap welded 78%; butt welded 72%; galvanized, lap welded 70%, butt welded 67%, with further discounts of 10% and 5% on large lots. Boiler tubes in small lots are quoted: charcoal tubes, 2 in. and 2½ in., 65%; 2½ in. and larger, 70%; merchant tubes, 2 in. and 2½ in., 72½%; 2½ in. and larger, 75%.

Nails.—There is little change in the wire nail situation; manufacturers fight shy of making long contracts at present figures. Quotations are firm at \$1.50 in carload lots on dock and \$1.60 in small lots from store.

Cut nails remain quiet and dull with no change in prices. Quotations are \$1.25 in carload lots on dock and \$1.35 in small lots from store.

Old Material.—The fact that stock-taking is at hand keeps the market quiet and rather weak. Inquiries are generally for material at less than quotations. We quote: Railroad wrought scrap, delivered, New York, \$11.25@12.25; No. 1 yard wrought, f. o. b. Jersey City, \$10@11; machinery cast, delivered at works, \$9@10; hammered car axles, delivered New York, \$15@16.50; car wheels, f. o. b. Jersey City, \$9@10; scrap steel rails, \$9@10; old iron rails, \$11@12; wrought pipe and tubes, delivered New York, \$7@8; burnt iron, buyers, works, \$5@6. Iron borings at mill are \$7; iron turnings at mill \$8.

Birmingham, Ala. Dec. 20.

(From Our Special Correspondent.)

For some reason which would appear difficult to explain, slight concessions have been made in the prices asked by the makers for pig iron during the past week. I say difficult to explain, because although the production is phenomenal yet the consumption is keeping pace with it. This is readily demonstrated by the fact that the stocks in the hands of the makers have decreased since April 1st from 158,216 tons to 41,000 tons December 1st, and since that time the inquiries for iron have been greater, and sales have been consummated in proportion to the inquiries. The fact that concessions have been made by some makers of about 25c. per ton is not disputed, and one of the heaviest operators informs me that his company had to meet the concession or see heavy business go to a competitor. The production for December will, unless some unforeseen accident occurs, equal that of any of the last few months, and it is hoped that the consumption will continue at its present ratio and that stocks January 1st will not exceed 25,000 tons exclusive of the quantity carried in the warrant company's yards.

Apparently the controversy between the State and the corporation as to the back tax question, especially with regard to pig iron in the warrant company's yards and held over by the companies themselves during the past four or five years, will be settled out of court. So far as regards the increased valuation by the back tax commissioner for the year 1897, which was to come up in the circuit court during the present month, all these cases were postponed because of incompleteness in the records certified to that court by the county commissioner's court, and under ordinary circumstances would be called up in January next. Judging from appearances and reading between the lines in conversation with politicians and others who were in favor of this legislation, I am very much inclined to think that the cases are to be allowed to drag along until the next meeting of the Legislature, in the winter of 1898, when the law will be repealed. The corporations engaged in the iron and coal industries employ about 13,000 men, which would represent a population of nearly 60,000 souls. The capital invested is nearly every dollar of it from the Northern States and foreign countries, consequently the argument presents itself that 60,000 out of the total population of the State of Alabama are furnished the means of obtaining a livelihood by foreigners. The advisability of agitating this legislation with regard to taxation, because of the effect which such

agitation would have on the influx of capital to develop the resources of the State, has been questioned. It is generally conceded that the best method of obtaining the repeal of a bad law is to thoroughly enforce that law, and the result of agitating this back-tax commissioner's will, I believe, prove in the end advantageous to the State, because it will result in the repeal of the act and in the passage of broader and more liberal legislation toward foreign capital in future. The result of this would necessarily be that more foreign capital would be brought into the State for investment in industries directly and indirectly connected with the very valuable mineral resources which exist within its boundaries.

The fact that convict labor is not employed in any of the iron furnaces or in the iron ore mines in this State, nor has such labor been so employed by any of the companies at present engaged in the manufacture of pig iron, should be sufficient reason why our iron men are not worrying about the action of the Canadian and English governments relative to the prohibition of the entry of prison-made goods into those countries. Convicts are only employed in Alabama in digging coal and in cultivating the convict farm at Speigner. The proportion of coal mined by convict labor in the State is as about one ton to fifteen mined by free labor. In the face of these facts it can readily be seen that the statements published in some papers are entirely incorrect.

Buffalo. Dec. 22.

(Special Report of Rogers, Brown & Co.)

The opinion is quite general that there will be a strong buying movement throughout the country beginning soon after January 1st. This district expects to participate in the movement. Buyers who predicted large stocks and falling prices at the end of this year are surprised at the decrease in stocks, which continues unchecked by heavy production. Furnaces in this district are still busy shipping on orders already entered. New orders are quite numerous, though generally for small amounts. One producer in this territory reports more business taken for December this year than in any December for five years back. We quote below on the cash basis f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$11.25; No. 2 strong foundry coke iron, Lake Superior ore, \$10.75; Ohio strong softener No. 1, \$11.75; Ohio strong softener No. 2, \$11.25; Jackson County silvery No. 1, \$14; Southern soft No. 1, \$11.75; Southern soft No. 2, \$11.35; Niagara malleable, \$10.75.

Cleveland. Dec. 21.

(From Our Special Correspondent.)

Iron Ore.—The chief interest in the ore market at the present time lies in the probabilities for the next season. The ore producers are getting ready to join their interests for 1898, it is said, and it is probable that a meeting will be called soon. Mr. W. C. Runyon, the secretary of the old range association which was formed last spring, will issue circulars at an early date calling for a meeting of all the producers for the purpose of making the allotments for the year and limiting the production. During the past week the activities in the market were chiefly confined to movements toward the furnaces. The furnace men have wanted the ore and the agents of the producers were only too anxious to ship it to them as fast as possible before the severe weather set in, when furnace men prefer little handling of ore. The small lots of ore which were sold during the week were disposed of at the prices fixed at the beginning of the season. They follow: Specular and magnetic ores, Bessemer quality, \$3@3.75; specular and magnetic ores, non-Bessemer quality, \$2.50@2.75; hematite ores, Bessemer quality, \$2.50@2.8; hematite ores, non-Bessemer quality, \$2@2.50.

Pig Iron.—The market is much stronger this week, and in some instances prices have advanced. The general tendency of the market at the present time is upward. Following are the quotations: Lake Superior charcoal, \$13.25; Bessemer, \$10.25@10.50; No. 1 foundry, \$11.15@11.25; No. 2, \$10.65@10.75; No. 1 Ohio Scotch, \$11.15; No. 2, \$10.65; gray forge, \$9.25@9.50.

Pittsburg. Dec. 22.

(From Our Special Correspondent.)

Business last week was a revelation to the dealers in iron and steel; instead of a quiet market and weak prices expected during the holidays, the reverse was the situation. The large sales of pig iron and billets was a general surprise all around. The Bessemer sales for next year's delivery exceeded 50,000 tons at an advance in prices. Consumers who have large contracts for 1898 are not disposed to run the risk and take the chances of higher prices. While the output is the greatest in the history of the iron trade, the same can be said of consumption.

The week's advance in Bessemer was 25 to 40c. Inquiries for delivery next year are coming in freely; so far as known no sales beyond the first quarter have been consummated. On the whole, there is evidently a strong undertone of strength in the market indicating higher prices, and that there will be plenty of business after the turn of the year. Two or three months ago furnaces at various points had their yards stocked with metal waiting purchasers; this is now changed, the yards are bare of stock and production disappears nearly as fast as

turned out from the furnace. The Eastern pig iron market is reported dull, they do not seem to have been aware of the movement at Pittsburg and in the Valley.

Finished Material.—There was a larger inquiry for next year's delivery, as well as for the various descriptions of steel products, with an improved feeling as regards prices; from the amount of iron building under contract the coming year will no doubt be the banner one; the advance in billets will soon cause a movement in prices.

Wire Rods.—Rods were in steady demand; sales show an advance in prices; the supply on hand is said to be limited.

Wrought Iron and Steel Pipes.—The market is devoid of animation; new orders have been slack.

Nails.—The demand has improved considerably and this is considered somewhat unusual at this season of the year.

Steel Rails.—No new contracts are reported. The mills are said to be well fixed for next year.

Sheet Bars are firm, with liberal transactions, principally for next year's delivery.

Most of the departments of the Homestead steel plants are closed, and will be shut down until December 27th. It is expected that a new girder rail mill to replace the 33-in mill will be started then. During the suspension in the soaking pits in all departments will be rebuilt.

Among the sales reported for delivery in 1898 are 37,000 tons Bessemer, 6,000 tons mill iron and 16,000 tons billets. Total sales for 1898, 59,000 tons.

COKE SMELTED, LAKE AND NATIVE ORE.

Tons.	Cash.
15,000 Bess., 1st 3 mos., 1897, V.	\$9.60
10,000 Bess., 1st 3 m., 1897, V.	9.65
5,000 Bess., D. J. F., V.	9.65
5,000 Bess., F. M., V.	9.50
3,000 Mill Ir., Jan. V.	8.60
3,000 Mill I. J., D. M., P.	9.15
3,000 Mill I. J., F. M., P.	9.15
3,000 Bess., F. M., V.	9.50
1,500 Mill Ir., F. J., P.	9.10
1,000 Mill Iron, Dec.	9.00
1,000 Mill Iron, Dec.	9.00
500 Mill Iron, Dec.	9.00
300 Bess. Ir., p' mp't P	10.30
100 No. 2 F'd'y, p't, P	10.00
50 Bess., prompt, P.	10.50

CHARCOAL.

50 Cold Blast, P...	21.50
50 No. 2 F., P.....	15.00
25 Cold Blast, P....	22.00
25 No. 3 F., P.....	15.00

BLOOMS, BILLETS, SLABS.

8,000 Bill., 1st 3 mos., 1897, Mill	\$15.75
5,000 Bill., 1st 3 mos., 1897, Mill	15.75
3,000 Bill., J. F., Mill.	15.65
2,500 Bill., J. F., M., W.	15.25
1,000 Bill., D., Val.	14.60
1,000 Bill., D., J., M.	15.35
1,000 Bill., D., Mill	14.80
1,000 Bill., p., Mill	15.00
1,000 Bill., D., Mill	15.50
500 Bill., p., Mill	15.00

Philadelphia. Dec. 23.
(From Our Special Correspondent.)

Pig Iron.—This week's movements in pig iron have been unimportant in point of sales, but of interest in point of possibilities. Leading brokers have had offers, inquiries and propositions concerning iron, but decline to give specific details at present. The market is declared in some quarters to be stronger, in other quarters weaker. The situation is about this, that quite a number of concerns are asking for prices for longer or shorter terms, some showing a willingness to contract for iron as far along as next July. As a rule our people are avoiding such engagements, though Virginia and Alabama ironmakers are not averse to them. Still not much business of this sort could be closed, or some cat would be out of the bag. Some low phosphorous iron was ordered. Basic iron has been figured on and large transactions are in sight. Bessemer is stronger, and the buyers are quite willing to talk about deliveries over a long period of time. Mill irons are dull because of the slackness of work. Foundry irons, especially No. 1, are in fair request at about \$12 for No. 1, though three or four brands bring more. No. 2 is \$11@11.25; forge \$10@10.50.

Billets.—The market as to present deliveries is dull, but considering the small stocks and brightening probabilities for the coming season the chances are that early in the new year buyers will place long contracts. The general belief is that prices will be firmer and higher.

Merchant Bars.—The only thing that will give tone to the bar iron market will be the resumption on full time of car-building work. After considerable rooting the information has been gotten that a great deal of car-building capacity in this State will be filled up in January. Builders, however, are not buying. Western mills will compete, and already we hear of offers at an alarming shading below 1c. per pound.

Skelp.—Some mill owners have quoted remarkably low prices.

Sheet.—All mills will proceed early in January to make more iron than they have been turning out. The larger buyers have shown no anxiety recently to get their orders in. Store stocks will be replenished, and mill stocks of certain gauges will be increased. Prices are low but firm.

Merchant Steel.—Present distribution is light, and manufacturers are not showing any desire to encourage buyers.

Nails.—Nails are weaker in a retail way, but mill men say there will be no further shading in a wholesale way until there is a general settling up and down. Production will slacken up a little during the winter.

Plate and Tank.—The agents who have had in hand the placing of large orders have made moderate purchases, but have not covered the large requirements that have been talked about so long. The mill representatives here say that there is a very much larger volume of work in sight than a month ago and that it is uncertain just now what policy the large buyers will pursue. There is no change in prices.

Structural Material.—The same remarks apply to structural iron and steel makers. Every day brings out more encouraging features. Mill owners report business light at present, but with the large amount of work offering they are confident of a busy winter. Prices, however, do not improve. They are, if anything, weaker.

Steel Rails.—A number of small orders were booked at mills direct.

Old Rails.—No sales have been reported.

Scrap.—The yard men report trade quiet.

Cartagena, Spain. Dec. 3.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Eight cargoes of dry iron ore, three of high grade manganiferous and one of 60% magnetic ore have been moved during the past month. There is a good demand for all classes of ore, practically nearly all the ore that can be cut during the next six months having been already sold. The specular ore from the Perin district, of which some years since large quantities were shipped from this port, but owing to water in the mines has been lying almost untouched for the last 10 years, is now being actively worked and a considerable quantity of ore is likely to be put on the market during the coming year. This ore, although of small mechanical condition, contains over 60% metallic iron, and is moreover very pure as regards silica, phosphorus and sulphur, which makes it useful to ironmasters for mixing with low metallic lumpy ores. Quotations are 50% ordinary Portman, 5s. 10d. @ 6s. 4d. per ton; special low phosphorus, 6s. 2d. @ 6s. 10d.; special iron ore, 7s. 4c.; specular iron ore, 9s. 6d.; magnetic ore, containing 60% iron, 10s. 9d. per ton. For manganiferous ores we quote: 14s. 6d. per ton for No. 1, containing 20% iron and 20% manganese; 11s. 6d. for No. 1 B, containing 25% iron and 17% manganese; 10s. 4d. for No. 2, containing 30% iron and 15% manganese; 9s. 3d. for No. 3, containing 35% iron and 13% manganese.

METAL MARKET.

NEW YORK, Friday Evening, December 24, 1897.

Gold and Silver.

Price of Silver per Ounce Troy.

December.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.	December.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.
18	4.85	251 ¹¹ / ₁₆	66	.433	27	4.84 ¹ / ₂	26 ¹ / ₂	56 ¹ / ₂	.440
20	4.85	26 ¹ / ₁₆	56 ¹ / ₁₆	.437	23	4.84 ¹ / ₂	26 ¹ / ₁₆	57 ¹ / ₁₆	.444
21	4.85	26 ¹ / ₁₆	56 ¹ / ₁₆	.439	24	4.84 ¹ / ₂	25 ¹ / ₁₆	57 ¹ / ₁₆	.444

Silver after selling off to 25¹/₁₆d. has advanced on bear covering and with demand from the East has been in very good request at advancing prices. The market closes steady.

The United States Assay Office in New York reports the total receipts of silver at 58,000 oz. for the week.

Gold and Silver Exports and Imports

At all United States ports, November, 1897, and years from January 1st, 1897 and 1896:

	Coin and bullion.		In ores.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
GOLD					
Nov. 1897..	\$699,310	\$2,505,398	\$173	\$509,071	E. \$2,314,866
1896..	33,599,589	26,918,837	97,761	4,479,640	E. 2,298,873
1895..	57,641,413	100,194,167	183,651	1,736,018	E. 44,165,151
SILV.					
Nov. 1897..	4,979,277	1,544,305	1,334	1,540,129	E. 1,896,177
1896..	52,551,963	11,017,012	260,759	19,232,102	E. 22,563,608
1895..	56,243,791	11,224,776	892,120	16,069,271	E. 29,841,864

This statement includes the exports and imports at all United States ports, the figures being fur-

nished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York

For the week ending December 21st, 1897, and for years from January 1st, 1897, 1896, 1895, 1894:

Per.iod.	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
We'k	\$15,665	\$43,892	\$556,075	\$49,741	E. \$478,107
1897..	29,815,546	43,251,753	15,510,553	3,074,474	E. 1,000,128
1896..	40,801,438	76,629,932	36,347,778	3,647,264	E. 3,128,000
1895..	71,09,850	29,091,066	37,396,832	1,617,921	E. 77,694,701
1894..	95,158,204	16,494,031	33,866,901	1,639,847	E. 110,841,227

The gold exported for the week this year went to South America and the West Indies; the silver went principally to London. The gold and silver imported came chiefly from Central and South America.

Average Monthly Prices of Silver

in New York and London, per ounce Troy, from January 1st, 1897, and for the years 1896 and 1895.

Month.	1897.		1896.		1895.	
	Lon-don. Pence.	New York. Cents.	Lon-don. Pence.	New York. Cents.	Lon-don. Pence.	New York. Cents.
January..	29.74	61.79	30.69	67.13	27.36	59.69
February..	29.68	64.67	31.01	67.67	27.47	59.90
March....	28.96	63.06	31.34	68.40	28.33	61.98
April.....	28.36	61.85	31.10	67.92	30.39	65.61
May.....	27.86	60.42	31.08	67.88	30.61	65.75
June.....	27.58	60.10	31.46	68.09	30.47	65.64
July.....	27.36	59.61	31.45	68.75	30.48	65.75
August....	24.93	54.19	30.93	67.34	30.40	65.61
September	25.66	55.24	30.19	65.68	30.54	65.90
October..	26.77	57.97	29.68	65.05	30.89	67.64
November	26.87	57.93	29.46	64.98	30.79	67.42
December.	.....	.....	29.70	65.24	30.40	65.47
Year.....	.....	.....	30.67	67.06	29.53	65.28

The New York prices are always per fine ounce, or ounce of pure silver; the London quotation is per standard ounce or for metal 925 fine.

FINANCIAL NOTES OF THE WEEK.

Trade continues in a rather unsettled condition. The lull before the end of the year is felt as usual at this season, and there is besides some hesitation as to the future. While the demand for iron and steel and in fact for all materials of construction is very good, there are rumors everywhere of trusts and combinations, among which the wire trust is the leader, and these always have a disturbing influence. The important textile trades are in bad condition, which may very probably be made worse by labor troubles which are sure to follow the extensive cutting of wages which has been going on. The coal troubles in the West are not yet fully settled, although there is a prospect that some general agreement will be reached before long. Above all the uncertainty as to settlement of the currency question, and the strong probability that it will be left to be a leading issue in next year's Congressional elections, is not encouraging.

The House Committee on Banking and Currency has been discussing with the Secretary of the Treasury his proposed currency measures. It is understood also that the committee will take into consideration the action of the Indianapolis Conference and its Monetary Commission before presenting any measure to the House.

Money continues high in London and, indeed, all over Europe. The balances due this country are now largely kept abroad, where they are earning higher interest than they could at home. As long as this condition lasts gold imports at New York are not to be expected. Gold continues to come from Australia, however, shipments of \$500,000 from that country being noted this week.

The statement of the New York banks—including the 66 banks represented in the Clearing House—for the week ending December 18th gives the following totals, comparison being made with the corresponding weeks in 1896 and 1895:

	1895.	1896.	1897.
Loans and discounts.	\$489,646,600	\$487,016,000	\$606,679,300
Deposits.....	517,290,500	523,589,900	669,891,400
Circulation.....	13,973,100	19,797,100	15,751,100
Reserve:			
Specie.....	67,856,500	77,251,600	104,267,000
Legal tenders.....	75,555,000	86,920,600	78,931,900
Total reserve.....	\$146,411,500	\$164,172,200	\$183,198,900
Legal requirement..	129,322,700	130,897,725	167,472,850
Surplus reserve....	\$17,088,800	\$33,274,475	\$15,726,050

Changes for the week this year were an increase of \$87,100 in specie, and decreases of \$1,046,000 in loans and discounts, \$5,278,500 in deposits, \$103,100 in circulation, \$4,868,100 in legal tenders, and \$3,161,375 in surplus reserve.

The statement of the United States Treasury, on Thursday, December 22d, shows balances in excess of outstanding certificates as below, comparison be-

ing made with the statement for the corresponding date last week:

	Dec. 16.	Dec. 22.	Changes.
Gold.....	\$159,367,692	\$159,805,032	I. \$437,340
Silver.....	14,474,757	14,231,903	D. 242,854
Legal tenders.....	39,286,349	46,559,038	I. 7,272,729
Treasury notes, etc....	2,521,252	2,824,229	I. 302,977
Totals.....	\$215,650,010	\$223,420,202	I. \$7,770,192

Treasury deposits with national banks amounted to \$46,252,431, a decrease of \$691,608 during the week.

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:

Banks.	1896.		1897.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Asso....	\$77,251,690	.....	\$104,267,000	.....
England.....	169,048,635	.....	153,815,385	.....
France.....	383,640,045	246,716,821	392,783,200	206,349,000
Germany.....	216,550,000	.....	222,235,000	.....
Austria-Hun.	145,765,000	63,155,000	188,300,000	61,880,000
Netherlands.	13,170,000	33,845,000	13,140,000	33,630,000
Belgium.....	20,840,000	.....	21,252,800	.....
Spain.....	42,640,000	50,995,000	46,275,000	55,130,000
Italy.....	59,835,000	11,805,000	60,015,000	10,635,000
Russia.....	445,930,000	.....	573,240,000	.....

The returns for the Associated Banks of New York are of date December 18th; the Bank of Italy, November 20th; the Bank of Russia, November 1st-13th; the Bank of Austro-Hungary, December 11th; Spain and the Netherlands, December 4th; the Bank of Belgium, December 20th; Germany, December 18th; the others are of date December 23d. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England and the Bank of Russia report gold only. 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 December 9th are reported by Messrs. Pixley & Abell's circular as below:

	1896.	1897.	Changes.
India.....	\$4,440,178	\$5,276,206	I. \$836,028
China.....	725,985	436,982	D. 289,003
The Straits.....	746,396	603,418	D. 142,978
Totals.....	\$5,912,559	\$6,316,606	I. \$404,047

Arrivals for the week this year were £203,000 in bar silver from New York, and £27,000 from the West Indies a total of £230,000. Shipments for the week were £174,550 in bar silver to India, and £72,470 to China, also £24,062 in Mexican dollars to Penang and \$6,749 to Singapore, a total of £277,831.

The Indian Council resumed the sale of bills in London this week and 40 lakhs were disposed of at an average of 15 1/2d. per rupee. It is understood that from 40 to 50 lakhs in bills will be offered each week from now until March.

Prices of Foreign Coins.

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

	Bid.	Asked.
Mexican dollars.....	\$ 45%	\$ 47
Peruvian soles and Chilean pesos.....	41	44
Victoria sovereigns.....	4.84	4.87
Twenty francs.....	3.84	3.87
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.78	4.80

Other Metals.

Copper.—The market is very firm, but dull and quiet, the approaching holidays making themselves felt. It is understood that the Calumet & Hecla Company is still booking orders at 11c., while the smaller companies do not offer at all. Electrolytic copper is still obtainable at 10 1/2% to 10 3/4% in cakes, wire bars and ingots, and 10 1/2% to 10 3/4% in cathodes. Nothing is changed with casting copper, which is still quoted 10 1/2% to 10 3/4%. Very few orders have been received from Europe, where buyers still refuse to pay the higher values established here during the current month, but it is expected that a better feeling will spring up after the turn of the year.

The London market was steady and transactions were moderate. The opening quotations were the same as last week, but subsequently a decline of 2s. 6d. set in, which continued up to date, and the closing prices are £48 @ £48 2s. 6d. for spot and £48 10s. @ £48 12s. 6d. for three months prompt. For refined and manufactured we quote: English tough, £49 15s. @ £50; best selected, £50 10s. @ £51; strong sheets, £57 10s. @ £58; India sheets, £55 @ £55 10s.; yellow metal, 4 1/4d.

Tin continues to be pressed for sale, and the market is dull and somewhat irregular. We have to quote for spot and December 13 65 @ 13 70c. and for futures 13 70 @ 13 75c.

The London market shows hardly any variation, and the metal is quoted £627s. 6d. @ £62 10s. for spot and £63 @ £63 2s. 6d. for three months prompt. Report from the East are somewhat conflicting as regards the quantities held there. It is contended by some parties that stocks held by natives amount to 5,000 or 6,000 tons, which is denied by others. Shipments for the next two months may certainly be expected to be quite heavy.

Lead.—There has not been much business doing. Consumers are all well provided with the

metal and refuse to take in further lots at the present asking price. On the other hand, most refiners are out of the market, but in spite of that lead could be purchased if anybody wanted to, and the market is rather dull at 3 70c. New York. From St. Louis business in common is reported at 3 52 1/2c., and in refined at 3 55c.

The foreign market is dull and buyers are keeping back. Prices are again somewhat lower, Spanish lead being quoted £12 10s. and English lead 5s. higher.

St. Louis Lead Market.—The John-Wahl Commission Company telegraphs us as follows: Pig lead continues unchanged, but there is a little more inquiry for future lead, and for January delivery it is worth 3 55c., February, 3 57 1/2c. Spot lead continues dull at 3 52 1/2c. Quite a number of sellers look for better prices after the holidays.

Spelter continues flat and irregular, and 3 70c. has been freely accepted in St. Louis, which is about the parity at which the metal can be exported. In consequence thereof we have to reduce prices to 3 1/2 @ 3 90c. New York.

The foreign market remains dull, good ordinaries in London being quoted £18 2s. 6d. and specials 2s. 6d. more.

Antimony.—In spite of the higher prices advised from England, the market does not show any change and prices remain dull at 8c. for Cookson's, 7 1/2c. for Hallett's, 7 1/2c. for U. S. Star and 7 1/2c. for Japanese.

Nickel.—Business continues moderate and no change in prices can be reported. We quote for ton lots 33 1/2 @ 36c. per lb., and for smaller orders 35 1/2 @ 38c. London prices are 14 @ 16d. per lb., according to size of order. The London price is about on a parity with New York, allowing for the duty of 6c. per lb.

Platinum.—Prices are now quoted at \$14.50 @ \$15 per oz. New York. The London quotation is 56s. @ 57s. per oz. Supplies are not large and a rise in prices is looked for.

For chemical ware, best hammered metal, Messrs. Elmer & Amend, New York, furnish the following quotations, 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, 57c., 58c.

Imports and Exports of Metals.

Port.	Week, Dec. 16.		Year, 1897.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum, boxes.....			3,522	.....
Antimony ore, short tons.....		2	.....	1,764
" regulus, casks.....				471
Brass, old, short tons.....	6		634	160
Chrome ore.....				90
Copper, fine, long tons.....	\$355		51,707	6,548
" ore.....		1,504		11,498
" matte.....		\$154		425
" sulphate.....		265		4,952
Ferro-chrome.....				26
Ferro-manganese.....			3,296	52
Iron ore.....				269
" old.....				52
" pipe.....	390			617
" pig, bar, rod.....	66	10	11,973	4,585
" pyrites.....				7,670
Lead, antimonial.....				100
" bullion.....	\$590	1,740	35,362	69,531
Manganese ore.....				6,185
Nails.....		60		841
Nickel.....		10		1,408
Rails, old.....				13,761
Spiegeleisen.....				15,387
Steel billets, rods.....	93	309	15,823	20,853
Tin.....		\$60		1,216
" dross.....				418
" and black plates, boxes.....		19,271		374,030
Zinc.....				3,943
" dross.....		16		1,714
†Baltimore.				
Brass scrap, long tons.....			9	.....
Chrome ore.....			21	5,511
Copper, fine.....			44,122	.....
" matte.....				163
" sulphate.....				1,844
Ferro-manganese.....			3,380	635
Ferro-silicon.....				231
Iron ore.....			2,756	258,116
" pig, bar, etc.....			4,632	11,737
" pipe.....				852
Lead.....			220	590
Manganese.....			562	15,248
Rails, steel.....				6,514
Spiegeleisen.....				2,205
Steel.....				6,363
" wire.....				12,861
Tin.....				5,714
" and black plates, boxes.....				25,507
Zinc.....				139
" dross.....				172
*Philadelphia.				
Antimony.....				2,712
Chrome ore.....				300
Copper ore.....				13,435
Ferro-manganese.....				122
Iron ore.....	2,700			174,763
" pig.....				50
" pyrites.....				7,976
Manganese ore.....				51,407
Tin.....		15		953
" and black plates, boxes.....				47,677

*New York Metal Exchange returns. †From our Special Correspondent. ‡Week ending Dec. 23.

and 50c. per gram. Wire and foil are 55c., 50c. and 57c. per gram.

Quicksilver.—The New York price has again been increased and is now \$38.50 per flask. The London quotation remains at £6 17s. 6d., per flask, with the same price named from second hands.

The Minor Metals.—Quotations are given below for New York delivery:

Aluminum:		Bismuth, 10 lb.	\$1.50 @ \$1.80
No. 1, 98% ingots, 10 lb. @ 40c.		Phosphorus, 10 lb.	45 @ 50c.
No. 2, 90% " " 31 @ 34c.		Tungsten, 10 lb.	70c.
Rolled sheets, " 38c. up		Tungstic acid, 450.	
Alum.-Nickel, " 33 @ 39c.		Ferro-tungsten, 60%	60c.

Variations in price depend chiefly on the size of the order.

Average Monthly Price of Metals

In New York, for the years 1897 and 1896; in cents per pound.

Month.	COPPER.		TIN.		LEAD.		SPELTER.	
	1897.	1896.	1897.	1896.	1897.	1896.	1897.	1896.
Jan.....	11.75	9.87	13.44	13.02	3.04	3.08	3.91	3.75
Feb.....	11.92	10.64	13.59	13.44	3.28	3.19	4.02	4.03
March ..	11.80	11.03	13.43	13.30	3.41	3.14	4.12	4.20
April....	11.48	10.98	13.34	13.34	3.32	3.07	4.13	4.07
May.....	11.03	11.15	13.44	13.54	3.26	3.03	4.21	3.98
June....	11.11	11.67	13.77	13.59	3.33	3.03	4.21	4.10
July.....	11.11	11.40	13.89	13.63	3.72	2.96	4.32	3.97
August ..	11.16	10.98	13.80	13.49	3.84	2.73	4.26	3.76
Sept....	11.30	10.66	13.98	13.15	4.30	2.77	4.18	3.69
October ..	11.13	10.66	13.88	12.94	4.00	2.80	4.17	3.72
Nov.....	10.88	11.23	13.79	13.09	3.76	2.96	4.03	3.99
Dec.....	11.28	.....	12.96	.....	3.04	.....	4.14	.....
Year ..	10.88	.....	13.29	.....	2.98	.....	3.94	.....

CHEMICALS AND MINERALS.

(For current prices of chemicals, minerals and rare elements see page 780.)

New York. Dec. 24.

Heavy Chemicals.—Business continues quiet, and prices remain unchanged. We quote: Caustic soda, 60%, \$2.10 @ \$2.20 per 100 lbs.; 70 @ 74%, \$2 @ \$2.15. Alkali, domestic, 58%, 65 @ 67 1/2c. for 50-ton lots and over, and 70 @ 80c. for smaller quantities; 48%, \$1 @ \$1.20 for jobbing lots. Foreign, 82 1/2 @ 87 1/2c. Carbonated soda ash, 90 @ 95c. per 100 lbs., for 58% basis of 48%. Bleaching powder prime brands, \$1.85 @ \$2.00; Continental F brand, \$1.85 @ \$1.90; other brands, \$1.75 @ \$1.87 1/2 per 100 lbs. Bicarb. soda English, 2 @ 2 1/2c. per lb.; American, bulk, \$2 @ \$2.25 per 100 lbs. Sal-soda, English, 67 1/2 @ 75c. per 100 lbs.; American, 62 1/2 @ 65c. per 100 lbs. Chlorate of potash, \$9.50 @ \$9.75 per 100 lbs.

Acids.—This market is featureless, demand being light and prices unchanged. Quotations are per 100 lbs. in New York and vicinity in lots of 50 carboys or over, as follows: Acetic acid, commercial No. 8, \$1.50 @ \$2; redistilled, 28%, \$2 @ \$2.15. Muriatic acid, 18%, 90 @ \$1.50; 20%, \$1 @ \$1.75; 22%, \$1 1/2 @ \$2, according to make and quantity. Nitric acid, 36%, \$3 1/2 @ \$4 1/4; 40%, \$3 3/4 @ \$4 1/4; 42%, \$4 1/2 @ \$5. Oxalic acid, \$7.25 ex-dock and \$7.50 ex-store. Mixed acids, according to mixture. Sulphuric acid, 66%, \$1 @ \$1 1/4. Chamber acid, 50%, \$3 per ton at factory. Blue vitriol, \$3 3/4 @ \$4 1/4, according to grade and order.

Brimstone.—Trade is of a routine character, and quotations are \$21.50 @ \$22 per ton for near by arrivals of best unmixed seconds, and \$20.75 @ \$21 for forward shipments. Thirds are from 75c. to \$1 less per ton.

Fertilizing Chemicals.—Buying was rather light this week at practically unchanged prices. It is understood that the menhaden fish factories have combined, and that the steamers plying between Delaware and Maine have been bought by a syndicate of English and American capitalists. This will probably cause prices of fish scrap to rise, but as yet no change has taken place. Potash salts are being delivered on old contracts. In a month or so prices will doubtless be fixed for the coming year. We quote: Sulphate of ammonia, gas liquor, \$2.27 1/2 @ \$2.30; bone, \$2.17 1/2 @ \$2.20 per 100 lbs. Dried blood, high grade Western, \$2.20 @ \$2.25 per unit New York \$1.90 per unit f. o. b. Chicago. Azotine, \$1.80 @ \$1.85; basis New York. Concentrated phosphate (30% available phosphoric acid), 57 1/2c. per unit. Acid phosphate, 13% @ 15%, av. P₂O₅, 55 @ 60c. per unit at sellers' works in bulk. Dissolved bone black, 17% @ 18% P₂O₅, \$16 @ \$16.50 per ton. Acidulated fish scrap, \$10 @ \$10.50 and dried scrap \$19 f. o. b. fish factory. Tankage, high grade, \$15.50 @ \$16 per ton, f. o. b. Chicago; concentrated tankage, \$1.55 per unit, f. o. b. Chicago; New York, \$20; low grade, \$13 @ \$13.50. Bone tankage, \$19 @ \$20; ground bone, \$21 @ \$23. Bonemeal, \$19.50 @ \$22.50.

Sulphate of Potash: 90%, New York and Boston, \$1.90 1/4; Philadelphia, Baltimore and Norfolk, \$2.01; Southern ports, \$2.03.

Double Manure-Salt. Quotations for 48 @ 49%, less than 2 1/2% chlorate, are 1 01 @ 1 01 1/2c., to arrive, and 1 02 @ 1 03c. on spot; basis of 48%. High grade, 90 @ 98% sulphate of potash, 1 06 1/2 @ 2 00 1/2c. to arrive; basis of 90%. In bulk 24 @ 36%, 36 1/2 @ 37 1/2c. per unit phosphoric acid.

Muriate of Potash: We quote: New York and Boston, 1 75 @ 1 78c. Philadelphia and Norfolk, 1 76 @ 1 79 1/2c.; Charleston, Savannah, Wilmington

and New Orleans, for 80@85% basis of 80%, 1'78 1/2@1'81c. in lots of 50 tons and upward.

Kainit.—Invoice weights, as taken at port of shipment, per ton of 2,240 lbs., testing 12 1/4% actual potash, equivalent to 23% sulphate of potash, \$8.80 @ \$8.90.

Nitrate of Soda.—Demand is small, but prices are somewhat firmer. Spot goods are quoted at \$1.67 1/2 @ \$1.70 per 100 lbs.; nearby arrivals are \$1.62 1/2 @ \$1.65; future shipments, \$1.55 @ \$1.57 1/2.

NOTES OF THE WEEK.

Shipments of phosphate rock from the Mount Pleasant field, in Tennessee, from January 1st to December 1st, 1897, amounted to 101,250 tons. Quantities of this phosphate have gone to France, Germany and other European countries.

There were shipped from Port Tampa, Fla., during November, 4,775 tons of phosphate rock. From Savannah, Ga., 6,203 tons went forward in the same month.

Liverpool.

Dec. 15.

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

There is no new feature to report as regards the chemical market, and business continues quiet all round.

Soda ash is firm, though there is not much fresh trade reported. The range for tierces as to market may be called about as follows: Leblanc ash, 48%, £4 10s. @ £1 15s.; 58%, £4 15s. @ £5, per ton net cash; ammonia ash, 48%, £1 @ £1 2s. 6d.; 58%, £4 5s. @ £4 7s. 6d. per ton, net cash; bags are 5s. per ton under price for tierces. Soda crystals keep steady and for most markets £2 17s. 6d. per ton, less 5%, is quoted for barrels, or 7s. per ton less for bags. Special quotations for American business.

Caustic soda does not attract much attention from buyers, but with no pressure to sell quotations are maintained and spot range, as to market, is about as follows: 60%, £6 5s. @ £6 10s.; 70%, £7 2s. 6d. @ £7 10s.; 74%, £8 @ £8 5s.; 76%, £8 10s. @ £8 12s. 6d. per ton net cash.

Bleaching powder is inactive, but outside make is difficult to get hold of. For hardwood packages the spot range remains at about £3 5s. @ £6 7s. 6d. per ton, net cash, as to destination. Low prices are still quoted for home trade requirements over 1898, but practically without any effect on export values.

Chlorate of potash is flat at nominally about 3 1/2d. per pound, but there is nothing doing to test values.

Bicarb. soda is steady at £6 15s. per ton, less 2 1/2% for the finest quality in 1 cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia shows some improvement and is quoted at £9 @ £9 2s. 6d. per ton, less 2 1/2%, for good gray, 21@25%, in double bags, f. o. b. here as to quality.

Nitrate of soda is in retail demand and offering at £7 15s. @ £7 17s. 6d. per ton, less 2 1/2% for double bags, f. o. b. here, as to quantity and quality.

Carb. ammonia, lump, 2 1/2 @ 3d. per lb.; powdered, 3 1/2 @ 3 1/2 d. per lb., less 2 1/2%.

MINING STOCKS.

Complete quotations will be found on pages 776, 777 and 778 of mining stocks listed and dealt in at:

Aspen.	Helena.	London.
Baltimore.	Los Angeles.	Mexico.
Boston.	New York.	Paris.
Cleveland.	Philadelphia.	Roseland.
Colo. Springs.	Pittsburg.	Shanghai.
Denver.	Salt Lake.	Valparaiso.
	San Francisco.	

New York.

Dec. 21.

Dealing in mining stocks has been only moderately active this week, owing in part to the approaching Christmas holiday. On the Consolidated Exchange there was a better inquiry for the Colorado stocks, especially those of Leadville, owing to good developments in the Small Hopes property. Bidders raised the price of Small Hopes from 55c. a week ago to 75c. Leadville Consolidated, which had not been dealt in since early in November, sold 530 shares at 8c.—a drop of 17c.

Lacrosse appeared this week after an absence of about three months, sales being made at 11c. Little Chief changed hands at 14c. Of the other Colorado stocks Isabella sold at 33@34c. This company reports a net profit in November of \$11,472. It has been announced that Mr. J. J. Hagerman's right to vote all stock of this company known as "Stamped Isabella" ceased on December 15th, and all such stamped stock can now be exchanged for the regular stock.

Elkton was decidedly quiet in the local market, notwithstanding the fact that the company realized a net profit of \$3,873 in November, and that the closing month of the year will show a similar gain. Golden Fleece advanced from 55c. on Saturday last to 63 1/2c. on December 21st. The company reports a net profit of \$4,526 in November, against \$7,489 in the previous month. Lillie was called on the Mining Exchange this week, and there were buyers of 300 shares at 72c. This company paid its second dividend of 1c. per share on December 1st, making a total of \$17,000 paid so far.

The Comstocks were traded in to a better extent this week, and several of them fluctuated notably. Consolidated California & Virginia opened at \$1.20,

advanced to \$1.35, receded to \$1.25 the following day, and closed at \$1.30. The assessment of 25c. is past due, and the day of sale is on December 29 h. Best & Belcher ruled steady at 55c., which is 9c. higher than a week ago. On December 28th the company will sell all stock upon which the assessment of 25c. has not been paid.

Belcher changed hands at 15c. The assessment of 20c. on this stock is due to-day, while the date of sale is fixed for January 11th. Gould & Curry was traded in for the first time since December 6th; sales were made at 45c., an increase of 5c. since the last transaction. The 82d assessment of 20c. levied by this company was delinquent on December 7th, and any stock upon which this levy has not been paid will be sold on December 20th. Sierra Nevada was sold at 56c., the first transaction since November 30th when the stock was sold at 50c. In Union Consolidated very little has been done recently, and the latest sale was made on December 22d at 30c. An assessment (No. 55) of 15c. was levied recently, which will be delinquent on January 11th.

Yellow Jacket advanced from 37c. to 45c. on reported developments in the mine.

The California stocks are attracting little attention outside of Brunswick, and this stock it is understood is being bought in by the opposition so as to gain a sufficient amount to overthrow the present management at the annual election in January next. There were sales of 1,500 shares of this stock at 12c. Standard Consolidated was featureless, while Syndicate changed hands at 6c.; an advance of 1c. from a week ago.

The Utah stock, Horn Silver, was sold at \$1 45, which is 10c. less than two weeks ago. The directors of this company met this week and declared a dividend of 5c. per share (\$20,000), payable on December 30th. This is the first dividend since January, 1895, when it was 12 1/2c. per share. The total distributed to date amounts to \$5,150,000. Ontario was quoted at \$4.50 @ \$5, and shows sales of 395 shares.

Homestake of South Dakota was strong in price, opening at \$40 and rising to \$45, closing at \$42. The double dividend amounting to \$62,500, which will be distributed on December 27th, has, it seems, caused increased confidence in the share market.

The Klondike companies are experiencing more or less trouble from different sources. On December 16th an attachment for \$52,500 was taken out against the British North American Trading and Exploration Company of No. 63 Wall street, this city, in favor of General Joshua M. Varian. General Varian claims that \$50,000 is for the use of his name as a director, and \$2,000 for commission in getting a party to put \$10,000 into the company. General Varian became a director in September last, and he alleges that he was to receive 50,000 shares of stock or \$50,000 in money, but did not receive either the stock or the money. He also alleges that he was to receive 25% commission on subscriptions which he obtained. The attachment was obtained on the ground that the company is a West Virginia corporation. It is capitalized at \$5,000,000. General Benjamin F. Whitlock is president, and when the company was organized the name of Governor O'Ferrall, of Virginia, appeared as first vice-president.

When the case came up in the Supreme Court a day later the attachment was vacated, as the attorneys for the trading company stated that the matter was adjusted with General J. M. Varian.

There were sold at auction on December 22d 2,000 shares of Phoenix Lead Company for \$100; 5% debenture bonds (\$5,000) of Illinois Steel Company at 80%; 5 common shares Trenton Pottery Company at 11, and 10 preferred shares at 51; \$2,000 worth of first 7 1/2% bonds of Delaware & Hudson Canal Company at 146 1/2; \$5,000 worth of 5% bonds of New York, Susquehanna & Western at 105 1/2; \$5,000 worth of 5% general mortgage bonds of Central Railroad of New Jersey at 113; 47 shares of 6% preferred stock of Woodstock Iron Works, of Anniston, Ala., at 105; \$2,000 worth of 1st 5% bonds of Duluth & Iron Range Railroad at 101 1/2; \$5,000 worth of general lien 3 1/2% bonds of Erie Railroad at 71 1/2; \$10,000 worth of Buffalo, Rochester & Pittsburg 5% general mortgage bonds at 101 1/2; 100 shares of Lappin Brake Shoe Company at \$5.

Boston.

Dec. 22.

(From Our Special Correspondent.)

There has been but very little doing in copper stocks the past week until to-day when a drive was made in Centennial which carried the stock down to \$11, the lowest price for many months. The opinion seems to be general that an assessment is among the early probabilities, hence the desire to unload the stocks before the announcement is made. Boston and Montana declined early in the week to \$143 1/2, with a later rally to \$146 1/2, but selling off again this morning to \$145 1/2. Butte & Boston has held quite steady between \$23 1/2 and \$24 1/2, with latest sales at \$23 1/2. The dealings in both these stocks have been light. Calumet & Hecla was dull but steady at \$470. Quincy firm at \$116, and Tamarack after touching \$125 advanced to \$130, reacting to \$128. Osceola was dull but steady at \$37 1/2 to \$39, and later \$37 1/2. Franklin declined \$3 1/2, to \$17, but Atlantic was strong at \$25 1/2 @ \$26. Old Dominion opened at \$23 1/2 and advanced to \$25, but declined later to \$24. Wolverine holds pretty well at \$16 @ \$16 1/2, but there is very little doing in it. Arnold was firm at \$2. A sale of Bonanza Development Company was reported at 35c.

In gold stocks, Gold Coins sold at \$2; Pioneer at \$5 1/2 @ \$5 3/4; Merced declined 3/4 to \$4 1/2; Santa Ysabel declined from \$8 to \$5 1/2, and the rights from 80c. to 20c.

3 P. M.—After the noon hour Centennial rallied to \$11 1/2 and closed there. Boston & Montana declined to \$144 1/2, and Butte & Boston from \$24 to \$23 1/2, closing at \$22 1/2. Old Dominion declined to \$23, and closed at \$23 1/2.

(From an Occasional Correspondent.)

The fire at the Tamarack-Osceola Company's coal docks at Dollar Bay has spread with great rapidity during the past week and it is understood in Boston that it is now entirely beyond control. Heavy loss is inevitable and most strenuous efforts do not avail to check the steady progress of the flames. Gas from the fire is smelt 10 to 15 miles away.

The Wolverine mine has been running an additional stamp at the old Allouez mill for a week and is now producing about double its former output or something over 200 tons mineral per month; this rate of output can easily be maintained.

The feature in the market to-day has been the decline in Centennial stock to \$11, with only fractional rally. This is low-water mark, since the stock sold at \$25 three months ago. It is understood that the results from the recently started mill are somewhat disappointing to certain stockholders, although the development work in the mine continues to show a satisfactory grade of rock.

Baltic declined during the week to \$6 1/2, with sales to-day at \$8, which price is quite a concession from \$12 1/2 last week. Cochiti has sold rather freely at \$8 during the week. The market to-day is \$7 1/2 @ \$8, no sales being reported.

Salt Lake City.

Dec. 18.

(From Our Special Correspondent.)

As usual the decline in silver caused a lower range of prices in the silvers and later the drop in lead had a further weakening effect. In spite of these disturbing influences the market remains firm, with a healthy tone. Silver King affords the market exception in the lead-silvers, by advancing to \$16 bid, \$17.50 asked, and, with several orders on the market, is the strongest security on the active list. Other than this there is nothing new to chronicle as to the silver and lead silver shares, save the dread of dividends being cut off, or reduced, should these metals suffer continued weakness. Generally, the reliable producing mines show well and could readily maintain even larger shipments if the products bring desirable prices.

Geyser-Marion once more offers a stronger front, due in part to confidence in the management's integrity and in part to what seems a well authenticated report of improvement at the mines. The bears are routed and no more talk of 75c. or 80c. shares is heard. Monday it sold as low as 96c., and Thursday the bid advanced to \$1.02 1/2. The slight sag this morning is a bit of manipulation, as there are numerous orders at hand for the shares. About 5,000 changed owners during the week.

Northern Light is on the run and it is difficult to predict where it will land. Monday it did business at 48c., to-day 1,500 went at 38c. and 500 at 37 1/2c.—a depreciation of more than 50% in a half year. The cause is twofold: less gold values in ores than is generally believed and the mill's inability to treat the tonnage previously given out. Chloride Point no longer moves upward. How can it be explained that, immediately following the announcement of its initial dividend, a new supply of treasury shares is offered for sale? Not only this, but it is given out that a January dividend will be paid. Apparently the mine has merit and is steadily shipping good grade ore, but the day for this sort of dividend wild-cattling is long past.

Ajax stockholders' adjourned annual meeting on December 17th adjourned *sine die*, so the old board remains at the helm till the next act in this melodrama. The several times continued injunction hearing, involving the control, is booked for another inning January 13th. It did business at 30c. Friday, the first transfer for months. The prevailing belief is the property can be given its former standing with a little systematic exploration. Swansea and South Swansea are recording sales at current figures. A day or two ago there were offerings of Swansea for Mammoth at an even exchange, in small or large lots. Emerald scored sales at 4 @ 4 1/2c.; Four Acres at 3 1/2c.; other Tintics present no new features.

Mercur again chronicles high-water mark, doing business at \$8.50. Slowly it moves up and would have a more rapid pace were money easier. Sunshine is stronger over the prospect of something happening thereabouts soon. Sacramento is practically out from under the cloud of threatened litigation and presents a better form. Many shrewd operators affirm this is the best buy on the Salt Lake market at current figures. Certainly, with \$40,000 and more in the treasury, and the generous ore showing, it is well worth investigating.

Horn Silver is still inquired for. Each day the intimation is more pronounced of resuming dividends with the new year. The handsome reserve fund is substantially augmented by 1897 shipments,—largely due to lead's advance—besides accomplishing a large amount of development, while the property is in far better condition than in December, 1896.

Utah has just made known a dividend of 1c. per share, aggregating \$1,000, payable December 29th. Unless market conditions materially change for the worse such premiums will continue, or better.

San Francisco.

Dec. 18.

(From Our Special Correspondent.)

The market was very quiet all through the earlier part of the week. Later there was a spurt in Sierra Nevada on the strength of good reports from the mine, where some new developments are said to have been made. This carried up the rest of the list and made some stir; but a reaction followed, and the close was quiet and rather weak. Next Saturday will be a holiday again, and in fact we cannot look for much activity in stock dealing until after the New Year begins.

Some quotations noted for Comstock shares were as follows: Alpha Consolidated, 7@8c.; Alta, 3c.; Andes, 15c.; Belcher, 15c.; Best & Belcher, 52@53c.; Bullion, 5@6c.; Caledonia, 22c.; Challenge Consolidated, 25c.; Chollar, 38@39c.; Consolidated California & Virginia, \$1.30; Consolidated Imperial, 1@2c.; Consolidated New York, 2c.; Confidence, 88c.; Crown Point, 28@29c.; Exchequer, 6c.; Gould & Curry, 40c.; Hale & Norcross, \$1.25; Justice, 27c.; Kentuck, 6c.; Mexican, 26@30c.; Ophir, 66c.; Occidental Consolidated, \$1.20 @ \$1.25; Overman, 4@5c.; Potosi, 42@43c.; Savage, 22 @ 23c.; Sierra Nevada, 60@66c.; Segregated Belcher, 7c.; Scorpion, 1c.; Silver Hill, 2c.; Union Consolidated, 27c.; Utah Consolidated, 6c.; and Yellow Jacket, 34c. For Eureka Consolidated 23c. was bid. Standard Consolidated was offered at \$1.60.

The Champion Mining Company, of Nevada County, has declared a regular monthly dividend of 25c. per share, payable December 21st.

The Rockland Gold Mining Company has levied an assessment of 3c. per share, delinquent January 3d.

A special meeting of the stockholders of the Alaska Improvement Company has been called for December 28th to reconsider the action taken at a recent meeting to dissolve the corporation.

Paris.

Dec. 12.

(From Our Special Correspondent.)

The mining stock market continues quiet and with few notable incidents. The South African gold stocks especially are quiet and nothing is doing, in spite of the reported increases in production, which do not affect our buyers.

In the metallurgical shares there has been some hesitation, and while the quotations have not fallen, there has been no increase, except in the Russian group, which continues active.

The coal stocks, which are rather investment than speculative stocks, are strong and prices continue at a high level. The demand for coal has been unusually good this year, and will continue so unless there is an unexpected change in the industrial conditions prevailing.

The copper shares show little change, and values are not decreasing. The demand for copper shows fewer signs of diminishing than it did a few weeks ago.

There has been a little excitement in the nitrate shares, but few people are interested in those properties now, and the attention they attract is very limited.

There is some excitement over the new move of Germany in China. The general impression is that this action will precipitate the inevitable break-up of the Chinese Empire; the question is, who is to get the best share. The decision of this may lead to some European complication. That is what all financiers fear here.

AZOTE.

London.

Dec. 15.

(From Our Special Correspondent.)

The Stock Exchange has been upset somewhat by a collapse in Anacondas, due to a message from Hamilton Smith to the effect that the profits for the past six months are very much reduced and that the usual 10% dividend cannot be paid. Of course all sorts of wild rumors are sent about to account for this, such as the mine giving out, ore becoming poorer, etc. People rushed round selling at 4½ the shares they bought at 47, thinking themselves lucky to get off so cheaply. Those who know anything of the internal working of the company are aware of the real reason of the decline, that the furnaces have hitherto been forced to their utmost capacity and that in consequence a considerable stoppage for repairs has been necessitated during the past few months. But there are very few people in England who do know the inside of the Anaconda management, perhaps not even the directors of the Exploration Company itself. Another cause for depression is that the discovery has recently been made that there is considerable floating debt not yet paid off by the new company to the original owners. When the purchase was made it was thought that the purchase price included everything, but this delusion has recently been exploded.

The feature of the American section this week has been the floating of the British American Corporation by Whitaker Wright. The success of his Lake View Consols has inspired such confidence on the part of the public that the £1,500,000 of capital has been subscribed with eagerness, though the prospectus was lacking in information such as would prove the value of the purchase. The most remarkable thing about it is the securing of an option on the Le Roi at Rossland. So many English promoters have claimed that they had an option on this mine that people shook their heads incredulously when informed in confidence beforehand that Governor MacIntosh, of the Northwest Provinces, had secured an option on the mine and was acting for Whitaker Wright. Such is the

fact, however. In the prospectus it leads the reader to suppose that the Le Roi has actually been bought or will be bought with the capital of the British American Corporation. This, I think, will not be the case, but a subsidiary company will be floated and a large amount of additional capital raised. Other mines on which options have been obtained are the Josie, No. 1, Nickel Plate, Oronogo, Pack Train, Legal Tender, Derby, Surprise and You Know, all at Rossland; the Algonquin group, consisting of 18 claims, situated on Castle Mountain, Christina Lake; the Nelson Poorman group of six properties on Eagle Creek, near Nelson; the Murphy and Katharden properties, in the district of Nelson. The Yukon properties consist chiefly of the assets of the Alaska Commercial Company, which was established 29 years ago. Besides this there are claims at K ondike, town sites at Dawson City, etc.

The Board of Directors includes the Marquis of Dufferin, once Governor-General of Canada; Lord Loch, once Governor of Cape Colony, and Governor MacIntosh, of the Northwest Provinces. The prospectus also mysteriously announces that another director of high position and influence will join after allotment. I have reason to believe that this is the Marquis of Lorne, who also was once Governor-General of Canada. Paragraphs sent round to the papers say that the Marquis of Dufferin has applied for 50,000 shares at £1 each. The wonder is where he will get the money from to pay for them, or even for a small fraction of them, for he is notoriously one of the most impetuous of noblemen.

Another Canadian company which is being formed is the Recordia Exploration Company. This is a parent company which is to deal with British Columbian, Ontario and Klondike properties. The British Columbian properties are the Anaconda, Kootenay and Columbia claims in Deadwood Camp; coal land near White Lake, Osoyoos, Yale District; coal lands and town lots at Grand Forks City. The Ontario properties include the Gold Coin mine, 29 miles south of Rat Portage. The Klondike interests are not specified. The engineers recommending the properties are Thomas Richard and Alfred Woodhouse. Not much information is given as to the value of the properties, most of which appear to be nothing more than prospects.

Another company in process of formation is the Klondike Prospectors and Financiers, Limited. This is being promoted by Col. Josiah Harris, and the engineer is Mr. John Robertson. It is rather difficult to understand why "Klondike" should form part of the name of the company, for the operations contemplated seem to be confined to British Columbia. It is intended to purchase Mr. Charles Ball's system of suction dredging, and Mr. J. W. Clark's plant for recovering gold and silver. The properties to be dredged are parts of the Fraser River not specified, and parts of the Quesnelle River north fork also not specified. Of Clark's plant I have no details, but of Ball's dredge I know something. It consists of an ordinary suction dredge, but instead of employing a diver to direct the nozzle, he uses an ordinary diving bell for a comparatively unskilled man to stand in. Another object of the company is to sell the Silentium wickless paraffine gas stove.

The Palmarejo Company has been reconstructed this week. It will be remembered that the original vendor, Mr. Applegarth, and his mine manager, Captain Drake, were ejected by a vote of the shareholders some eight months ago. Since then Mr. Liddle has thoroughly examined the mine and finds that the facts have always been misrepresented.

The Pike's Peak Tunnel Mining Company is being introduced in England by Charles E. Waite. It is vouched for by Mr. Wm. Weston, whose opinions are confirmed by Sir Douglas Fox and Read Campbell & Company. The former is an eminent civil engineer and the latter mining and civil engineers and contractors. The object is to build a series of tunnels to tap the deeper veins of the Cripple Creek district. The company is incorporated under the laws of Arizona, and its capital is put at \$50,000,000 or £10,000,000. The company is now offering 2,000,000 shares of £1 each for subscription at par. A truly magnificent scheme, especially from a promoter's point of view.

Much attention has been drawn to the South African mining market by the remarkable advance in the production of gold on the Rand, as shown by the figures for November, 297,131 oz., or an increase of 22,949 oz. over the previous record. The development of the deep level mines is responsible for most of the increase, a notable example being in Rose Deep, which returns 9,529 oz. Langlaagte Star, which has renewed crushing, and Robinson Randfontein, a new producer, have added to the increase. Most of the older mines continue producing steadily, and have not suffered recently from lack of water or labor. Though the deep levels have produced so largely, there is still much doubt as to their real profits. Estimates are given every month, but these in past times have been proved so misleading that no one depends much on them, and the yearly reports are looked forward to with interest. There is very little buying of any of the deep level shares on the part of the public, and the big promoting houses have to do all the buying of their own goods and thus to create strength which would not otherwise exist.

Quite a little upset has been caused in the West Australian market by the transfer of Mr. Charles Kaufman from the London & Globe Company to the West Australian Market Trust. The former company is Whitaker Wright's and the latter Horatio Bottomley's. The two promoters are by far the most powerful in the West Australian market.

Mr. Kaufman's contract with the former terminated in October, and better terms were offered by Mr. Bottomley, who talks as if securing Mr. Kaufman's services was the most successful stroke of his life. Mr. Kaufman has been extremely fortunate in having been connected with so great a mine as Lake View Consols; in fact this mine has made his reputation. But there is many a practical miner in more humble circumstances whose opinion of a mine or prospect would be more valuable.

The Lake View Consols mine has just issued its report for the first 15 months of its work since being floated here, up to end of August last, and it shows very fine results. The tons of ore crushed were 14,803, yielding 37,582 oz., valued at £156,463; 5,667 tons of tailings yielded 6,363 oz., valued at £24,943; and concentrates sold (mostly tellurides) produced £10,574. The total production realized £191,960, while the expenses were £63,132, leaving a profit of £128,848. The capital of the company is £250,000, and a dividend on the period's work of 50% was declared. All this time only 20 stamps were in operation, but since then, in October, 40 stamps more have commenced. Additional granite and concentrating plants are also in construction. The amount of milling ore in sight is about 250,000 tons, and below the level there is tellurides and sulphides, which have not yet been adequately explored.

Rossland, B. C.

Dec. 15.

(From Our Special Correspondent.)

Continuous snowstorms have materially retarded progress in this and other portions of West Kootenay District. The snowfall in some parts is unprecedented in extent, the comparatively early stage of the winter being taken into account. The reports which have been received from the various mining divisions of the district have evidenced considerable activity in the direction of production and shipments. The winter has always been a favorite season with shippers in the Slocan and upper districts, as the snow has been found to be an important factor in the transportation of ores.

There has always been a tendency in this district to magnify results, yet the number of shippers is constantly increasing and it is reasonable to expect from the amount of progress made in the direction of exploration and the establishment of smelters and other reducing works that next year will surpass any of its predecessors so far as West Kootenay is concerned. The present year which is about expiring witnessed the marked decline of wild-cattling and the rapid advance of the industrial feature of the mining business. The smelting facilities will be ample for two or three years at least. There is still much to be done in the way of production and the spirit of stock-jobbing, though curbed, is still ready to break forth with its former energy if the conditions will permit it.

MISCELLANEOUS DIVIDENDS.

Maryland Coal Company semi-annual of 2% on the preferred stock payable at the New York office on January 3d.

Exploration syndicate, quarterly dividend of \$2.50 per share, payable at the office, No. 35 Wall street, New York, on December 31st.

MEETINGS.

Michigan Gold Mining, Bonding and Leasing Company, annual meeting at the office, No. 613 Mining Exchange Building, Denver, Colo., on January 10th, at 4 p. m.

Oro Grande Mining and Milling Company, stockholders' meeting at the office, 48 West Second South street, Salt Lake City, Utah, on January 4th, at 8 p. m.

LATE NEWS.

(From Our Special Correspondent.)

END OF THE WESTERN UNION LEAD QUOTATIONS. —At length the agitation first started by the *Engineering and Mining Journal* against the pseudo-brokers' lead quotation, daily wired west from New York by the Western Union, is bearing fruit. After January 1st the Western Union announces that it will no longer be a party to this deception. This decision was determined on, as reported here, through a protest made by A. F. Holden, of the old Jordan & Galena, on his recent visit East. However, it is doubtful if producers will be immediately benefited, as the lead refiners have a scheme to furnish their, so styled, brokers' quotation to subscribers—pledged not to make public these figures—in another way, through the Gold and Silver Telegraph Company, a sort of wheel within a wheel. By this plan no lead and silver quotations can be generally known till the associated press report is published in the papers, which will be annoying. Whatever the outcome, this step is a little gain and the agitation for the right should be continued.

From Tintic, Juab County, Utah, for the week ending December 18th, the following lots of ore were forwarded: Bullion-Beck, 20 cars; Gemini, 11 cars; Swansea, 5 cars; South Swansea, 3 cars; Utah, 1 car; Star Consolidated, 2 cars; Mammoth, 12 cars; Picnic, 1 car; Morning Glory, 1 car; Centennial Eureka, 1 car. Consignments of concentrates were: Eureka Hill, 6 cars; Sioux Mill, 2 cars; also 4 cars of bullion. From the Dragon Iron were sent 11 cars of hematite for fluxing.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Alamo, Anaconda, Annetta, etc., with columns for location, par value, and prices for Dec 17-23.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Aetna Con., Allouez, Anaconda, etc., with columns for location, par value, and prices for Dec 16-22.

* Official quotations Boston Stock Exchange. * Bid and ask quotations. Total sales, 27,611.

BALTIMORE, MD.* Week ending Dec. 2.

Table of stock quotations for Baltimore, MD., listing companies like Atlantic Coal, Big Vein Coal, etc., with columns for location, par value, and bid/ask prices.

* Official quotations Baltimore Stock Exchange.

CLEVELAND, O.*

Table of stock quotations for Cleveland, O., listing companies like Aurora, Chandler, Cleveland-Cliffs, etc., with columns for par value and Dec 21 prices.

* From our special correspondent.

ASPEN, COLO.

Dec. 11.

Table of stock quotations for Aspen, Colo., listing companies like Agnes C, Aita Argent, Aspen, etc., with columns for location, capitalization, par value, and quotations.

COLORADO SPRINGS, COLO.:

Table of stock quotations for Colorado Springs, Colo., listing companies like Alamo, Anaconda, Arg'ntum J, etc., with columns for par value and Dec 13-18 prices.

* Official quotations Colo. Springs Mining Stock Association. Total shares sold, listed, 478,550; unlisted, 292,400.

COAL AND INDUSTRIAL STOCKS.

Table of coal and industrial stocks, listing companies like American Coal, Col. C. & I. Dev, etc., with columns for par value and Dec 17-23 prices.

* Official quotations. New York Stock Exchange, mining, 9,095 shares; other stocks, 9,740 shares; Consolidated Stock and Petroleum Exchange, mining, 19,024 shares; Mining Exchange, 1,371,275 shares. Total shares sold, 1,410,547. * Bid and ask quotations. * Ex-dividend.

PHILADELPHIA, PA.:

Table of stock quotations for Philadelphia, Pa., listing companies like Cambria Iron, C. & P., etc., with columns for location, par value, and Dec 16-22 prices.

* Official quotations Philadelphia Stock Exchange. * Bid and ask quotations. Total sales \$ 995.

PITTSBURG, PA.*

Dec. 22.

Table of stock quotations for Pittsburgh, Pa., listing companies like Allegheny, Carbondale, etc., with columns for location, par value, and bid/ask prices.

* Official quotations Pittsburgh Stock Exchange.

STOCK QUOTATIONS.

DENVER, COLO.

Table of stock quotations for Denver, Colorado, listing various companies and their share prices from Dec. 13 to Dec. 18, 1897.

* Official quotations Colorado Mining Stock Exch. * Bid and ask quotations. Total shares sold, 661,000.

HELENA MONT.

Table of stock quotations for Helena, Montana, listing companies and their share prices for the week ending Dec. 18, 1897.

* Special Report of Samuel K. Davis. Total shares sold, 2,600.

SAN FRANCISCO, CAL.

Table of stock quotations for San Francisco, California, listing various companies and their share prices from Dec. 16 to Dec. 22, 1897.

* Official telegraphic quotations, San Francisco Stock Exchange.

LOS ANGELES, CAL.

Table of stock quotations for Los Angeles, California, listing various companies and their share prices from Dec. 6 to Dec. 11, 1897.

* Official quotations, Los Angeles Mining and Stock Exchange. * Bid and ask quotations. Total sales, 216,000 shares.

SALT LAKE CITY, UTAH.

Week ending Dec. 18.

Table of stock quotations for Salt Lake City, Utah, listing various companies and their share prices for the week ending Dec. 18, 1897.

* From Our Special Correspondent. * Utah companies. † Mines in Vanderbilt, Cal. ‡ Mines in Tuscarora, Nev.

ROSSLAND, BRITISH COLUMBIA.

Dec. 15.

Table of stock quotations for Rossland, British Columbia, listing various companies and their share prices for Dec. 15, 1897.

* From Our Special Correspondent.

MEXICO.

Week ending Dec. 14.

Table of stock quotations for Mexico, listing various companies and their share prices for the week ending Dec. 14, 1897.

NOTE.—In most of the older 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. Many newer companies have a nominal par value, usually \$50 or \$100. Prices are in Mexican dollars.

STOCK QUOTATIONS.

LONDON. Dec. 10. Table with columns: NAME OF COMPANY, Country, Authorized capital, Par value, Last dividend, Quotations. Lists various mining and engineering companies with their financial details.

PARIS. Week ending Dec. 2. Table with columns: NAME OF COMPANY, Country, Product, Capital Stock, Par value, Latest divs., Prices. Lists companies like Acieries de Creusot, Briansk, etc.

VALPARAISO, CHILE. Nov. 6. Table with columns: NAME OF COMPANY, Location, Capital paid, Sh. Val. paid up, Last Dividend, Prices. Lists companies like Arturo Prat, Caracoles, etc.

SHANGHAI, CHINA. Nov. 19. Table with columns: NAME OF COMPANY, Country, No. of shares, value, Last dividend, Price. Lists companies like Jebeu Mg. & Trad., etc.

DIVIDENDS. Table with columns: NAME OF COMPANY, Current Dividends, Paid since Jan. 1, 1897, Total to date, NAME OF COMPANY, Current Dividends, Paid since Jan. 1, 1897, Total to date. Lists companies like Aetna Con. Q., Alaska-Mexican, etc.

ASSESSMENTS. Table with columns: NAME OF COMPANY, Location, No., Dinq., Sale, Am. Lists companies like Abbie, Alta, Belcher, etc.

November dividend paid.

New assessment.

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 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 \$31,350,000 in dividends and the Cons. Virginia \$42,390,000. § Dividends paid since consolidation. ¶ Bodie, Bulwer and Mono transferred to Standard Cons., January, 1897. * Dividends have not been paid in several years.

Note.—This table is corrected up to December 1. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.

RARE ELEMENTS, CHEMICALS AND MINERALS—CURRENT PRICES.

NOTE.—This table is revised up to December 30th. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.

CHEMICALS AND MINERALS.

These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts.

Table listing various chemicals and minerals such as Abrasives, Acids, Alcohol, Alum, Aluminum, Ammonia, Ammonium, Argols, Arsenic, Asbestos, Asphaltum, Barium, Bauxite, Benzole, Bismuth, Bitumen, Bone Ash, Borax, Bromine, Cadmium, Calcium, Carbide, Carbonate, Chlorine, Chrome Ore, Clay, Cobalt, Copper, Feldspar, Flint, Fluorspar, Glass, Iodine, Iron, Kaolin, Lead, Lithium, Magnesia, Magnesium, Marble, Mercuric, Mica, Mineral Wool, Nickel, Nitrate, Oxide, Potash, Pyrites, Quartz, Silica, Soda, Sulphate, Sulphur, Talc, Tellurium, Tin, Uranium, Zinc, and Zirconium.

Table listing various metals and alloys including Manganese, Nickel, Oils, Potassium, Strontium, and Zinc, with their respective units and prices.

Table listing various pigments and colors such as Benzine, Chrome, Green, Yellow, Lampblack, Litharge, Metallic, Marbled, Ocher, Orange, Paris, Red, Shellac, Turpentine, Ultramarine, Vermilion, White, and Zinc.

Table listing various rare elements including Argon, Barium, Beryllium, Boron, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Germanium, Glucinum, Helium, Indium, Iridium, Lanthanum, Lithium, Molybdenum, Niobium, Osmium, Rhodium, Rubidium, Rutherfordium, Selenium, Silicon, Strontium, Thallium, Thorium, Vanadium, and Wolfram.

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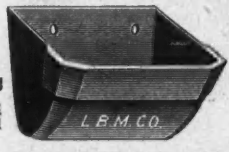
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Colorado Iron Works, Pages 33 & 35.

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No. 3. See Ads. of JEFFREY MFG. CO., Pages 16 and 34

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See Page 27.

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See Card of SULLIVAN MACHINERY CO. Page 24

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See Page 32.

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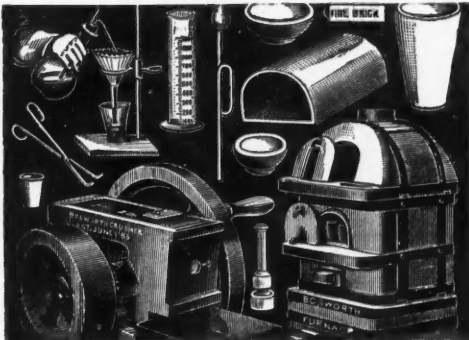
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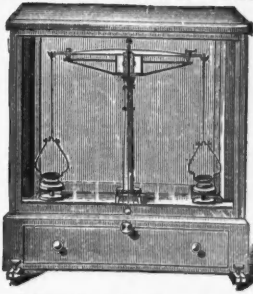
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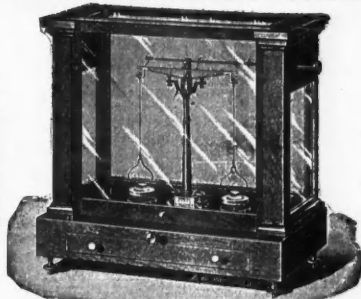


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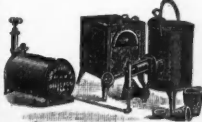
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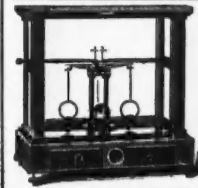
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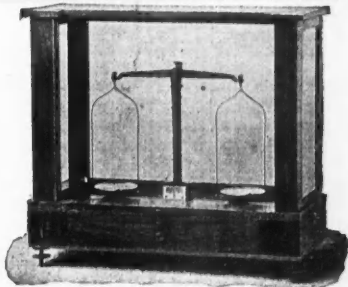
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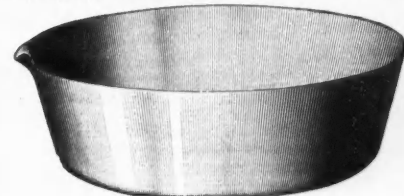
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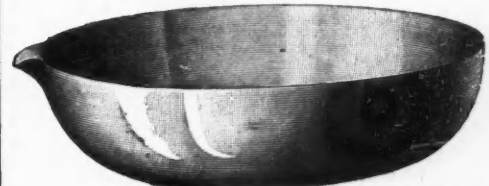
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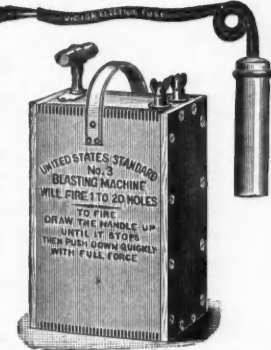
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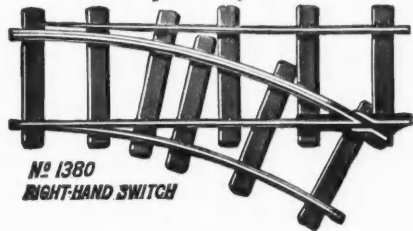
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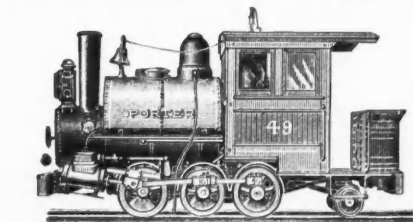
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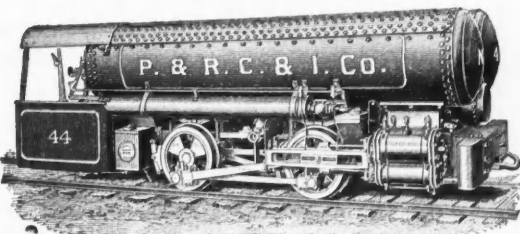
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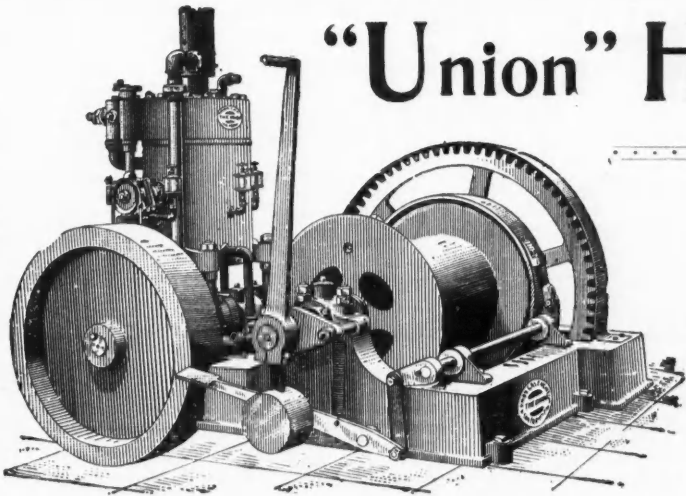
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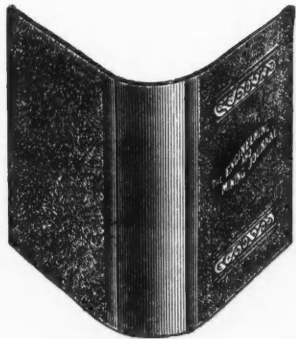
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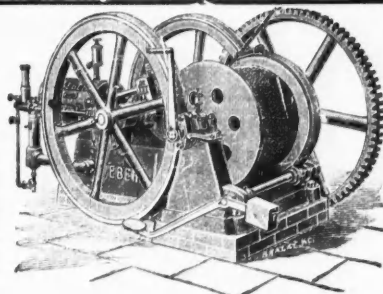
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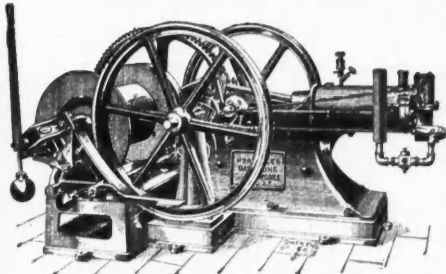
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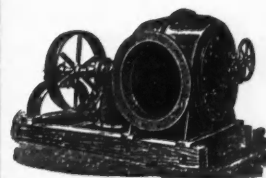
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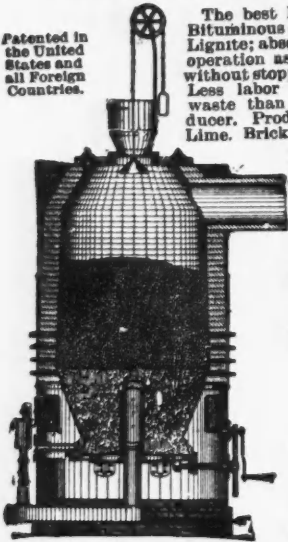
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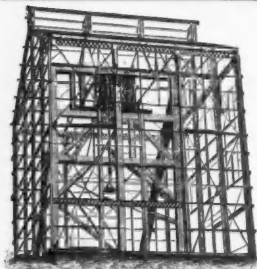
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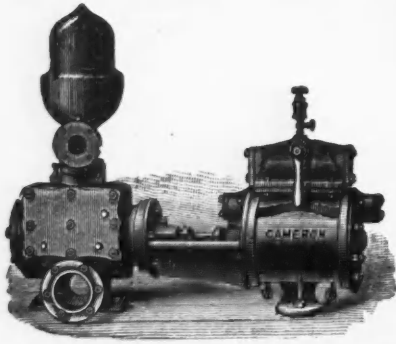
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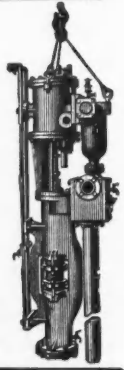
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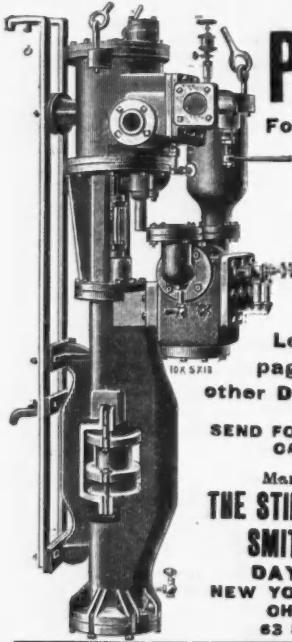
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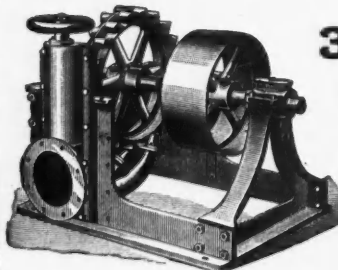
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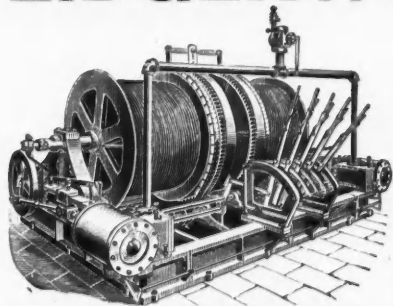
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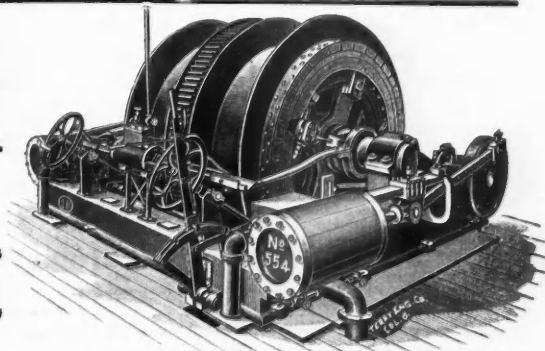
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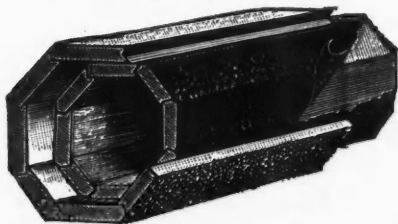


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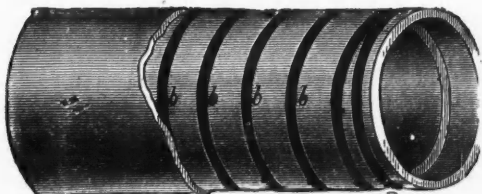
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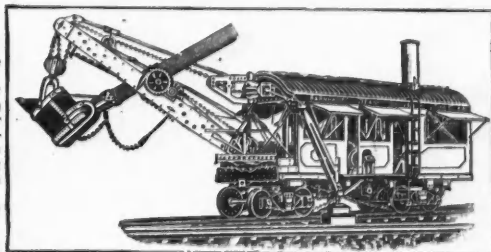
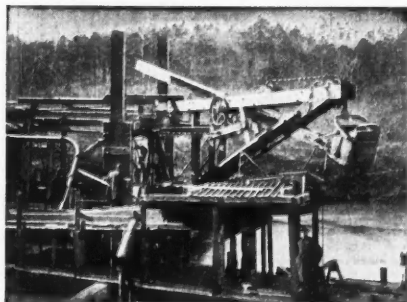
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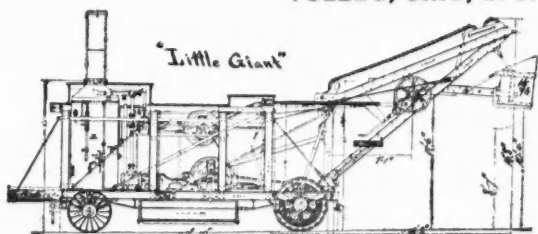
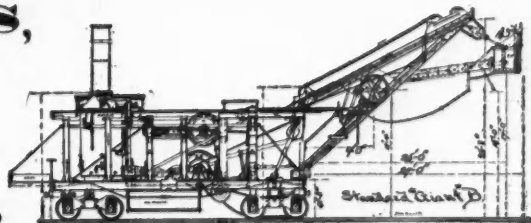
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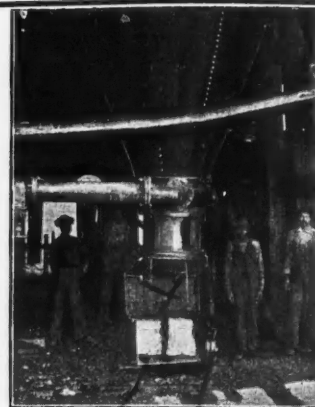
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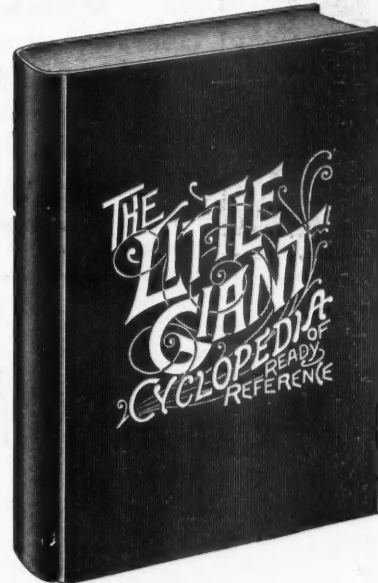
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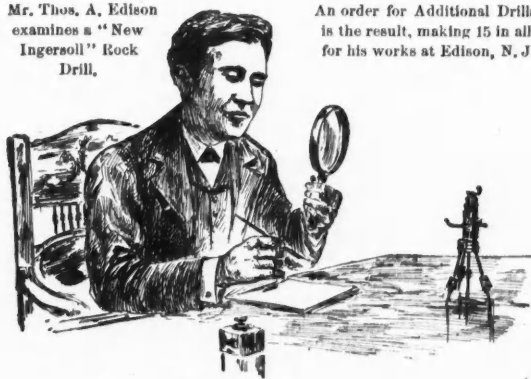
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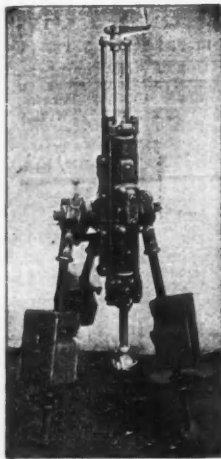
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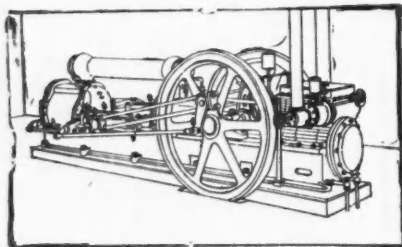
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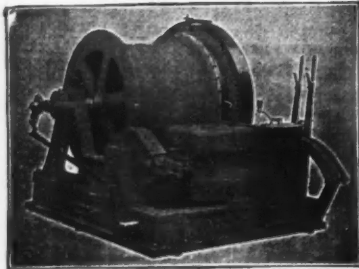
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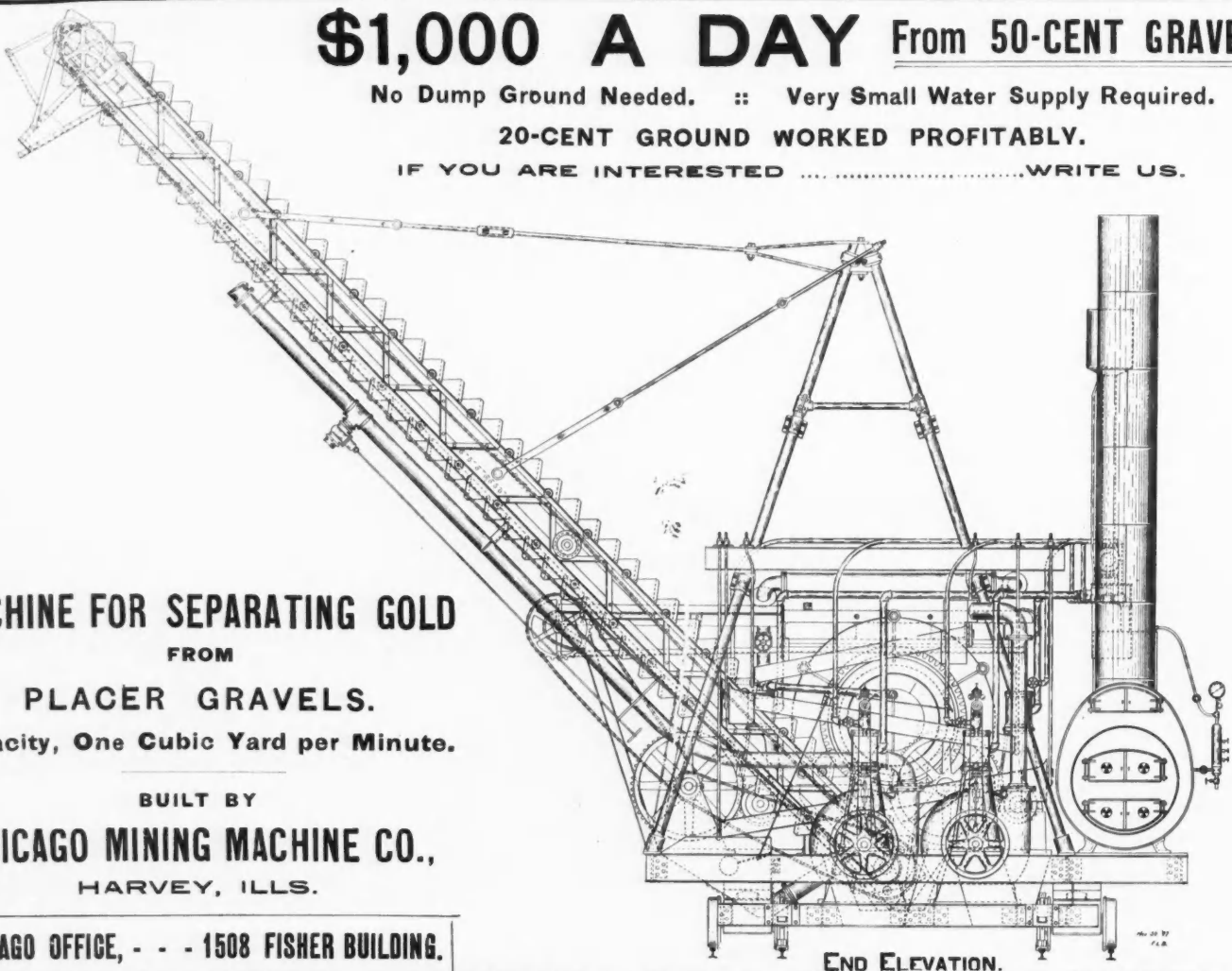
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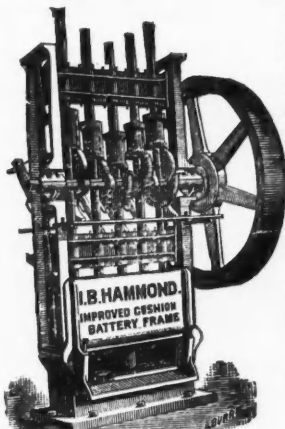
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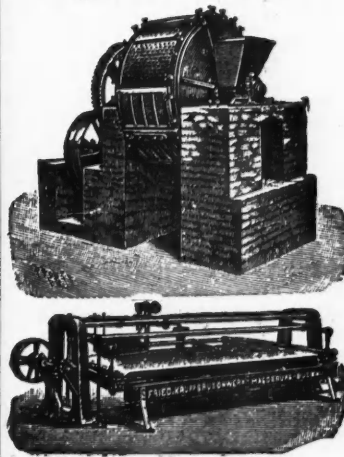
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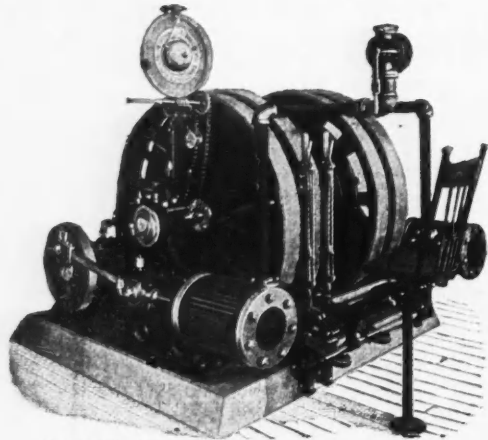
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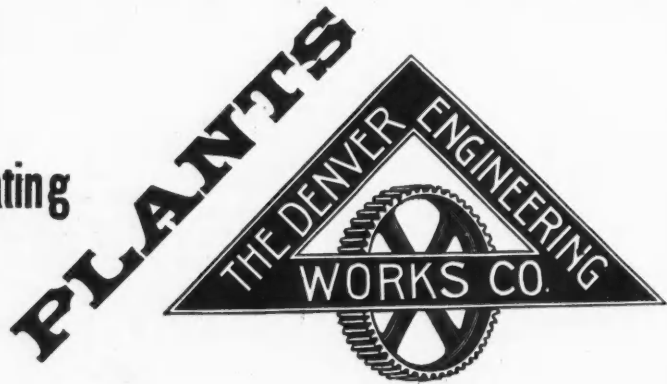
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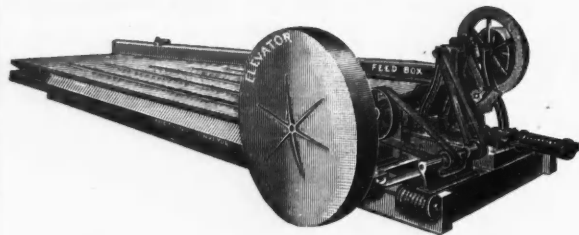
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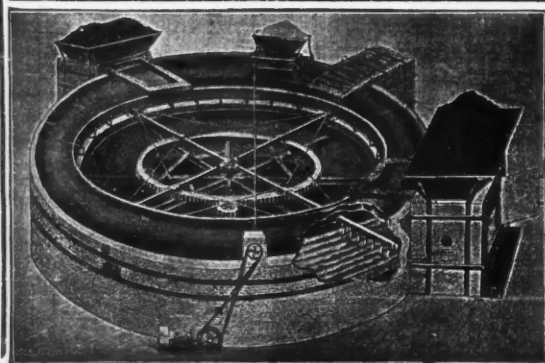
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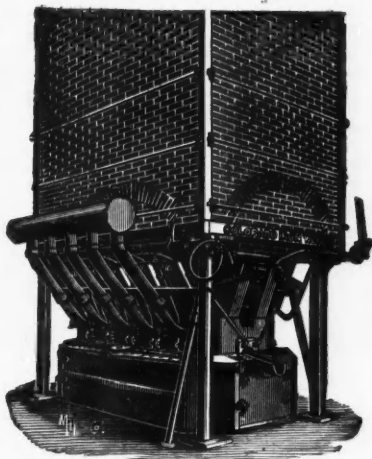
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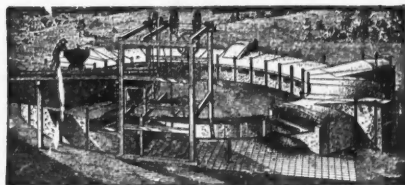


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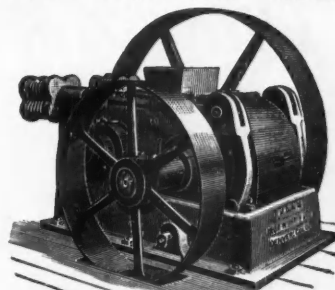
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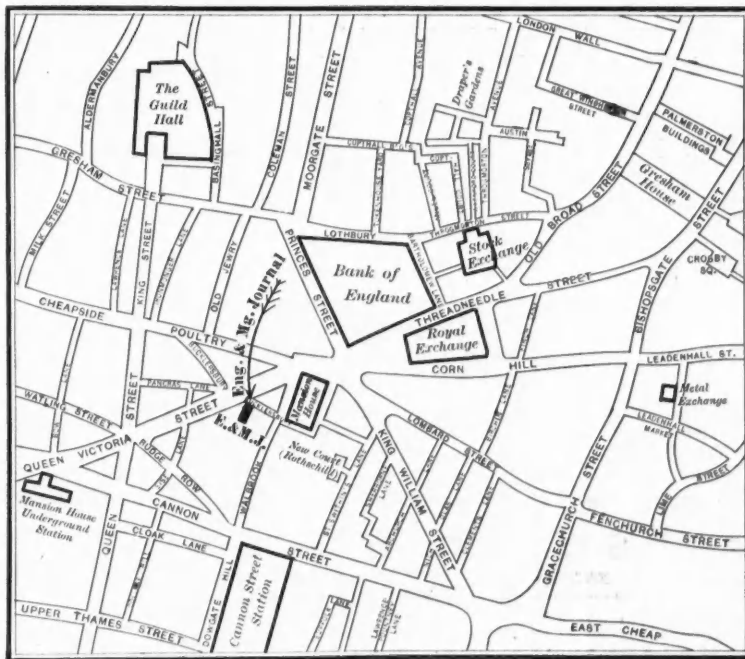
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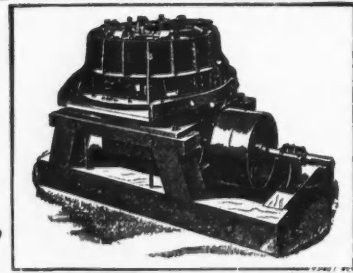
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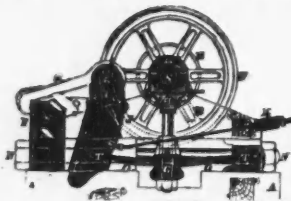
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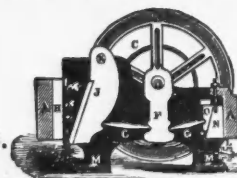
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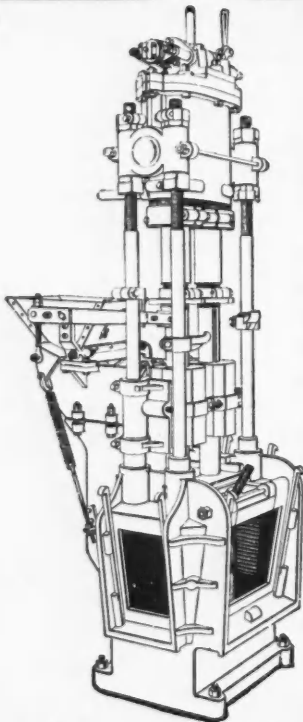
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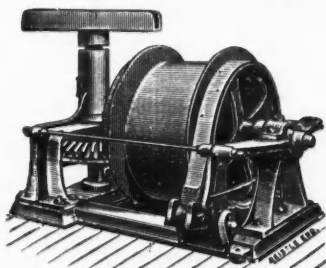
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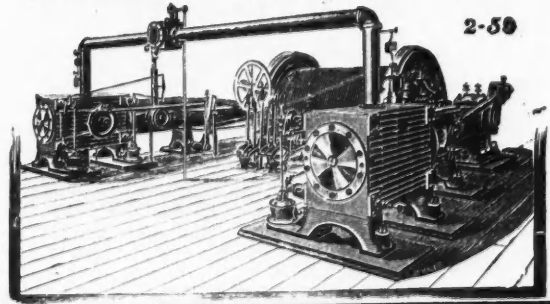
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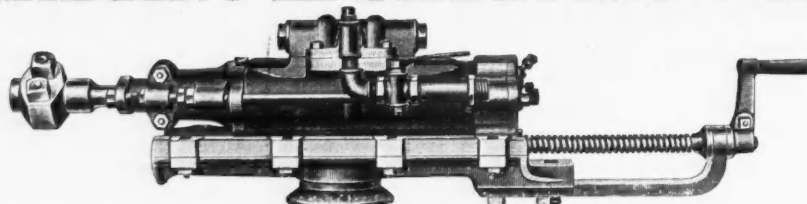
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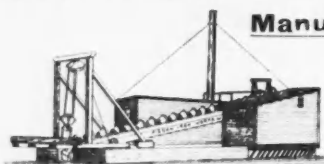
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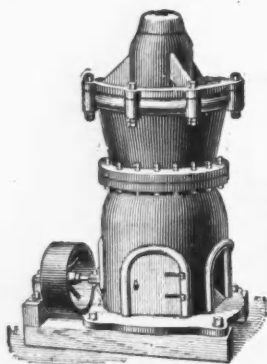
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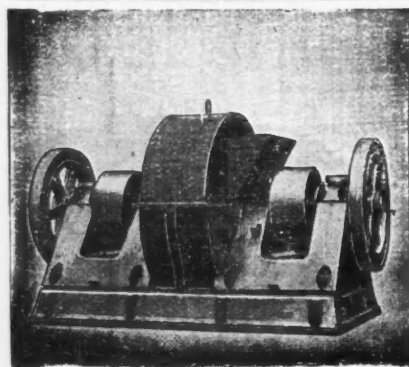
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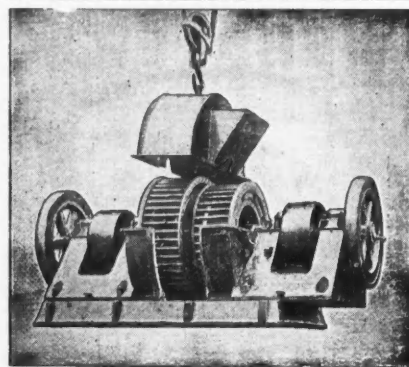
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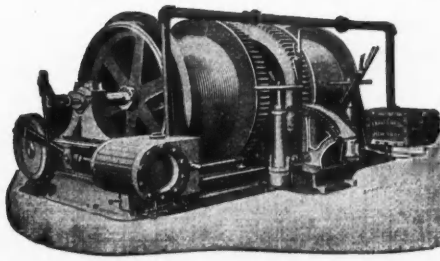
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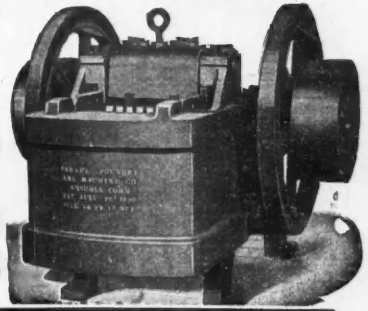
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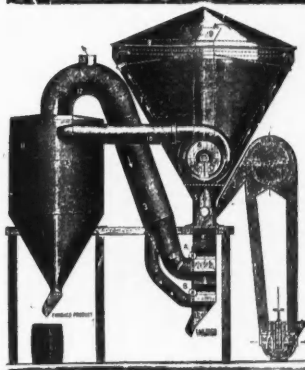
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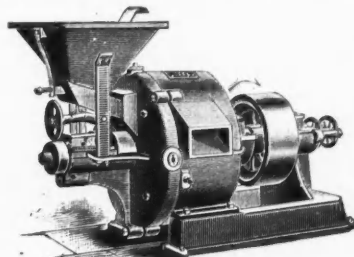
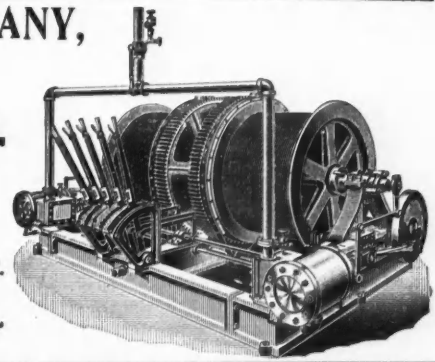
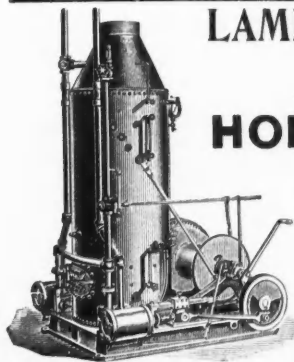
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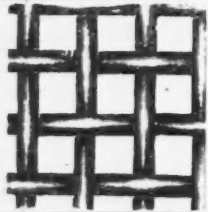
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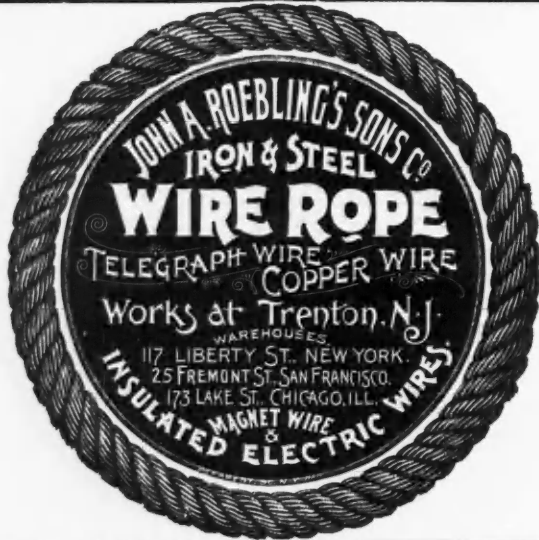


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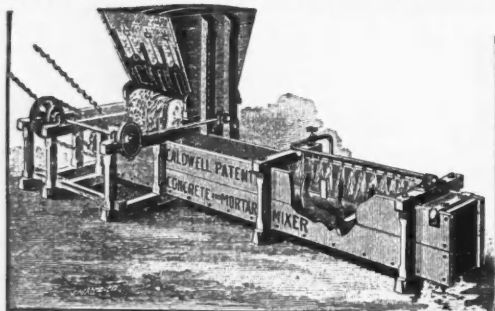
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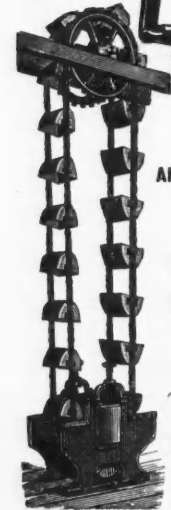
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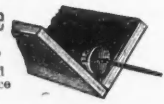
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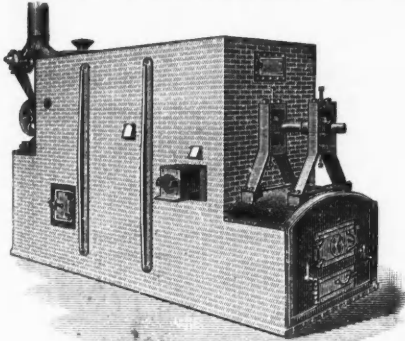
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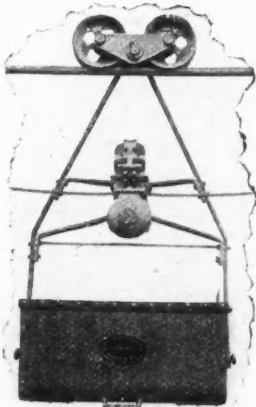
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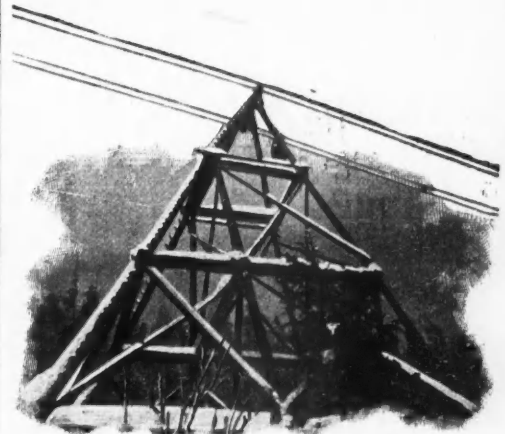
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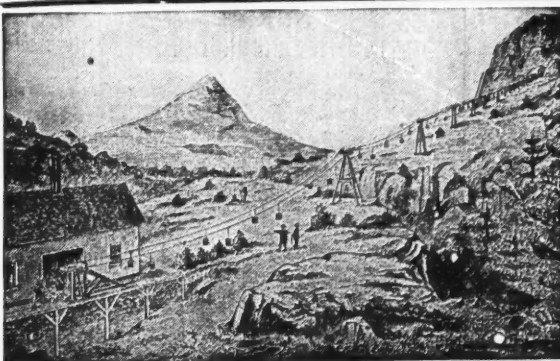


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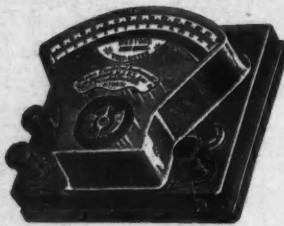
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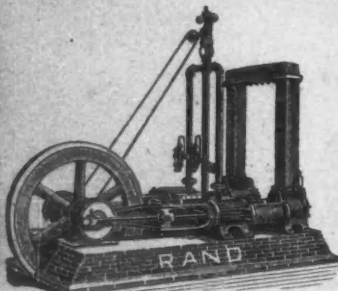
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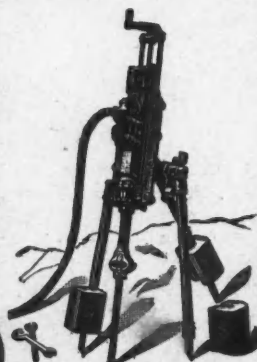
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