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A bill to establish a department of mines and mining, the head of which is to be a member of the Cabinet, has been reported on favorably and introduced in the House of Representatives at Washington. The action of the committee in reporting the bill is mainly due to the efforts of the California members. What action the House will take is, of course, uncertain. Apparently there is no active opposition, and the greatest obstacle the bill will have to meet is the indifference of the majority. It is, perhaps, unfortunate that the bill to create a department of commerce is also before the House, since there will be some opposition to the increase of the Cabinet by two new officers, and this may cause the failure of both bills at the present session, which would practically mean a postponement of the Mines Department bill until the next Congress. We have as yet no copy of the bill just reported, and are therefore unable to comment on its provisions.

When the scheme for amalgamating a number of the leading borax producers in the United States, South America and Asia Minor under the name of Borax Consolidated, Limited, was first promulgated in London a year ago, the advisability of the step was much questioned, and it was considered that the company was overcapitalized. The results of the first year's working have, however, been very satisfactory, for the net profits have amounted to £243,000, which is sufficient to pay 4½ per cent. interest on nearly £800,000 debentures, a dividend of 5½ per cent. on £800,000 preference shares and 12½ per cent. dividend on £600,000 ordinary shares, besides placing large amounts to reserve and paying off preliminary expenses. The directors do not state what the output was, or what price they received for the crude or refined borax, so that we are unable to judge whether the present rate of profit is likely to be permanent or not. It will be remembered that this company absorbed the Borax Company, Limited, which owned mines in Asia Minor and works in France; the Pacific Borax & Redwoods Chemical Company, which had mines in California and works in England; and several French companies with works in France and mines in Peru and Chile. The company practically controls the borax trade of the world.

The advance sheets of the Inspectors of Mines of the United Kingdom give the following statement of the number of fatal accidents and of the loss of life in the mines and quarries of Great Britain during the year 1899, as compared with the previous year:

	1898.		1899.		Changes.	
	Accid'ts.	Deaths.	Accid'ts.	Deaths.	I.	D.
Coal mines	828	908	863	910	I. 35	I. 2
Metalliferous Mines	31	33	47	56	I. 16	I. 23
Quarries	131	134	117	117	D. 14	D. 17
Totals	990	1,075	1,027	1,083	I. 37	I. 8

In the coal mines 796 deaths occurred underground and 114 at surface. As usual, the most prominent cause was falls of ground, which caused 433 deaths, while only 54 resulted from explosions of firedamp or coal dust, and 69 were from accidents in shafts. The other prominent cause of death was in haulage, 168 deaths having taken place in or about tramways and inclines underground. In metalliferous mines again, falls of ground were the leading cause, resulting in 19 deaths. Of the total 50 occurred underground and 6 at surface. Even in the quarries falls and slips of ground resulted in 44 deaths, or far more than those due to any other cause.

The increase shown in the totals was doubtless due to the great activity which prevailed in nearly all the mines of Great Britain throughout the year. In the coal mines especially work was pushed, and it is quite possible that the employment of extra men or inexperienced laborers may have been partly responsible for the increase. For several years prior to 1899 the tendency had been to a diminished number of deaths.

The International Mining Congress, which has held two meetings, the last one at Salt Lake in 1898, was to have held its third session in Milwaukee in the summer of 1899, the reason given for selecting that city being two in number; to awaken interest in mining in Eastern communities, and to meet at a central point, where the coal, iron and copper miners of the East as well as the metal miners of the West could conveniently attend. For various reasons—prominent among which was a total lack of interest as to the proposed meeting in the city selected—no meeting was held in 1899. An attempt is now being made to revive the Congress and to hold a meeting in Milwaukee during the coming summer. A committee has been organized, circulars sent out, and the appointment of delegates invited. The governors of the States interested in mining, municipal bodies and organized commercial and mining associations are asked to send delegations.

We fear that the objects of the Congress are not well enough defined and its organization is too loose to secure large attendance, or to war-

rant its prolonged existence. An association to live at all—to say nothing of success—must have some special object and well-defined bond of union among its members. It must also, and this is most important, have an active central body or administration to hold it together and keep in touch with the members. With so ill-defined and changing a composition as that of the International Congress this is impossible. We do not desire to stand in the way of any movement to advance the interests of the mining industries, but it seems to us that in this case there is an expenditure of money and labor required which does not promise any adequate return, and might better be applied in other ways.

ENGLISH CONDITIONS OF ENGINEERING AND SHOP-PRACTICE.

A letter, just received from a personal friend who, after many years of practice as a mechanical engineer in America, now occupies a high position in the technical management of a large British establishment, contains some statements worthy of serious consideration.

I use, in substance, some passages from this letter, suppressing all names and modifying particulars which might serve as clues to its authorship, but taking care to leave unaltered the significant remarks to which I would call attention.

My correspondent expresses the belief that recent events and developments (including the South African war, and the incidental demand which it has made upon English manufacturers) will serve to arouse the English people to a realization of the deficiencies of their engineering methods and shop-practice. He thinks they have fallen behind in nearly every department, except ship-building; and he gives me the following example:

The other day, he visited one of the largest bridge-shops, to which he had submitted for estimate a skeleton drawing and specification, for the steel frame of a new building. A detailed drawing was placed before him; and he was astonished at the dimensions given by the manufacturers to the various columns and members of the trusses. Ten minutes' calculation sufficed to show that the stresses per square inch in their sections varied to the extent of several hundred per cent., and that the average stress was 2,000 pounds per square inch, whereas his specifications permitted 13,000 pounds. In other words, they were proposing to use several times as much material as a correctly proportioned design would require, while their structure, as a whole, being no stronger than its weakest part, would derive from this excess of material no additional security. Upon calling attention to this circumstance, he received the answer: "We only figure when we have time to do so."

This incident, perhaps, throws some light upon the late success of American bridge-builders in competing for contracts in Africa. I have noticed that some English authorities, desirous to break the force of that victory, have suggested doubts as to the soundness of the American design.

The fact is, that people who do not "figure," unless they "have time," seldom have time, and fall back upon what the late Col. King, of the United States Engineers, used to call "the engineering of the eye." They want a structure to look as well as to be strong; and they put superfluous material in places where the stress is small, so as to be "on the safe side." Col. King was accustomed to say that this habit was a most fortunate one, because, though it wasted material, it insured the safety of innumerable structures erected by unscientific builders, who are seldom liable to make their structures too weak, because they judge of them by the eye. On the other hand, when the superfluous material thus wasted has to be paid for by the pound, the people who have "time to figure" will win the victory in commercial competitions. After all, what does this proviso as to "time" mean, except that the concern which pleads such an excuse employs nobody whose special duty is to "figure," and who always has time for that, because he has nothing else to do? The excuse is, in fact, a revelation of insufficient organization in the concern which offers it.

My correspondent adds that, in his judgment, all that English establishments need is a strong "shaking-up" in this respect, as a result of which the descendants of Watt and Stephenson will certainly manifest the courage and ability needed for the requisite reform. In this I heartily agree with him, unless it should turn out that the evil effects of another factor in the situation, mentioned by him, have become too deep and permanent for any cure. I refer to the spirit of the modern (not the earlier) trade-unionism, which he justly characterizes as the greatest danger now threatening British industries. As he observes, "the workmen, ruled by their societies, and imbued with the principles of ultra labor-unionism, consider that they have no obligations; that the best man is he who, for a certain amount of payment, performs the least work; and that the smaller the quantity of work performed by each individual, the more employment there will be for the workmen as an aggregate whole." Utterances to that effect, he says, are heard every day.

Such utterances are not unfamiliar to us in America, though American workmen, as a rule, still show some pride in the loyal and efficient performance of their task. If the difference, in this respect, between Great Britain and the United States continues, it will give us the commercial supremacy to which our natural resources and our national capacities entitle us. Otherwise, we cannot hope for success in international competition. For this modern tyranny and monopoly, exercised in the name of "labor," is not only opposed to the principle of loyal co-operation and efficient work; it is also hostile to scientific training and technical progress. It does not want anybody to "figure." It fights new improvements, tooth and nail. It denounces as treason to "labor" the rise of ambitious and industrious workmen to the rank of capitalists or "captains of industry."

Let us hope that the American love of liberty and hatred of tyranny may save us from complete surrender to this impudent despotism.

R. W. R.

THE CUMBERLAND COAL REGION.

The Cumberland coal region is one of the oldest producers of bituminous coal in the United States, the first coal in the district having been mined and shipped in 1842. For many years it furnished the chief supply of the seaboard bituminous trade. Cumberland coal was the standard, and its quality has enabled it to meet the competition first of the Clearfield and other Pennsylvania districts, and later of the West Virginia coals. The original limits of the district in Western Maryland were enlarged about 20 years ago by the extension of railroads into the adjoining section of West Virginia, which has added materially to the output of the district.

The region has been favored by the transportation facilities afforded it by two railroads and a canal. The mines are connected with these outlets at Cumberland by the Cumberland & Pennsylvania Railroad and its branches, which are owned by the Consolidation Coal Company, the oldest and largest producer in the district; by the Georges Creek & Cumberland Railroad, which was built through the exertions of the late Henry Loveridge, long president of the Maryland Coal Company; and by the West Virginia Central & Pittsburg Railroad. The statistics of the district have been kept more carefully and in more complete detail than those of any other coal mining region in the United States. This is due to the officers of the Consolidation Coal Company and the Cumberland & Pennsylvania Railroad, who have kept and published records from the first beginning of operations. The report sheet for 1899 is now before us and affords an interesting study. The production for four years past has been as follows:

	1896.	1897	1898.	1899.
Frostburg Region, Maryland	3,553,608	3,840,158	4,007,240	4,322,997
West Virginia Region	1,307,822	1,463,331	1,526,396	1,808,464
Totals	4,861,430	5,303,489	5,533,636	6,131,461

The increase last year over 1898 was 597,825 tons, or 10.8 per cent. The total coal mined in the region during the 58 years since shipments began has been 109,725,659 tons; of which 94,418,248 tons came from the mines of the Maryland section, and 15,307,411 tons from the West Virginia section, the first shipments from which were made in 1881. From the statement we are enabled to trace the disposition of the coal mined, which was last year as follows:

	Frostburg Region, Md.	W. Virginia Region.	Totals.	Per ct.
Shipped to tidewater	3,586,281	1,240,342	4,826,623	78.7
Used by Baltimore & Ohio R. R.	536,913	.....	536,913	8.8
Converted into coke	.....	403,916	403,916	6.6
Used locally	199,803	164,206	364,009	5.9
Totals	4,322,997	1,808,464	6,131,461	100.0

The coal used locally included that consumed at mines and on the railroads of the region. The coal used on the Baltimore & Ohio was consumed by the locomotives and in the shops and works of that company. The coal converted made 269,291 net tons of coke; of this 1,882 tons were used locally, leaving 267,409 tons for shipment. The yield of coke was 66.6 per cent. of the coal converted. The total shipments out of the region—excluding coal used by the Baltimore & Ohio—were divided as follows:

	Coal.	Coke.	Totals.
Baltimore & Ohio R. R.	2,964,485	235,508	3,199,993
Pennsylvania Railroad	1,669,715	31,901	1,701,616
Chesapeake & Ohio Canal	192,423	.....	192,423
Totals	4,826,623	267,409	5,094,032

The Baltimore & Ohio carried 62.8 per cent. of the total tonnage out of the region; the Pennsylvania 33.4 per cent.; the Chesapeake & Ohio Canal 4.8 per cent. The importance of the canal, which once carried a very large share of the tonnage to the seaboard, has been diminishing for years past, and it is quite possible that a sale of the State interest in it may soon end its use as a water line. The coal mines have, however, excellent transportation facilities, and are not likely to lose their market.

NEW PUBLICATIONS.

"The Ore Deposits of the United States and Canada." Third Edition; Entirely Rewritten and Enlarged. By James Furman Kemp. New York and London; the Scientific Publishing Company. Pages, 484; illustrated. Price, \$5.

The appearance of a new and enlarged edition of Prof. Kemp's admirable treatise is matter for much satisfaction to mining engineers in practice, as well as to students and instructors in the department with which it deals. In the special science of ore-deposits, as in the larger sphere of lithology and dynamic geology, it has been given to American observers to contribute, from the phenomena presented by this continent, facts and arguments which have profoundly affected both the conclusions and the classifications previously based upon a less extensive induction in the Old World. This is specially true of ore-deposits, in the discussion of which the Freiberg school, chiefly familiar with the veins of the Erzgebirge, impressed upon the professional public—and particularly upon American mining engineers, many of whom, a generation ago, received their training at that famous center—a somewhat narrow view, and a classification which was clear and logical, but not comprehensive and well-proportioned. As I have already said elsewhere, I think there has been little or nothing brought forward by modern investigation which was not noticed, half a century ago, by the brilliant, acute and wise Cotta, who lectured on this subject at Freiberg when I was a student there; but it must be confessed frankly that Cotta and his school did not realize the great importance of many classes of ore-deposits which they recognized rather as exceptions than as great representative types, and that their classification of ore-deposits assigned to the "true fissure-veins," with which they were most familiar, too prominent a position. Their views, brought to this country, in part directly through their books and their pupils, and in part through the experts and miners of Cornwall—a region likewise characterized by "true fissure-veins"—dominated for many years the technical instruction and literature of this country. But this authority was broken at last by new contributions from European fields, and by the work of the individual investigators and of the State and national geological surveys of the United States.

The first edition of Prof. Kemp's treatise, which appeared in 1892, furnished a welcome and satisfactory summary of the new, as well as the old, work in this field; and the appearance of a second edition in 1895, and of this third edition now, must be deemed conclusive evidence of the favor with which the book has been received. Apart from its comprehensive character, covering the recent as well as the classic literature of its subject, it was specially useful because it furnished in abundance American illustrations, which American students could personally inspect, instead of remote European ones, which were inaccessible to most of them. For the preparation of such a treatise, the young and ardent successor to the chair of the veteran Newberry was peculiarly qualified by field-practice, as well as book-learning, and by the gift of clear statement and logical arrangement.

It would be superfluous, in this notice of a new edition, to point out the original merits of a book so widely used and so highly valued. More important—at least to the many mining engineers who already possess the first or the second edition—is the question, whether the modifications and additions embodied in the third edition are important enough to warrant its purchase by those who have already an earlier one. This is a matter of considerable practical importance to those of us who, limited in our expenditures for books, must, if we purchase one, go without some other. The rapid advance of science, and the consequent change in the views of even the best leading authorities, makes it unsafe to rely upon old editions of living authors; and one is tempted to wait until a writer is definitely dead, before purchasing what can be safely regarded as not only the latest, but positively the last, version of his conclusions. Unfortunately, in many cases, we cannot afford so to wait, and the question presents itself to us with uncomfortable frequency, whether a new edition contains enough new matter to make it indispensable to us. To this question, as it arises with regard to the book under consideration, Prof. Kemp's new preface does not give a satisfactory answer. He says that the expansion of the title to cover Canada; is justified by additions to the contents; that about 100 pages of new matter have been added, and considerable portions of the former text rewritten; that the illustrations have been doubled in number, and many maps have been introduced. But he does not specify the nature and importance of these changes.

An inspection of the book has convinced me that its increase in value is well worth its price; and I conceive that I can render no better service to author or readers than by giving here, in some detail, the results of a comparison which I have caused to be made between this edition and the preceding one.

1. I may remark, by way of summary, that the number of pages has been increased from 343 to 481, and that of the illustrations from 94 to 163. This might (and, in fact, does) mean a good deal in the way of added value.

2. On many subjects the passages in earlier editions have been entirely rewritten, in the light of later evidence. Among these the following may be specially mentioned: the formation of joints, cleavage, etc., of small cavities in rocks; the phenomena and relations of underground waters—treated with regard to Posepny's monograph, and to the work of the United States Geological Survey; the mother-rocks of the various metals; the composition and relations of igneous rocks—discussed anew from the standpoint of physical chemistry, and with regard to the experiments of Morozewicz—etc.

3. Under "Iron," the account of the Lake Superior region has been entirely rewritten, with new maps and illustrations; and the same may be said of the subjects of typical magnetite deposits and of titaniferous magnetites.

4. Under "Copper," the discussion of lenses of pyrite and pyrrhotite has been rewritten, with new illustrations; the Butte District receives a new description, with maps and illustrations; and much additional information has been given concerning the copper-districts of Lake Superior and Arizona.

5. The description of the lead and zinc-districts of the Mississippi Valley and of Missouri has been entirely rewritten, and furnished with additional illustrations.

6. In Colorado, the account of the Leadville District has been brought up to date; and other districts, such as Ten Mile and Aspen, have been described from the work of the United States Geological Survey. The San Juan region, as well as Custer County and Cripple Creek, have been similarly redescribed, with new illustrations.

7. The same is true of the Black Hills of Dakota, the description of which contains much new matter, both in print and in picture.

8. The descriptions of Montana and Idaho have been revised with the aid of experts of the United States Geological Survey, and on the basis of the author's recent personal investigations.

9. Considerable new material appears with regard to California, especially in the discussion of the gold-bearing gravels and quartz-mines. In this connection, I am glad to see that Prof. Kemp accords just and hearty recognition to the investigations of Dr. J. R. Don, of New Zealand, on the occurrence of gold, and its relations.

10. The account of the gold-deposits in the Southern States has been rewritten and enlarged.

11. Alaska and the Klondike have received new attention and additional description. Unfortunately, trustworthy accounts of the new Cape Nome District have come too late to be included.

12. Nova Scotia has been more fully considered; and some attention has been given to British Columbia.

In short, this edition, issued at the very end of 1899, is as closely up to date as was humanly possible. I think I have fully established my thesis, that it is indispensable to American students and mining engineers, whether they own already an earlier edition or not; and I can heartily congratulate Prof. Kemp upon the result of his patient and intelligent labor, and the profession to which I belong upon a friendly guide so competent and indefatigable.

Not the least excellence of this book is its full and careful references, enabling the student to follow up in detail the subjects of which it treats. This feature possesses special importance with respect to the new material introduced. Prof. Kemp's footnotes constitute an excellent guide to the recent and important technical literature which is not catalogued elsewhere.

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.

"A New Industrial Situation." With an Introduction by George Westinghouse. Pittsburg; Published by the Westinghouse Companies. Pamphlet, pages 24; illustrated.

"Western Australia. Statistical Register for the Year 1898 and Previous Years. Part II, Public Finance. Part XII, Miscellaneous." Perth, W. A.; Government Printer. Pages, 28 and 40; with tables and diagrams.

"Fifth Annual Report of the Boston Transit Commission; for the Year Ending August 15th, 1899." George G. Crocker, Chairman; B. Leighton Beal, Secretary. Boston; published for the Commission. Pages, 76; illustrated.

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 will only 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.

Accidents in Coal Mines.

Sir: I have read with much interest the article in the "Engineering and Mining Journal," under date January 27th on "Fatal Accidents in Coal Mining in North America," and as the question has always been one of deep personal interest to me, I trust I may be pardoned for suggesting one or two other lines of inquiry, with the object of still further minimizing the regrettable loss of life that seems inseparable from coal mining in all countries.

While I quite agree with the writer of the article mentioned, in that the usual custom of basing the ratio of the number of lives lost on the number of tons of coal produced, is not at all satisfactory; I beg to suggest that other considerations than the number of men employed should be used as a basis in comparing one State with another. The most important questions to consider, when making tables for comparison, are the natural conditions surrounding coal mining in each State; the character of the roof and floor, the inclination of the strata and the presence or absence of carburetted hydrogen gas. Mr. Hoffman quotes the returns from Kansas and Kentucky as standards for mine inspectors and managers, but I hardly think this is a fair proposition. I am informed that in Kansas especially, the seams are flat and the presence of firedamp is very rare. I had the honor to be State Inspector of Coal Mines for the State of Washington during the year under consideration and also during part of 1897. According to Mr. Hoffman's tables, the loss of life per 1,000 men employed during 1897 was 2.48, and during 1898 was 2.70. The decrease for the year 1898, compared with the average for the previous five years, from 1893 to 1897 inclusive was 4.79.

Speaking from my experience in the State of Washington and my observations in other States and countries, I am forced to the conclusion that the majority of accidents can be traced to one cause: The employment of foreigners underground, who do not understand our language and cannot intelligently follow instructions. The men acting as underground foremen and mine bosses in the State of Washington will bear favorable comparison for practical knowledge and intelligence, with men in a similar station in life in any coal mining country, yet explosions are of frequent occurrence. Twice my own life was placed in

serious jeopardy by men utterly unable to speak our language, or to understand plain instructions given in it.

Again, some of the mines in the State of Washington are as fiery as any of which I ever heard or had personal knowledge, and I spent several years of my early manhood in the Silkstone coal field of South Yorkshire, England, one of the hottest on record. I have seen gas bubbling up in the ditch on a gangway, in a mine in Washington, half-a-mile from the face of said gangway. In that half-mile of territory, there were many places where the gas bubbled out strong enough to extinguish the light in a safety lamp. When it is also considered that this seam pitches at an angle of from 75° to 80°, the danger from the explosion of carburetted hydrogen gas can readily be realized. All the mines in Washington produce more or less inflammable gas. It is manifestly unfair to compare such a mining section with one where little or no carburetted hydrogen is found.

How to regulate the operation of such mines and guard as far as possible against these horrible disasters, is a serious problem. With lamentable shortsightedness, it seems to me, an effort to influence a State legislature to enact remedial measures is invariably met with the combined opposition of the operators and, strange to say, sometimes of the miners also. It has seemed to me that the unsatisfactory state of this question could best be regulated by Federal investigation, and that if we had a Department of Mines and Mining at Washington, with the head of the department a Cabinet officer, as is now being strongly advocated by mining men all over the United States, reliable data could be arrived at and some efficient method suggested whereby a more uniform system of inspection and the enforcement of intelligent and humane rules could be had.

R. H. Norton.

San Francisco, Feb. 2, 1900.

A Curiosity in Blast-Furnace Practice.

Sir: I enclose a photograph which cannot fail to be of interest to many of your readers who have to do with blast furnaces. It represents a curious freak which occurred when rodding the furnace at the Hall Mines' smelter here some little time ago under the following circumstances:

The big copper furnace had been banked for 24 hours and shortly after the blast was turned on it became apparent that some obstruction about mid length of the furnace prevented a free flow of slag to the



IRON ROD TIED IN THE BLAST FURNACE.

tap hole, it being forced to flow through the back tuyeres. To remedy this a long rod of 1-in. round iron was rammed in by the combined force of four men. On attempting to withdraw it it was found necessary to use a dog and wedge, and even then very considerable difficulty was experienced in getting it out, and the superintendent, who happened to be present at the time, remarked to the foreman: "You surely have got a knot on the end of your rod, Jack," yet little expecting to see his surmise so marvellously borne out in the mass of slag and iron which eventually came out on the end of the rod.

The accompanying photograph shows the knot exactly as it came out of the furnace, being cut off from the long end of the rod at A, and the adhering slag knocked off; but otherwise it was neither hammered nor drawn, for, as will be seen, no blacksmith could improve its symmetry. B marks the end that was driven first into the furnace, and it is flattened but slightly; the total length from A to B is 16 in.

Norman Carmichael,
Assistant Chemist and Assayer, Hall Mines.

Nelson, B. C., Feb. 2, 1900.

WALTER SHANLY.

The death of an eminent engineer whose work, both in Canada and the United States, is an enduring monument to his reputation, took place at his home in Montreal December 17th. His closing years were passed so quietly that his decease was hardly known at the time beyond his circle of immediate friends.

Walter Shanly was born in Queens County, Ireland, in 1819, and was 80 years old at the time of his death. He was educated at home, and resolving to adopt the profession of a civil engineer, he went to Canada in 1836. He served as an assistant on the Beauharnais and Welland canals and later on several railroad lines in Canada and New England. During this apprenticeship he mastered his profession thoroughly and in 1850 he was placed in charge of the construction of the Ottawa & Prescott Railroad. Later he had charge of the surveys made for the improvement of navigation on the Ottawa and French rivers. He was engineer in charge of construction of the Western Division of the Grand Trunk Railway, and after its completion he acted for four years—1858 to 1862—as general manager of the road. His time after leaving the Grand Trunk was occupied in several minor works, until he took the contract which gave him the highest reputation.

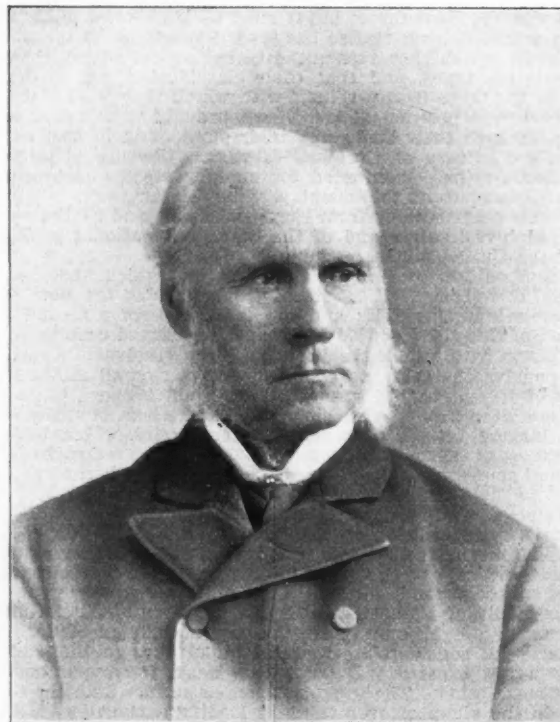
For over 20 years the State of Massachusetts had been working on the construction of the Troy & Greenfield Railroad, which included in its line the famous Hoosac Tunnel, and which was to furnish a second and independent line from Boston to the Hudson River. The six-mile tunnel was the great obstacle to the completion of the road; several

sets of engineers and contractors had exhausted their resources and failed, and the people of the State had begun to believe that the tunnel would never be completed.

Under these circumstances there were many doubts expressed and felt when, in 1869, two Canadian engineers—Walter Shanly and his brother Francis—took the contract to complete the Hoosac Tunnel. The art of tunnel construction was much less advanced 30 years ago than now, but the two Shanlys were masters of their profession, and with incessant perseverance in the work and an intelligent use of the best machinery and men to be had, they finally succeeded, and in 1875 the way was open for through trains over the Hoosac Tunnel Line. The original plan of a State-owned line, by the way, had been long abandoned, and soon after its completion the Troy & Greenfield Railroad, including the tunnel, was turned over to the Fitchburg Railroad Company, which has ever since operated the line.

The Hoosac Tunnel gave Mr. Shanly a wide reputation. His advice was sought on many engineering questions, and his services as consulting engineer were in demand until advancing age led him to retire from active work; although he always retained a keen interest in his profession.

While he never neglected his engineering work, Mr. Shanly found time to take an active part in politics. He was for a number of years



WALTER SHANLY.

a member of the Canadian Parliament and was an intimate friend of the late Sir John A. Macdonald. He held other public positions with credit. He was never married. He was a well-known and popular figure in Montreal, where he lived for 48 years, and he had many warm friends not only in that city but in all parts of Canada, besides many in the United States. Walter Shanly was the ideal type of gentleman, a man of the very highest standard of honor, uprightness and courtesy. No one ever knew of any act of his life that did not come up to this ideal standard. A man of strong character, of great ability, and of high achievements, he was modest, gentle and thoughtful of others—a man without reproach. No nobler type has ever lived. This is the testimony of one who knew him intimately for half a century.

R. P. R.

EFFECT OF NONCOMPLIANCE OF MINE OWNER WITH STATUTE.—An employee injured through the failure of a mine owner to supply escape shafts—stairways partitioned off from main airway, and having substantial hand rails and platforms—as required by the laws of Illinois, passed in accordance with the constitutional provision of that State requiring the legislature to pass laws for the protection of miners, etc., need not show he was exercising ordinary care; his negligence being no defense to the mine-owner.—*Carterville Coal Company vs. Abbott* (55 *Northeastern Reporter*, 131); *Supreme Court of Illinois*.

PORTAGE LAKE SHIP CANALS.—Statistics of commerce in Portage Lake ship canals, printed herewith, are from the annual reports of Major Clinton B. Sears, United States engineer in charge. Development of these waterways is due largely to the great copper industry of the Portage District. There is also included in reports of the commerce of these canals the freight carried by regular line boats that stop at towns in the copper region to take on or discharge only a part of such freight. In 1899 there was moved through these waterways 1,582,169 net tons of freight, valued at \$54,994,843. In 1898 the tons of freight aggregated 1,367,685, and in 1897 the total was 1,020,723 tons. The mineral freight in 1899 included 639,558 tons coal, 72,320 tons copper, 59,014 tons of iron ore, 37,281 tons pig and manufactured iron, 39,593 tons building stone and 44,280 barrels salt.

THE LAKE SUPERIOR MINING INSTITUTE.

The sixth annual meeting of the Institute began at Iron Mountain, Michigan, February 6th, in accordance with the programme already issued. Nearly 100 members were present. The first part of the proceedings was a visit to the mines about Crystal Falls and Iron River, and a special train carrying the members started at 9 a. m. The first stop was at the Cundy Mine, Quinnesec, where a magnetic hard ore is produced. Shipments to the Illinois Steel Company's plant at Chicago are being made by rail from both shafts. The property is owned by this corporation, and as the ore is being continually shipped the stockpiles are never permitted to grow very large. A new dry house now nearly completed was inspected.

From the Cundy the visitors went direct to the mammoth paper mill at the lower Quinnesec Falls, owned and operated by Kimmell & Clark. Officials at the plant escorted the visitors from where the pulp is unloaded from the cars to the rooms where the paper is removed from the rollers and packed ready for shipment. At this point the falls have a drop of 65 ft., giving abundant power which is developed by a double turbine wheel. While the plant is new and yet incomplete, something over \$2,500,000 have already been expended on it. The main stack attracted much attention because of its enormous size. Its height is 180 ft., with a diameter of 18 ft. at the base and 8 ft. 6 in. at the flue.

After leaving the mill the special took the party to the Aragon Mine at Norway. At that place luncheon was served. The party proceeded to inspect the surface plant of the mine. A steel shaft house—the only one on this range—was inspected. At the Aragon also a pneumatic locomotive operates the underground tramming system. The pressure for it is furnished by a Norwalk high pressure compressor.

From the Aragon the party went to the Penn Iron Company's mines, passing the Currie and continuing to the West Vulcan. The top tram and electric bell systems were critically inspected. The tram system extends a distance of about 1,300 ft. and is operated differently from most tram systems of the Lake Superior district. The cars used are also different in construction from those in ordinary use. They are provided with eight wheels. From the West Vulcan the party went to the East Vulcan, which is now being unwatered. The hoisting plant operating the bailers was closely inspected. Two independent hoisting drums have been made to work in balance, enabling the operators to get the water out at a comparatively low cost.

The Verona Mine, which was recently acquired by Pickands, Mather & Co., and has been in operation but a short time, was next visited. This mine employs 35 men. C. E. Lawrence is superintendent and W. H. Bengry, for several years employed at the Salisbury Mine, Ishpeming, is in charge of mining operations. The working force will be considerably increased in the spring.

The next step was at the Lorretto Mine. The workings of this property extend directly under the Sturgeon River. It is near this mine that the Sturgeon and Pine rivers meet.

The first business session, held Tuesday evening at the new court house at Iron Mountain, was well attended. President William Kelley, who has general supervision of the Penn Iron Company's properties, presided, and delivered his annual address, which was a resume of mining conditions in the Lake Superior country since 1860. He referred to the ups and downs of the business and gave much useful information concerning it. In his belief the surest way to reduce the cost of production at any property is to increase the output. He alluded to some of the more practical methods adopted with a view to reducing cost of production. The electric haulage systems, the mules, modern cages and many other things all had much to do with reducing the expense of operating mines. The steam shovel also has done much in that direction. It has been found that the cost of loading with shovels is not more than half as great as by other methods.

L. M. Hardenburg, of the concentrating works at the Pewabic Mine, read a paper on the treatment of the ore. A. W. Thompson, of the West Vulcan, illustrated the electric bell system at that property. His paper was complete and it brought out quite a discussion of the methods employed in the bell systems generally.

James McNaughton, general manager of the Chapin Mining Company, presented a highly interesting paper on mine dams and the unwatering of shafts, drifts, etc., in the event of sudden inflows of water.

Twenty-four new applications for membership from mining men in the iron and copper districts were presented and accepted. With these the total membership is about 175.

On Wednesday the visits of inspection to various mines were made, and a second business session was held at Crystal Falls. Papers were read on "Economy in the Manufacture of Mining Machinery," by Mr. Fitch; on "Methods of Mining at the Badger Mine," by O. C. Davidson; on "A Scheme of Balanced Bailers as Used at the East Vulcan Mine," by William Kelley.

After the reading of papers some time was spent in discussing them. The business of the Institute was then taken up. The reports of the secretary and treasurer showed a growing membership and a balance of \$317 in the treasury. Invitations to hold a meeting in Milwaukee were presented and referred to the council.

The following officers were elected: President, Graham Pope; vice-presidents, O. C. Davidson, T. F. Cole, John McLean, F. W. Denton; managers, G. F. Brown, Walter Fitch, George H. Abell, James B. Cooper; treasurer, A. Yungbluth; secretary, F. W. Sperr.

Messrs. Hulst and Channing were appointed a committee to conduct the new president to the chair. Mr. Pope acknowledged the honor done him in a brief speech, which was highly appreciated.

On Thursday, February 8th, a special train for the Pewabic Mine was taken. The tram system at No. 2 shaft was the principal attraction and considerable time was spent looking it over. At this point the collar of the shaft is higher than the stockpile, consequently the tram is on an incline to where the ore is stocked. The location of the latter is favorable to loading into the cars. A cable system is in vogue. The cars are sent to the dump just as they come from underground.

The engine houses were next visited. Much interest was manifested

in the hoisting plant, as the cages work in balance. Over 500 men are employed at the Pewabic.

The weather became so severe that a visit to the Walpole and Milhe properties was deferred. In the afternoon the greater part of the time was spent about the Chapin Mine. The shops, warehouses, etc., were first visited and were found interesting. Some time was spent in the main engine house, where peculiarly shaped drums, few of which are in use in the Lake Superior District, are operated. The rope is flat. The surface tram system at the Hamilton shaft was also closely inspected. The cars are operated on an endless rope. The Ludington shafts of the same property were next visited. Superintendent McNaughton explained everything of special interest.

The banquet at the Commercial Hotel was the concluding function of the meeting. Graham Pope, the newly-elected president, acted as toastmaster.

The first response was by Hon. Chase S. Osborn of Sault Ste. Marie. He dwelt on the relations of the "Soo" Canal to the development of the upper peninsula, though he also touched briefly on other matters of interest to the State and particularly this part of it. The speaker told some very interesting stories in the course of his remarks. He concluded by saying he believed the Institute a good thing and was glad that the membership is manifesting so much interest in the meetings. Mr. Osborn is a charter member of the Institute.

Superintendent Cooper, of the Calumet & Hecla Smelting Works, at South Lake Linden, was called on and gave a very interesting description of how smelting is done.

J. Parke Channing also responded to a toast. He gave a brief but interesting review of the history of the mines at Butte, Mont.

George W. Hayden of Ishpeming was the last speaker. He touched on the development of the Upper Peninsula mines and finally drifted into the tax question, which has received such attention of late. He expressed the belief that many of those in the Lower Peninsula who were crying the loudest for greater taxation of the mining properties of the Upper Peninsula were entirely misinformed as to the true condition of affairs. Mr. Hayden declared that the mine owners of the Upper Peninsula were positively paying heavier taxes than they should, and that in the event of the rate being raised the legislators of the State will do this section a great injustice. Mr. Hayden's remarks were heartily received and frequently interrupted by applause.

This concluded a very successful meeting, and most of the members left for their homes on the early trains on Friday morning.

UTILIZING BLAST-FURNACE DUST.—In a paper read before the Societe Nationale d'Agriculture, M. Colomb Bradel states that the dust collected from the blast furnaces at Pont-a-Mousson, France, has been found to give very satisfactory results as a fertilizer on certain lands. It contains 4.6 per cent. potash and 20.5 per cent. calcium carbonate.

NEW NITROGLYCERINE EXPLOSIVE.—The "Revue des Produits Chimiques" says that Callenburg employs the following ingredients in the manner described: One part by weight of collodion is mixed with four parts of oil of turpentine, and the mass is heated to 40° C. over a water bath. After adding 30 parts of nitroglycerine the temperature is raised to 75°-80° C., whereupon the mass gelatinizes uniformly. With this gelatine are incorporated 40 parts of saltpeter, 24 parts of sulphate of magnesia and 1 part of carbonate of soda, all previously mixed together in a ball mill; and the finished product is packed into cartridges by the same machinery as ordinary gelatine dynamite. The explosive is of low inflammability, quite as insensible to the effects of friction or shock as any other kind, and can be stored in a damp atmosphere without deteriorating.

BRIQUETTE MAKING IN INDIA.—"Indian Engineering" says that at Haranpur, buildings and plant have lately been erected for the manufacture of Dandot coal dust into briquettes. The manufacture seems extremely simple. The coal dust, with 8 per cent. of its bulk of pitch, well mixed together, is poured into molds under a pressure of 18 cwt. to the square inch. From the molds they pass to an endless chain, which delivers them alongside the trucks into which they are to be loaded. The plant also includes a separator and washer, but these are not used, as it was found that they removed a large proportion of the coal along with the dirt. The slack coal costs 5 to 8 rupees per ton, and the briquettes, which measure 6 in. by 4 in. by 3 in., and scale 28 per hundredweight, cost, including all charges, such as interest on capital, 14 rupees per ton. The plant is capable of turning out 20 tons a day.

CLOTH AIR PIPES FOR MINES.—The London "Colliery Guardian" says that at a recent meeting of the Essen Technical Mine Officials' Association several specimens of cloth air pipes that fold together were exhibited by the makers, Boddinhaus & Co., of Dusseldorf, and caused general interest. The pipes are made of strong sail cloth, impregnated with india-rubber so as to be both air and water tight, being far cheaper and lighter than those made of zinc and wood, while they can be easily put up and made fast. The pipes are provided with galvanized-iron rings, spaced at certain distances apart, for suspension; and steel rings are also inserted at greater or less distances apart according to the diameter, for preventing the pipes from kinking when led round sharp curves. Owing to the easy manner in which the piping can be handled, more than 100 m. may be put up in a few minutes; and an ordinary mine tub can carry 150 m. of it. Inasmuch as this piping is cheap and easily put up, there is no great loss in the event of its being destroyed by an explosion. In blind shafts driven upward or downward the invention is quite indicated, because when shots have to be fired, the cloth pipes can be easily folded together out of the way, whereas zinc pipes that are not removable, would be much damaged. In the course of an animated discussion, the representative of the above named firm answered several objections and observed that the invention was employed with good results in both Silesia and Saxony.

STATE DRILLING FOR MINERALS IN MISSOURI.

State Geologist James A. Gallagher, of Missouri, has published an interesting statement of the work done by the Survey and of that proposed. After a general survey of the geological conditions of the State, of the known mineral deposits of economic value, and the probability of the existence of others, he makes the following announcement:

"It is now generally known throughout the State that the Fortieth General Assembly made a special appropriation for core-drilling, to be expended at the discretion and under the supervision of the Geological Survey. But how and where and for what specific purpose it is to be used is not generally known. Therefore, the public is entitled to at least a brief explanation.

"Having found, in my personal reconnaissance of the State, that millions of dollars are being thrown away annually on experimental drilling and digging for water, oil, gas, coal and the various metallic ores, in the most improbable rocks or structure for such things to exist in paying quantities, it occurred to me that, with a small appropriation for the express purpose of demonstrating that those things do exist in great abundance in certain rocks and certain kinds of structure, millions of dollars might be saved to an enterprising class of people and billions of mineral wealth brought to the light. In the meantime, such experimental core-drilling would supply data for scientific use that cannot be otherwise obtained.

"I had already recognized Cambrian country in a dozen or more counties in South Missouri. I had already recognized a probable gas zone in Cass, Ray, Carroll, Livingston, Grundy and Mercer counties; an important coal zone and probable oil zone under it, in Caldwell, Daviess and Harrison counties; a probable coal zone of great local importance in the Platte Valley; a probable coal and oil basin in Holt County. Making, in all, a dozen or more unexplored Cambrian zones in South Missouri and the four zones in North Missouri, just described; none of which have ever been explored to any considerable depth. The probable gas zone mentioned is merely a continuation of the same arch

"On the other hand, oil, gas, coal and disseminated lead are deposited in wide horizontal zones and there are no physical reasons why they should not be explored successfully with a core-drill. The disseminated lead deposits in our Cambrian limestones are practically inexhaustible. Further than that I cannot afford to go, in this announcement for the simple reason that we want to make the best possible contracts for core-drilling; and should we make contracts for drilling, we will have to make contracts with the land owners, by which they will be compelled to pay half of the cost of drilling in case it should be a failure, and the whole cost of drilling in case the object sought is found in paying quantities.

"Having thus eliminated everything but the four zones indicated in North Missouri and the Cambrian country in South Missouri, we are ready to receive bids for core-drilling to depths of 1,000 to 3,000 ft. in North Missouri; and we are ready to receive bids for core-drilling to depths of 300 to 600 ft. in the Cambrian limestones of South Missouri. Bids to be opened at the next regular board meeting, in February, 1900. The board reserving the right to reject any or all bids and to award separate contracts, or not, as it may elect.

"After the bids have been opened and contracts awarded (if any contracts shall have been awarded) and before any drilling is done, on the part of the State, special surveys will be made and the land owners notified that the Geological Survey will assume one-half of the risk of demonstrating the existence of oil, gas, coal or metallic ores (as the case may be) in paying quantities in the ground selected by the Geological Survey. Then, if the land owners, individual or corporation holding, under lease or option, the ground selected by the Geological Survey, shall respond by entering into such a contract as shall have been approved by the Attorney General of Missouri, core-drilling will proceed as rapidly as practicable under the then existing conditions.

"If we should be successful in one or more of these localities, in each field, the information thus gained would have a positive value and could be utilized in other like localities. If we should fail in all of



THE TOWN OF WINDBER, PA., AND COAL MINES.

or upward fold, in the same rocks, in which the Iola gas wells are situated. This fold is apparently well developed about Belton, in Cass County, rising again in Ray County and extending in a broken line far into Mercer County. If gas should be found in paying quantities at any point in that zone, it would be an easy matter to trace it in either direction to points where it might be utilized to greater advantage.

"In the probable oil zone which lies in Caldwell, Daviess and Harrison counties, there are two sharply defined local basins. Being situated, as they are, in the regular coal measures, those sharply defined local basins are almost certain to contain coal beds of great economic value, which would be demonstrated by core-drilling even through oil should not be found in paying quantities under them. I have, however, personal knowledge of the fact that oil (not black bituminous, but genuine petroleum) does occur in the zone just mentioned. If explored to a greater depth and with reference to local structure, it seems quite probable that oil deposits of great value might be located.

"In the Platte Valley is a sharply defined invert or trough in which the Leavenworth coal lies and is now being worked extensively both in Kansas and Missouri. It would be the most logical thing conceivable for the Leavenworth coal to extend, in isolated productive lenses, on the floor of that trough to the Iowa line. And there are reasons for believing that some other horizons than that of the Leavenworth coal might be found productive. I mean, of course, thick enough for profitable mining.

"Finally, the most pronounced basin of all lies near Forest City, in Holt County. But a very deep hole would be required to explore it.

"Now, if the unexplored Cambrian country in the 16 other South Missouri counties should be found to contain a few zones of disseminated lead, as rich and extensive as those now being worked in Madison and St. Francois, or should large copper deposits be found, which is quite probable, it would be a great saving to Missouri to have those ores smelted at home or with home fuel.

"To further simplify this core-drilling proposition, I will say it is a well-known fact that the core-drill cannot be used successfully in the reconstructed channels of the Burlington-Keokuk or country rock of Southwest Missouri. The only deep-seated ore bodies in the First Silurian are deposited in narrow, vertical fissures, from 3 to 10 ft. wide. What practical man would think of going out with a core-drill to look for a fissure? Having found a fissure, only the pick and shovel or the churn-drill can be used successfully in that kind of ground.

them, the information gained by the experiment would still have a negative value which might be utilized to some advantage in other localities."

EXPORTS OF OIL FROM BURMA.—"Indian Engineering" says that there has been an enormous increase in the export trade of Burma oil, which aggregated 736,844 gallons last year, as compared with 15,467 gallons in 1897-98, which was wholly due to the very large shipments of locally refined kerosene oil from Rangoon to Penang, the exceedingly small output of crude oil from the wells at Langkat, in Sumatra, having curtailed supplies of kerosene oil from Sumatra to Penang, which had, in consequence, to get oil from Rangoon.

A BELGIAN ORE CARRIER.—The John Cockerill Company has added one more to its existing fleet of nine steamers, six of which are engaged in bringing Spanish ore to Antwerp, whence it is conveyed in steam barges to the works at Seraing, near Liege, where it is smelted. The new vessel, a cargo boat specially designed for the same service, is the largest yet launched from the company's shipyard at Hoboken, being of 4,000 tons burden, with provision for 314 tons of coal and 766 tons of water ballast. The boilers, certified for a pressure of 11½ atmospheres, are fitted with Serve tubes, by which the best utilization of heat is obtained.

THE IRON INDUSTRY IN HYDERABAD, INDIA.—At the autumn meeting of the Iron and Steel Institute, Shamsul Ulama Syed Ali Bilgrami, Secretary to the Nizam's Government, Public Works Department, read a paper on the iron industry in the Hyderabad Territory. He first sketched the geological features of his highness's dominions, and then described the various iron ores found in them and the primitive processes by which iron and steel had been manufactured from time immemorial, concluding with a brief consideration of the prospects of reviving the industry on a large scale by the employment of European capital and the introduction of modern methods of working. In the Hyderabad State there were most extensive deposits of a high-grade magnetic ore in close juxtaposition with a large coal field, yielding coal of as good a quality as the best Bengal coal, and large deposits of Kadappa limestone, estimated to be 50 ft. in thickness, occurred quite close to the colliery. There were thus ore, fuel and flux occurring almost together.

THE LARGEST COLLIERIES IN THE UNITED STATES.

Written for the Engineering and Mining Journal by Burcham Harding.

About two years ago a system of collieries known as the Eureka Mines was opened in Somerset County, near the center of the State of Pennsylvania. The county hitherto had been mainly devoted to farming. The nearest city, Johnstown, lies 8 miles to the northwest. Driving from Johnstown by the highroad, one ascends gradually 900 ft. to a height of 1,700 ft. above the level of the sea. Where two years

ago there was one farm-house, to-day the town of Windber has been built, having 6,000 inhabitants. stores, among them that of the Eureka Supply Company. Four or five churches have been built and two large school houses. A line of railroad passes through the town. Five large hotels offer welcome to strangers. Houses are supplied with electric light. Long distance telephonic and telegraphic communications have been opened, as well as all the other adjuncts demanded for the comfort of the citizens.

Entrances to the mines are situated at radial points from the town. Near them are groups of houses inhabited by the miners, which have been erected by the company for its employees. Substantial frame houses, each with its own plot of ground in front and a garden at the

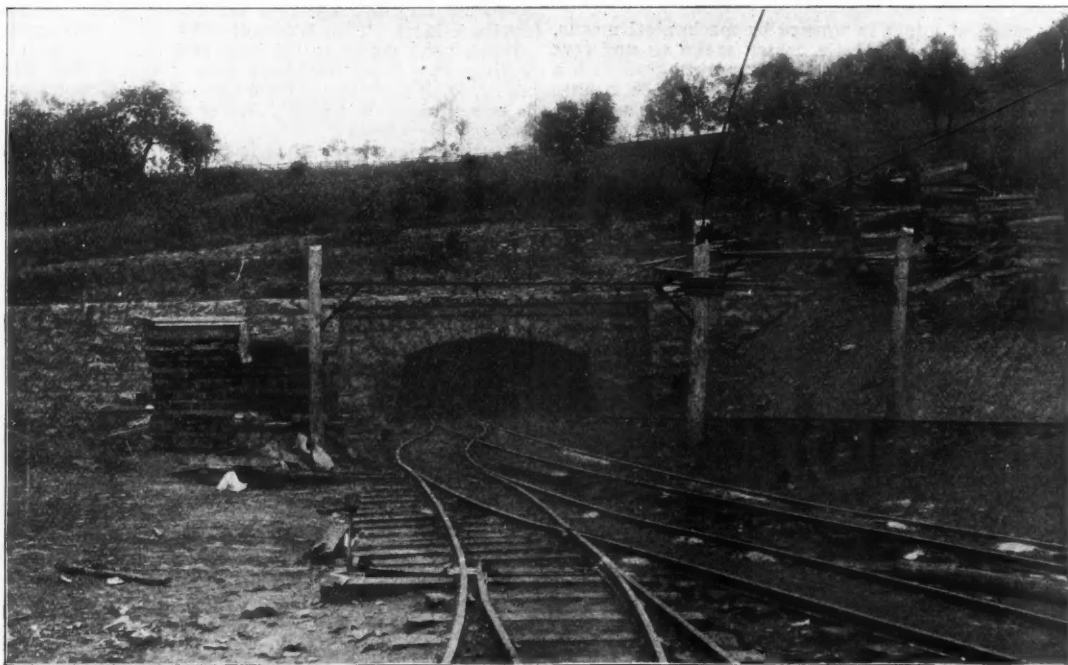


THE TOWN OF WINDBER, PENNSYLVANIA.

ago there was one farm-house, to-day the town of Windber has been built, having 6,000 inhabitants.

Attention was called to this district by prospectors as possessing a valuable seam of coal which might be readily worked. The Berwind-White Coal Mining Company, well known for its enterprise, secured the mining rights over 70 square miles. The country is marked by a series of hills, the seam of coal, averaging 4 ft. in thickness, being found near the base of the hills. It was a vast undertaking to open up these collieries, requiring expert organization, enterprise and capital. Plans had to be made for mining the coal and for carrying it to market, as the nearest railroad was 8 miles distant. The company which initiated this enterprise carried it on by applying the latest devices in mining science. Labor-saving machinery of all descriptions was introduced. Operations on the most extensive scale were designed, and wherever economies could be made by the expenditure of capital, there was no stint. The consequences of this broad-minded and liberal policy made

back, line the wide streets. When the mines were first opened, living accommodations were so scarce that only unmarried men could be employed, but this has been remedied by the foresight of the company. A casual visitor might pronounce these lines of houses lacking in beauty on account of the uniformity in design, but they provide substantial and comfortable homes for their occupants. Single houses contain four to six rooms, and the double houses have six rooms in each. They have all been erected by the company, which, however, grants the privilege to the employes of becoming the owners of the houses. The plot of ground for each residence is valued at \$75 and \$25 is added for clearing. The price of the houses is fixed at the actual wholesale cost, which makes the total expenditure from \$400 to \$600. The miners can either pay rent at \$7 per month, or by paying \$10 a month in lieu of rent, can liquidate the price of the house and become its owner as soon as the first cost is paid. The occupant can, within three or five years, become the owner of the property.



ENTRANCE TO EUREKA MINE No. 35, WINDBER, PA.

themselves immediately apparent, since 80 per cent. of the bunker coal now shipped in New York is mined at Windber.

This place, which was without a name, was christened Windber, an anagram upon the first name of the proprietary company. The group of mines is known as the Eureka, with numbers commencing with 30 and running upward. Numbers 30 to 36 mines are already in operation, and work upon numbers 37 and 38 is under way. The town of Windber stands centrally within a mile of the entrances to the mines. It is hard to believe that this town, with its busy population, has grown up within two years. Upon the main street are large and handsome

There is constant work for the miners, the bulk of it being paid for by the ton. The wages earned by the expert miner amount to about \$3 for a day of eight hours, and run from \$3 down to \$2, according to individual capacity. One shift of miners enters upon work at 7 o'clock in the morning, leaving at 3 p. m.; others taking their places when they retire. Some of the miners are content with working four days in the week, as they can earn sufficient for their needs during that time.

In this district there is a solid seam of coal about 4 ft. in thickness, which, excepting slight dips, is nearly as level as the top of a table, extending miles in every direction. Upon the top of this level seam

of coal are hills hundreds of feet high, covered with trees and verdure, with arable land and grazing fields. Between the hills, in the valleys, water-courses have made breaks through the seam of coal; otherwise, under the 45,000 acres of this mining property lies this continuous seam. During the two years of operation about 600 acres in all have been mined, it being calculated that about 4,000 tons of coal are found in each acre. In the offices of the company can be seen plans of the coal seam underlying the undulations of the surface, made from the most careful surveys. Upon these plans are plotted all the mining operations as they take place. The main headings extend from the entrances of the mines in straight lines. From the main headings, on each side, at distances of about 315 ft., are run cross-headings in lines at right angles to the main headings, and again on each side of the cross-headings are opened up rooms, so that the rooms on the right-hand side of a cross-heading, when cleared of coal, extend to the rooms on the left side of the next cross-heading. The main headings, cross-headings, and rooms have their names and numbers, and are clearly mapped out on the plans.

The roof of the mine is supported by pillars of coal in the usual manner until the rooms are cleared, when the pillars are removed and that part of the mine deserted. All the spaces cleared of coal are colored pink upon the plans in the offices of the company, the coloring being extended from week to week as the workings are developed. All these excavations are made by mining and removing the coal.

In course of time the main headings will extend 3 to 4 miles in length, and the cross-headings from 2 to 3 miles, until they reach the workings carried on in the adjacent mines. By this means the whole of this vast mass of coal will be gradually removed. The seam of coal worked in this territory is the "B," forming the second persistent seam above the Pottsville conglomerate, which is the base of the carboniferous series. It is known locally as the Miller seam, providing one of the best coals in the market for steamship purposes. Analyses show approximately 18 per cent. volatile matter, 3½ per cent. ashes, ½ per cent. sulphur, 1 per cent. moisture, and 77 per cent. fixed carbon.

Near the entrances to the mines power plants are erected to furnish motive power for all the mining operations. At No. 35 Mine there are three batteries of water-tube boilers, aggregating 750 H. P. In the adjoining building are two 200 H. P. air compressors, supplying compressed air for the mining drills, and for driving coal cutters and pumps. The power house also contains 150 KW. direct-current electric generators, direct-connected to steam engines. These machines supply electric current at 500 volts for lighting the mines and for electric haulage. There are no mules employed in the whole of this mining system, Baldwin-Westinghouse electric mine locomotives performing the haulage. This power house also furnishes a neighboring mine with compressed air and electricity.

The entrance to No. 35 Mine is in the side of a hill, shown in the accompanying illustration, wide enough for a double railroad track of 36-in. gauge. The face of the entrance is a flattened arch, substantially faced with stone. Entering this main heading and proceeding some little distance, the gloom is brightened only by a few electric lights, with perhaps a gleam in the distance from a locomotive head lamp. A double track of railroad extends throughout the main heading, with single branch tracks along the cross-headings, and single line sidings into the rooms.

All the coal in this system of mines is worked by mechanical means. Coal cutters are operated by compressed air, which make an undercut at the base of the vein by delivering a succession of rapid blows with a pick. When the drilling is performed near the top, the face readily breaks down by the use of explosives. About 5 minutes is used for a cut to be made, when the platform is withdrawn to a new position. One of these machines does the work of about 20 miners, and compared with hand labor increases the output of coal per acre about 12 per cent. About 100 tons of coal a day is the output from each cutter. At a short distance from the entrance to the mine the height of the heading is reduced to a little over 4 ft., which suffices for the passage of an electric mine locomotive with its train of cars.

(To be Concluded.)

THE NOME DISTRICT, ALASKA.

What has been written thus far about the now famous Nome District has been almost entirely on the practical side, or from the prospector's standpoint. Some interesting particulars, however, are given in a recent article* by Mr. T. C. Schrader, who visited the district last summer, while on his return from explorations in the Yukon. While his examination of the Nome gold-fields was only a preliminary one, he collected much interesting information, of which we give an abstract.

The Nome District is situated on the northwest coast of Alaska, on the northeast arm of Behring Sea, at the entrance of Norton Sound. It is the southern promontory of a large peninsula, extending westward toward Siberia between Kotzebue and Norton Sounds, and largely separates Behring Sea from the Arctic Ocean. Westward this peninsula terminates at the 168th meridian, in Cape Prince of Wales, the most westward extension of the American continent, which is here separated from Asia by Behring Strait, about 60 miles in width.

The promontory on which the Nome District is situated has long been known on nearly all Alaskan maps by the name of Cape Nome. The district lies about 100 miles northwest of St. Michael, and just outside of the Fort St. Michael military reservation. By ocean steamer route it is nearly 2,700 miles northwest of Seattle, and about 750 miles from Dutch Harbor, Unalaska. The Nome region, as known at present, extends from Cape Nome, the apex of the promontory, some 30 miles or more northwestward along the coast, and about 20 miles inland to the north. In the middle of this shore line, at the mouth of the Snake River, the new and thriving city of Nome is situated.

From Cape Nome for 30 miles or more westward to Synrock, the shore line is comparatively straight and smooth, but lying back of the shore

line, between it and the base of the mountains, occurs the well-known tundra. This consists of a strip of treeless, moss-covered, marine gravel, forming a coastal shelf, which, along the beach, is about 30 ft. above sea level. From here it slopes gently upward until at the base of the mountains, some 4 or 5 miles from the beach, it attains an elevation of 150 or 200 ft. During the summer it is usually wet, soft and boggy, and is dotted here and there by a few ponds, and is traversed by the Snake, Nome and Cripple Rivers and other smaller streams, which carry out the drainage from the mountains.

Along the north edge of the tundra, at the beginning of the mountains, the topography is low and rounding, with the floors of the main valleys rather flat, and from 1 to 3 miles in width. Seven miles north of Nome, crude gravel terraces, seemingly marine, rise to a height of about 1,500 ft. These seem to mark successive stages of land elevation still going on. Farther northward, 20 or 30 miles from the beach, the mountains become more rugged, and rise, in some instances, into seemingly permanent snow peaks, but probably nowhere exceed 3,000 ft. in elevation.

The nearest harbors for deep-sea or ocean vessels are Port Clarence, 60 miles northwest of Nome, and Golofnin Bay, the same distance northeast. It is not unlikely that one or both of these harbors will be connected with the Nome District by rail should the district prove as rich as present prospects indicate. Port Safety, a small harbor to the east of Cape Nome, will admit vessels drawing not over 8 ft. of water, but is not adequate for the accommodation of deep sea-going vessels. In front of Nome the sea is so shallow that the larger vessels cannot approach the shore, but are obliged to discharge their cargoes by means of boats and lighters, a method which is very precarious on account of the combers and breakers that usually sweep the coast.

The mountains thus far examined are composed of mica-schists and limestone, alternating in layers and beds with each other. They are thin or medium bedded rocks, and strike and trend northeastward and southwestward, and dip southeastward at an angle of about 45°. The limestone is bluish gray, and comparatively fine grained, and more or less well metamorphosed, often becoming crystalline marble. The mica-schist is sometimes slaty, but it also shows considerable metamorphic action and is garnetiferous. Locally, the rocks are sometimes folded and traversed by quartz veins and veinlets of both quartz and calcite, with also some iron and copper pyrites. Pyrites are also disseminated sporadically in the schists. The quartz veins and veinlets traversing the rocks are supposed to be the source of the gold. Far back in the mountains, granite is said to occur, but it may be represented merely by granitoid dikes, some pebbles of which occur in the beach gravels.

The tundra is composed of apparently marine gravels, derived from the rocks in the mountains, and is almost exclusively mica-schist and limestone. Toward the mountains the gravels are often coarse, carrying boulders of considerable size, but along the beach they have been largely reduced to fine gravel and sand by wave-action. It is in this reduced material that the beach gold occurs. In the gulches along the edge of the mountains the diggings are coarse gold, the largest nuggets found being about \$350 each. Here the gold occurs on the bed rock under the creek gravels, which are 6 or 8 ft. in thickness.

Along the beach the gold is quite fine, having been reduced by wave-action along with the gravel and sand to the size of bird shot, or even finer. Its occurrence here is, for the most part, under 2 or 3 ft. of gravel and sand, on a bottom layer of clay or argillaceous sand, called bed-rock by the miners. Thin layers of ruby sand inter-stratified along with the gravel, near the so-called bed-rock, are also often found to be richly auriferous. Beach diggings were operated last summer and fall for about 30 or more miles from Cape Nome to near Synrock. Coarse gold is mined in Anvil, Glacier, Dexter and Osborne Creeks and along Penny and Cripple Rivers.

In the gulches the work is carried on by stripping, sluicing and, to some extent, by rocking, while on the beach the method of extracting the gold has thus far been almost exclusively by rocking. Here the water used for rocking is generally that of the ocean. In a few cases, however, the sea water has been raised by steam power, and sluices constructed along the beach. In the rocker the gold is caught on blankets, and, to some extent, on copper plates, coated with mercury. In some instances, where the supply of copper plate could not equal the demand, the bottom of the rocker was covered by United States silver coins, principally \$1 pieces, and these coated with the mercury, which caught the gold. During the latter part of last summer and fall it is estimated that an average of about 2,000 men were working along the beach, and that they took out an average of about \$20 per day per man. In many cases the amount taken out was much greater. The tundra between the beach and the base of the mountains has been prospected to some extent and has not infrequently yielded from 10c. to 30c. per pan. Capital, however, will doubtless be required to handle the tundra with profit. The benches in the lower region of the mountains have been found to be auriferous and have been largely staked.

The country about the head of the Soloman and Bonanza Rivers, 40 miles northeast of Nome, reports good prospects. In the Golofnin Bay country, on Fish River and its tributaries, coarse gold was taken out last summer. At Ophir Creek, one of the chief tributaries, a single claim is said to have yielded \$75,000. Prospects have also been reported on the western shore of Norton Bay. Late last fall it was rumored that gold had been found at Cape York by a native employed in herding the government reindeer. These rumors have since been more than verified by Capt. Jarvis, who visited this region with the United States revenue cutter "Bear" and by a recent number of the "Alaskan Miner," published at Juneau, which reports the country rich, and that more than nine square miles of it were staked late in November and early in December. There seems good reason to infer that substantially the entire southern half of this large peninsula, covering 8,000 or 10,000 square miles, is gold bearing, and much of it very rich. It lies in the great Yukon gold belt, extending from the Klondike westward, and probably continuing across Behring Sea into Siberia. It seems more than probable that the Siberian Coast will be visited by enterprising American prospectors before another season has passed.

There is no timber in the Nome District. The nearest approach to it

*In the "National Geographical Magazine," January, 1900.

is a scanty growth of very stunted willow or elm along some of the waterways, but it is wholly inadequate for ordinary camping purposes. A growth of moss, which furnishes an abundance of food for reindeer, covers the surface except in the upper slopes of the mountains. There is, however, a sufficient growth of grass to sustain horses and cattle during the short summer months.

The climate of Cape Nome is mild, and for the most part moist or rainy during the summer, but cold and severe in the winter, which extends from late in October to May. The climate, however, is healthful. Last summer the only difficulty the population of Nome seemed to encounter was typhoid fever, and this, it seems likely, would not have occurred with a good drainage system and a wholesome water supply, which may be readily obtained with a little care and labor.

ABSTRACTS OF OFFICIAL REPORTS.

Brunswick Consolidated Gold Mining, California.

The report of this company for the year 1899 shows receipts as follows: Balance from previous year, \$84; bullion account, \$77,863; mis-

cellaneous receipts at mine, \$1,047; assessment No. 13, \$14,407; superintendent's overdraft, \$14,062; total, \$107,463. The charges were: Mine and mill expenses, \$87,916; New York expenses, \$1,762; San Francisco expenses, \$2,077; superintendent's overdraft, last annual statement,

was cheap, and the extra weight makes the track that much stronger. In order to get the main shaft in its present shape, we have removed 1,500 tons of hard rock. To blast out this rock without injury to pumps, columns, etc., required the greatest care. The double track is completed



POWER STATION AND TIPPLE, UREKA MINE NO. 31.

\$15,581; total, \$107,356. This left a balance at the close of the year of \$127.

Superintendent C. H. Mallen's report says: "There has been a very large amount of improvement work done in the mine, and on the surface during the year. In February we laid 1,600 ft. of 15 in. pipe to connect with the Maryland pipe line to give us hoisting and pumping power. While making this change in pipe line we removed the old hoisting foundation, and replaced it with a solid concrete double rail foundation, suitable for the double track we intended to put in. In the



VIEW ABOVE ENTRANCE TO EUREKA MINE NO. 30.

to the mouth of main shaft, and we are now engaged in erecting the new gallows frame, and double hoist. We have driven 527 ft. of drills and crosscuts, and 513 ft. of ore chutes and upraises. The face of the west drift No. 10 station shows 45 in. of ore, and east drift 18 in. We have hoisted and milled 6,004 tons of ore that averaged \$11.30 per ton. On December 29th we changed our water power from the old Maryland pipe line to the new South Yuba system which gives us an additional 100 ft. head at 2c. less per miner's inch. The Brunswick now has a first-class electric and water power."

Borax Consolidated, Limited.

In the report issued in London, and covering the year ending September 30th, 1899, directors state that the profits for that period, after providing for all management and administration expenses, aggregate £243,036. The requirements for the debenture interest for the year, and the interim dividend on the preference shares, amounted to £35,688, leaving a sum of £207,348 to be dealt with. The net profits made by the concerns taken over by Borax Consolidated, Limited, from October 1st, 1898, to the date of its incorporation (estimated at £35,000) are not available for distribution, and the directors have placed this amount to a special fund, called a property reserve account, and propose to write off to this account the whole of the amount appearing in the balance-sheet under the head of preliminary expenses and expenditure on inspection of properties, £23,610, leaving a balance of £11,389 to the credit of this account. The sum of £12,500 has been placed to depreciation reserve account, and £4,617 to the credit of the debenture stock redemption sinking fund. Of the balance of £155,230, the dividend on the preference shares for the six months ending September 30th, paid on November 1st, absorbs £22,000; and from the residue the directors propose to pay a dividend of 25s. per share (less income tax) on the ordinary shares, £75,000; to place to general reserve, £50,000, and to carry forward, £8,230.

Owing to the fact that the company was incorporated in January, 1899, it was practically only from that date that the company began to derive benefit from the amalgamation; on the other hand, it may be noted that some of the administration expenses commenced with the incorporation of the present company, and may consequently be expected to amount to a somewhat larger sum in future years. The advantages looked for from the amalgamation are, in the opinion of the directors, likely to be fully realized. In addition to the arrangements made with refiners of borax for the supply of crude material from the company's mines, which were referred to in the prospectus, contracts with other refiners have since been entered into, some of which on September 30th last had not yet come into operation, and the company has now contracted to supply crude material for some years to come to most of the borax refiners in the world.

The demand for borax and the various products manufactured by the company has been very good, and its works in England and abroad have been kept fully employed. The prospects for the current year in this branch of the company's business are also considered highly satisfactory, as a large number of contracts have already been secured. The capacity of the works has been increased, the buildings and plant have been kept in an efficient state of repair, and economies effected by improvements and additions thereto. The directors have thought it well to consolidate the position of the company by the acquisition of certain further properties, which they consider will prove a source of strength to it in the future; and for the purpose of providing the necessary funds, without unduly encroaching on the company's working capital, and pending the issue of further debenture stock, a temporary loan has been arranged.

RECENT DECISIONS AFFECTING THE MINING INDUSTRIES.

Specially Reported for the Engineering and Mining Journal.

SUFFICIENT EVIDENCE THAT MINE OPERATOR WAS NOT NEGLIGENT.—In an action for injuries received while employed in a mine, by the falling of its roof, evidence that such roof was supported by a post; that such support was sufficient for the purpose, and made a reasonably safe place for the men to work; that it was such as was usually employed in all well-regulated mines; that it was impossible to absolutely guard against such accidents, which were among the risks of the business—is sufficient to disprove negligence on the part of the operator of the mine, under an allegation that it had been negligent in failing to properly scaffold that portion of the mine.—*Choctaw, Oklahoma & Gulf Railway Company vs. Nicholas* (53 Southwestern Reporter, 475); Supreme Court, Indian Territory.

CREDITOR OF LESSEE HAS NO LIEN IN COLORADO.—The mechanics' lien act of Colorado (Session Laws 1895, p. 202, sec. 8), providing for a lien against mining property in favor of those who do work or furnish material for the development of mines, applies only where such work or material is furnished on a contract made with the owner of the property, or one acting by his authority as agent or contractor, and not where the contract was made by and for the benefit of a lessee. The office of a proviso, in a statute, is to limit, rather than to enlarge; and the proviso in the above section, as amended, that the section shall not apply to owners of mines who lease the same in small blocks, does not enlarge the section by making it apply to all owners who do not thus lease their lands.—*Wilkins vs. Abell* (58 Pacific Reporter, 612); Supreme Court of Colorado.

STATUTES DO NOT RELIEVE FROM COMMON LAW LIABILITY OF MINE OWNER.—The law of Illinois regulating coal mining, requiring mine owners to keep on hand a supply of timbers, and deliver same as required to the miners to enable them to properly secure the workings for their own safety do not relieve the owners of all responsibility for the condition of the roofs of the mine, nor supersede the requirements of the common law that the employer shall furnish the employee a reasonably safe place to work, as applied to a driver of cars over tracks in a mine entry, who has nothing to do with the propping of the roofs, and especially where the mine owner has been notified of the unsafe condition of the roof of the entry, and had assumed to repair it. The driver of loaded coal cars in a mine, drawn by a mule, cannot be held guilty of negligence as a matter of law, in attempting to climb over and in front of a moving car; there being no evidence as to the speed of such cars.—*Consolidated Coal Company vs. Bokamp* (54 Northeastern Reporter, 9); Supreme Court of Illinois.

AN AUTOMATIC PRECISION DIVIDING ENGINE.

The strides made within the last decade in the accurate topography and triangulation of the entire area of the United States—of which however but 1/15 part has been thus surveyed—have doubtless influenced the completion of what bids fair to rank as the most accurate machine for dividing and graduating the circles for the theodolites used in the consummation of this work, which has, up to the present time, been constructed. The designer and builder of this machine, Mr. Geo. L. Buff of Boston, recently of the firm of Buff & Berger, but now the president and manager of the new factory of the Buff & Buff Manufacturing Company of Boston, is constructing two more such machines, one of which is to the order of a foreign government.

In accordance with the quality of the work performed upon this machine, a brief notice of the location of the same and the exceptional provisions taken to guard against all errors due to external factors may give the engineer an indication of the delicate manipulation essential in the graduating of the horizontal circle of an engineer's transit. Situated some 6 miles outside of Boston, a completely isolated building, upon a solid ledge of rock, is devoted solely to this and one other machine. From the exterior, the building has a curious feature, as no windows are visible. Entering through a double vestibule we are ushered into an ante-room from which admission is gained to the graduating room itself. In this room, it would seem at first glance, as if an absolutely tight space had been provided, but further investigation discloses a heating duct, which by simple thermostatic control maintains the temperature of the room closely to 70° at all times. Illumination during the adjusting and setting-up process is received from incandescent lamps overhead, which source of light is, however, dispensed with in the actual graduating, so that the machine is actually run in the dark.

For the foundation of the graduating engine, a solid lead floor, supported by the piers and walls, which latter extend to bed-rock, provides for the elimination of any stray vibrations. The power to drive the machines is obtained from an underground shaft direct from the main shops, a source of power found to be productive of more uniform speed than is possible by the use of an independent motor. For the application of the power, small friction clutch pulleys are employed, operated from outside the actual graduating room.

We will first take up the operation and then the construction of this remarkable machine. In the operation or cutting of a complete circular graduation upon the silver surface of the circle to be afterward embodied in the engineer's transit, our attention is first called to the form of the cutters for engraving the lines. These tools are ground and sharpened in a special machine to obtain the exact equivalent angles, of which there are seven distinct ones. The need of this is such a disposition of the cutting angles that, as the keenness is gradually lessened, the same width of line will still be cut, and thus prevent any error from creeping in, through difference of width of first line and last line cut. Obviously long years of experience can be the only dictator in this.

The circle of the theodolite is now firmly fastened to the circle of the machine and an auxiliary attachment, having an astronomical level-vial of 1 second of an arc sensitiveness, is called into use to accurately center and level the former. Repetition of this action brings out the feature of great perseverance, so essential in such work, and also shows by the fact that in Boston proper the manipulation of such a delicate level-bubble would be impossible on account of the oscillation. Having this accomplished, the mechanism of the machine is adjusted to the needs of the case and all the connections are made in order to equalize the temperature. After 30 minutes duration the power is then applied and the machine begins to revolve slowly but not to graduate. This final process of starting the cutter in its work is soon performed by an automatic finger arrangement which lowers the poised cutter and at the finishing cut as effectively raises it up again. As viewed through the small observation window, the mechanical movements of the entire machine while engaged in the actual graduating process are extremely interesting, and comparatively simple, considering the large number of movements obtained.

The construction is of iron and steel alone, to gain that desirable coefficient of minimum friction, as well as an extremely small coefficient of expansion. Their use for such a critical purpose marks a new departure from the generally accepted metals for such use. The skepticism of almost every maker heretofore toward attempting to cut the teeth of the main circle in anything but a composition brass has been set aside and they have been cut directly in the annealed iron. The success of this venture and the remarkably smooth and perfect form of the teeth is doubtless due in part to the scheme pursued in the cutting as well as to the superior grade of charcoal iron now procurable, which, for homogeneity and close grain, much resembles a composition metal. The moving parts and centers are all of the finest steel, hardened and ground by special precision machinery to an absolute fit.

The automatic part consists of a few cams which are readily adaptable to the various styles of graduations. Their noiseless motion and positiveness of action constitute the two most noticeable features. Reasoning merely from their very simplicity, they evidently constitute one of the best mechanisms for transmitting the accuracies of the original to the duplicate circle.

Referring to the cut, Fig. 1, a first impression of extreme compactness is fully corroborated by inspection; the total weight of the machine, 1,900 lbs., makes it the heaviest machine of its type in this country. The capacities of this machine are any form of circular graduation to a minimum of a 2-in. reading for the verniers. The Buff & Buff Company of Boston, of whose equipment this machine is part, is, under the present management, devoting particular attention to the higher grade of triangulating and mining instruments. The theodolite No. 3,026 is a new type of several, and the searching tests made upon the graduations and workmanship throughout to sustain the high character of the graduation has clearly demonstrated the accuracies in this machine beyond those in the older machine of this same concern.

A summary of the reports, as shown in the measurements of the angles of a large triangle, when corrected for spherical excess, close the triangle to within 0.26 second of arc; the best result that has heretofore been reached is 0.38 second of arc. In their remodeled types these theodolites present a few important changes, the most important of which is in the telescopes whereby the ideal astronomical conditions of focal depth are more nearly reached, thus providing these transits with increased illumination and sharpness of field up to the very edge.

Fig. 2 shows the remodeled mining transit, made by the Buff & Buff Company, on similar lines to the theodolite.

FLORIDA LAND PEBBLE PHOSPHATE.

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

During a recent trip into Polk County, Florida, the center of the pebble phosphate industry, I was impressed with the revival of interest in this variety of crude phosphate, and the ingenuity displayed in overcoming some of the difficulties attending upon the mining of land pebble. The business has passed through many vicissitudes, and at one time it appeared as if the lessening profits would soon come to the vanishing point.

Speculation was rife and almost any land that had pebble on it was considered the foundation of a fortune. Many ill advised enterprises

were begun, and most of them soon came to grief. In a little pamphlet, published in 1891, there is given a list of 18 companies, 10 in Polk and 8 in De Soto County, with a total capital of \$5,165,000, and a daily capacity of 2,375 tons. Nearly all of these companies were organized within 15 months, as in 1890 there were but three, all of them in De Soto County. For a while some of them seemed to flourish, but it was not long before the "capital" became exhausted and the daily capacity fell to a few carloads. To-day the industry is carried on by a mere fraction of the number of companies organized in the flush times, and conditions have changed. It has been found that the digging of land pebble is not so simple as it looked, and that it required the best of men and of methods to win out. The old statement that 3 ft. of pebble could be profitably mined on removal of 12 ft. of over-burden has been tacked up as a warning to the average tenderfoot, who came down in a Pullman and went back on a tie-pass. It was inevitable that the law of the survival of the fittest should apply, and it did apply. After so long a time those who went into Polk County with a determination to succeed, and who were backed by money and experience gained elsewhere, have found it profitable, and to-day there is abundant evidence that there is money in land pebble.

It would appear that success has been reached by considering each separate deposit as a separate problem to be solved in and for itself. There are, of course, certain general principles that govern all cases, but each deposit is so differentiated from neighboring deposits, and indeed from itself, so to speak, that what is true here is not true there, and what is true to-day is not true to-morrow. Individual deposits present marked differences within narrow areas, and a system of mining, transporting and washing that may be yielding good results to-day may have to be changed to-morrow—not changed radically, but in some important detail. The character of the over-burden may change, the matrix in which the pebble occurs may change, and the nature of the pebble itself, while perhaps the minor variant, yet may not always be the same. Perhaps the most troublesome feature has been and is the nature of the matrix, for upon this especially depends the possibility of cleaning the pebble. The over-burden may be thin and easily removed, the phosphate stratum may be from 10 to 20 ft. thick, and the character of the clean, dry pebble all that even the most exacting foreign buyer could wish, but the cleaning of the pebble is the main thing.

Questions of transporting the matrix and pebble to the washers are of

much less importance than questions of cleaning the pebble after it reaches the washers, for it is here that the material is finally prepared for market. Mistakes may be made in removing the over-burden and in attacking the phosphate-stratum, and these may not be fatal, but pebble that is not clean is not marketable. The ordinary log-washer, modified to suit emergencies, has commended itself as the most efficient machine, and is in general use. Whether it would pay to jig some of the material, or to employ some modification of the Luhrig coal washer, remains to be seen. But in either case, whether ore-jig or coal-washer, the material should first be thoroughly washed and scoured in a log-washer. In most cases this seems to be all that is required, and the pebble from the rinsing-screens comes out bright and clean. But in other cases, notably where the pebble is associated with a stiff bluish clay, extremely difficult to remove, I believe that jiggling would give good results. This particular clay does not ball-up so much as break down into small pieces which are hard and soon become quite smooth. After so long a time it wears away by attrition, and gradually passes off in the wash-water, but this entails protracted scouring, the holding of the material a long time in the washer, or a multiplication of washers.

Mr. J. H. Pratt, of Bartow, who has had a long and valuable experi-

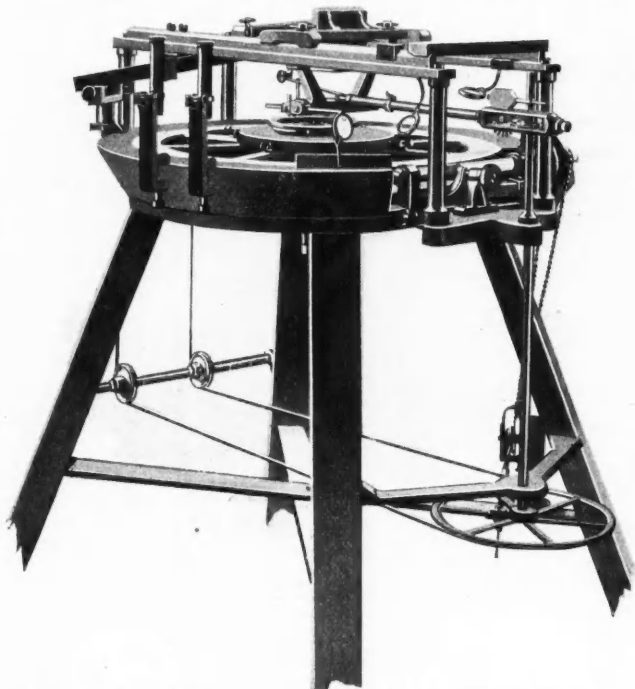


FIG. 1.—No. 2 GRADUATING ENGINE, BUILT BY GEO. L. BUFF.



FIG. 2.—BUFF RE-MODELED MINING TRANSIT.

ence with all kinds of Florida phosphates, informed me that in his prospecting work it has been his practice to wash the samples as soon as possible after drawing them. He has found that when the matrix becomes hard and has set to a sort of cement it is very difficult to wash. Clays that ball in the washer, even if the balls should carry off some phosphate, are much more easily removed than clays that break down into small, hard, smooth pieces.

With a certain kind of matrix, carrying but a small amount of this stiff, bluish clay, the practice of hydrauliclicking the entire matrix into a sump and pumping the entire mass 2,000 ft. to the washers, has given good results. This practice is possible by connecting centrifugal pumps in tandem and the scouring and knocking about the stuff gets renders it comparatively easy to wash. By the time it reaches the washers it is thoroughly disintegrated, and the work of separating the matrix from the pebble is performed by a log-washer and screens easily and rapidly.

As to the quantity of water needed to remove the matrix and carry it to the washer there are, of course, some differences of opinion. However, if results of this kind can be averaged, it seems that one cubic yard of matrix will require from 500 to 600 gallons of water, and this quantity will be increased to perhaps 1,000 gallons by the additional water at the washer and screens. But these figures are liable to considerable variations, depending largely upon the nature of the material and the care given to the washing.

The ordinary basis of sale for land pebble is 68 per cent. of bone phosphate and 3 per cent. of the combined oxides of iron and aluminum, with moisture at 2 per cent. Foreign buyers base their prices on water-free material, deducting from the weight of the cargo the amount of moisture it contains. For each unit of the combined oxides of iron and aluminum above 3 per cent. two units of bone phosphate are deducted from the percentage of this substance as found by analysis. Thus if the ferric oxide and alumina together are 3.25 per cent., there is deducted 0.50 per cent. from the bone phosphate, and so on until the ferric oxide and alumina are 4 per cent., when there is great difficulty in disposing of the cargo at all. The domestic market is not so exacting, but still no buyers seem to want material with over 4 per cent. of ferric oxide

and alumina, claiming that it is difficult to make good acid phosphate from crude rock containing more of these substances.

It is, therefore, apparent that in order to secure the best prices the rock, or pebble, must be as free from the objectionable oxides as possible, and great care must be given to the mining and washing, to avoid deposits in which there is clay hard to remove, and to remove the clay in the washer. There are to-day large deposits of good pebble in Polk County, which cannot be used because of the presence of iron and alumina in quantities above the specified limit. Some day, when the purer deposits have been exhausted, these will come into use, for acid phosphate of excellent quality has been made in large quantities of rock containing from 7 to 10 per cent. of ferric oxide and alumina. I make this statement from personal knowledge, the dicta of agricultural experiment stations to the contrary notwithstanding.

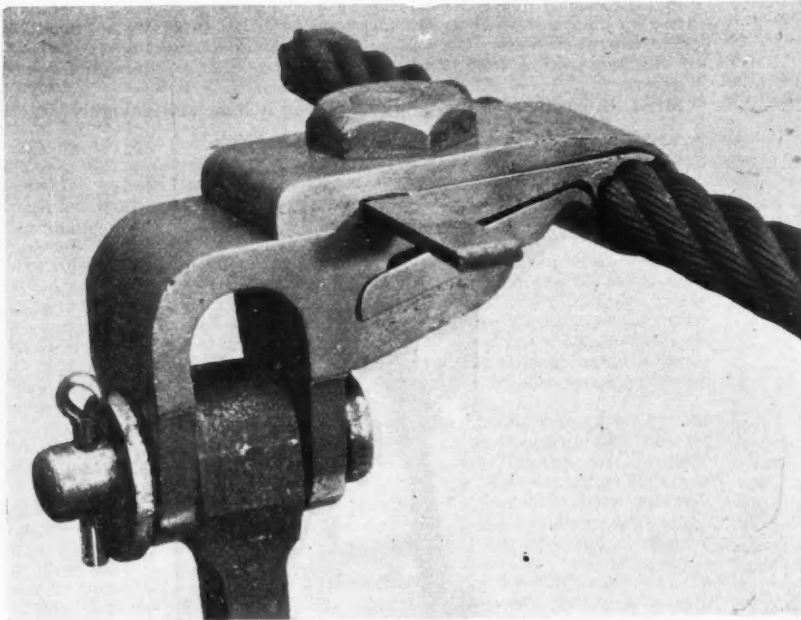


FIG. 1.—STRAP CLIP.

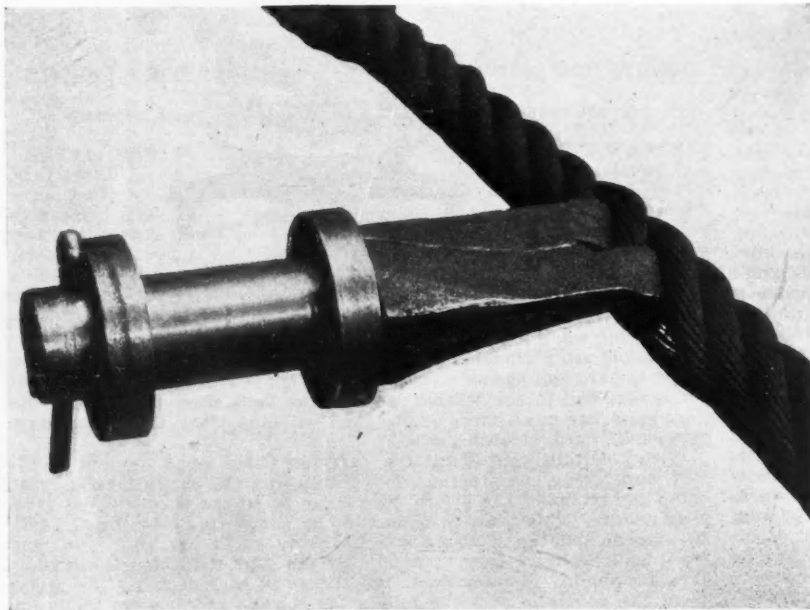


FIG. 2.—CENTER CLIP.

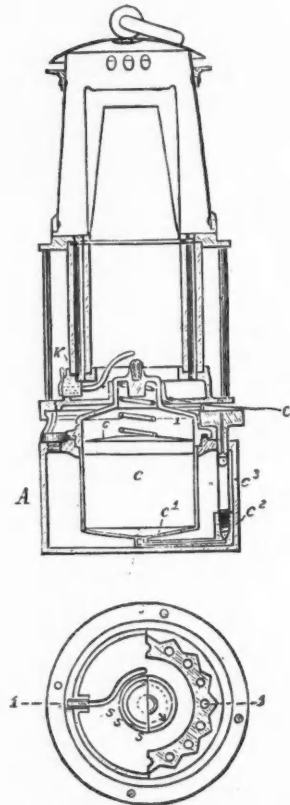
The current price of clean, dry pebble f. o. b. mines is about \$3.25, and freight to Tampa, the chief exporting port, is \$1.25, making the alongside price about \$4.50. As to what it costs to put the pebble on the cars, that is another question, and need not be entered upon here. It is sufficient to say that there is great activity in Polk County, improvements are constantly being made, and besides those already in operation some very large plants are being installed. The reader may make his own deductions.

BURMA JADESTONE.—The absence of disturbances in the Mogaung District, coupled with steady mining operations throughout last year, says "Indian Engineering," resulted in a larger output of jadestone, the exports by land to Western China having been greater than in 1897-98, while larger quantities were also brought down to Rangoon for shipment abroad. The exports of jade to China direct and through the Straits Settlements were 4,484 cwts. in 1898-99, against 3,861 cwts. in 1897-98.

NEW CLIPS FOR WIRE ROPEWAYS.

The design of a ropeway clip is a matter of great importance, since the clip is the attachment used to connect the carrier to the running rope. The illustrations herewith are of the two styles made by the California Wire Works of San Francisco, California, and used on the Hallidie ropeway. The strap clip, Fig. 1, is a serviceable device, but after several months' use the straps become very thin from the wear on the supporting sheaves, and have to be renewed. Unless they are carefully watched, there is danger of a carrier dropping off the rope.

The center clip is, as shown in Fig. 2, made in two halves and dropped forged from machine steel. The two collars are punched from the solid plate and need no machine work whatever. The only machine work on the clip is the drilling of the hole for the cotter pin. The hemp center,



MINERS' LAMP USING ACETYLENE GAS.

or heart of the rope, is removed at the point where the clip is inserted and while the strands of the rope are apart, the halves of the clip are inserted; the collars and carrier put on, and the clip is ready to do duty. The end of the leaf that passes between the strands is enlarged on the end to occupy the space intended for the hemp center or heart of the rope. The hanging weight affords no tendency for the clip to come out of the rope and after the rope is in tension the strands resume their former position, there being no increase in size of the rope where the clip is inserted.

The life of a strap on the strap clip is about five months, the life of the center clip is incalculable. This new invention will be greatly appreciated by all those mine owners operating single rope tramways. The center clip was patented May 9th, 1899, No. 624,648, and is the simplest clip on the market. Its ability to stand a torsional strain has been proven by supporting a weight of 1,980 lbs. before showing any weakness and 2,500 lbs. before being sufficiently distorted to prevent its passing the supporting sheaves and horizontal terminal sheaves of the tramway.

A MINER'S LAMP USING ACETYLENE GAS.

Some trials have lately been made in the Neu-Diepenbrock III. mine owned by the Selbeck Mining Company, of a miner's lamp fed with acetylene, designed by the Velo Company, of Dresden-Lobkau, Germany; and the results were satisfactory, although a few modifications in the direction of greater strength are recommended. The lamp is described in a note by Mr. Kuhn in the "Echo des Mines," of Paris.

This lamp, an open one, can be used conveniently and without danger in the roads and working places; and its illuminating power is ten times greater than that of an ordinary lamp, while it better withstands damp and air-currents. The illuminating power of an acetylene lamp is not diminished in bad air; but the flame of an oil lamp on the contrary becomes reduced appreciably in a foul air-current. Moreover, while water falling from the roof easily extinguishes the flame of an acetylene lamp, it can be relighted more readily than can an oil lamp. The clear light given by the acetylene flame facilitates inspection of the workings by the foreman; and an acetylene lamp placed 4 m. from the point where men are working gives sufficient light for them to see exactly what they are about, including the management of rock-drills. The cleaning of this lamp is a very simple matter; but it should be carefully overhauled before use, because a crack or a joint not perfectly tight might bring about an accident.

A new safety lamp, fed with acetylene, is shown by the accompanying vertical and horizontal sections, in which C is the inner chamber for receiving a cartridge of calcium carbide, while the water contained in the annular space, A, surrounding it penetrates into the lower portion of this chamber by the passage, C¹ C² C³, which is fitted with a valve that opens and closes in accordance with the pressure of the gas generated in chamber C. This lamp is lighted by a fixed platinum wire, made incandescent by an electric current; and, in order to obtain 8 hours' lighting with the German miners' lamp, it is sufficient to charge it with 120 grammes of fresh carbide of calcium. It is necessary to obtain this substance in small quantities at a time, because of its deterioration by keeping, which increases the expense; and calcium carbide can be delivered in the center of France for 0.70 fr. per kilogramme. Inasmuch as 120 grammes of carbide afford 8 hours' lighting, the total expense, including repairs and maintenance, will not exceed 10 centimes (2c.) for 10 hours.

MINERAL COLLECTORS' AND PROSPECTORS' COLUMN.

(We shall be pleased to receive specimens of ores and minerals, and to describe and classify them, as far as possible. We shall be pleased to receive descriptions of minerals and correspondence relating to them. Photographs of unusual specimens, crystals, nuggets and the like will be reproduced whenever possible. Specimens should be of moderate size and should be sent prepaid; We cannot undertake to return them. If analyses are wanted we will turn specimens over to a competent assayer, should our correspondent instruct us to do so and send the necessary money.—Editor E. & M. J.)

41.—An interesting find of a 5½ carat diamond, estimated to be worth nearly \$300, was recently reported to a jeweler in San Diego, California, who identified the stone as an undoubted diamond. Further developments are eagerly looked for by local capitalists.

42.—Mr. C. R. Orcutt has recently added a 28-carat opal, cut and polished by local talent, to his collection of the products of San Diego County, California. It is of flash fire pattern, though rather faint color, appearing colorless when uncut, but makes a very beautiful stone. Some specimens are very clear, more or less milky, but with more fire than any previously reported from that section.

43. Mineral Collections in Chicago.—There are several fine collections of minerals in Chicago, though the city is as yet much behind Eastern cities in the number of mineral collectors. The finest mineral collection in Chicago is without a doubt, that belonging to the Field Columbian Museum. It consists of about 40,000 specimens, and new specimens are constantly being added. The Field Museum collection profited greatly through the World's Fair; in fact, it was made up almost wholly through gifts and purchases at the Fair. The collection is well mounted, but because of bad light the specimens are never seen in their real beauty. Next to the Field Museum collection comes the Chicago University display of minerals. The collection comprises some 5,000 or 6,000 specimens, and, as a whole, is very attractive. This collection, like that at the Field Museum, was made almost wholly through purchases and gifts from the World's Fair. Armour Institute exhibits a good collection of minerals, a few thousand in number. The Chicago Academy of Science at Lincoln Park has a mineral collection of about 1,000 specimens. The mineral collection in the Chicago office of the "Engineering and Mining Journal" has a thousand or more specimens on exhibition. A number of small schools and colleges about the city have mineral collections varying in size and importance.

44.—P. R. E.—Bituminous Coal and Gypsum.—The sample of bituminous coal you send appears to be of good quality, but its percentage of carbon, freedom from sulphur, etc., can only be determined by analysis. The value of any coal seam depends on its location, quality, cost of mining, etc., questions which are for an engineer to investigate. Your supposed gypsum samples are not gypsum at all, as you might have easily told by trying them with a knife. Gypsum cuts easily, its hardness being but 1.5 to 2, or but little more than talc.

One of your samples is a granular quartz. The other is a schist, a fine-grained quartz rock, with thin streaks of some talcy mineral.

45.—Fluorite.—We have an inquiry for the fluorspar crystals carrying silver (see No. 33, February 3d, 1900, page 144) found near Prescott, Arizona, the fluorspar being mined as a fluxing material, and shall be pleased to hear from any of our readers who can furnish such specimens.

46.—A. M.—Gold Ore.—The handsome little specimen containing free gold, that you send us, is too small, and contains too great a variety of minerals for determination without analysis. The white rock is apparently a mixture of feldspar and barite. The dark mineral is apparently a mixture of sulphides, some of it is argentite.

47.—Gold Ore from near Silverton, Colorado.—Certain free-gold ores near Silverton, Colorado, make curious and interesting cabinet specimens when cut and polished. The gold occurs in a conglomerate, the pebbles being quartzite and the matrix dolomite. Such specimens on a polished surface show the original bedding planes of the quartzite pebbles, a series of fractures crossing both the matrix and the pebbles, and then a fine network of gold veins crossing the pebbles, the cement and the fractures.

48.—W. A. B.—Selenite.—The crystal you send is a very pretty one, showing the terminations very well, also the twinning habit of the mineral. We have seen similar crystals from near Put-in Bay, near Cleveland, Ohio.

49.—Minerals in Demand.—Mineral specimen dealers throughout the country are looking for fine specimens of rhodochrosite, rhodonite, axinite, apatite, autunite, cerargyrite, crocoite, titanite and vanadinite, stibnite in fine crystals and pyromorphite specimens are in fair supply, but particularly choice specimens are scarce. It is probable that few men of those engaged in mining understand the value of mineral specimens, that is, specimens suitable for mineral collections. Doubtless there are many mines in which are found, from time to time, specimens that would fetch high prices if sold to mineral dealers, but such specimens go to the mill or the waste dump. Miners and prospectors would find it to their advantage to be on the lookout for choice mineral specimens, and a sample sent to any mineral dealer would soon bring an answer as to value, etc. A really fine rhodochrosite specimen cannot be bought for less than \$25, and prices run up to \$200 for particularly choice ones. Good rhodonite specimens will bring \$15 and up. Axinite specimens of good quality will bring \$5 and up. Choice crocoite specimens sell from \$10 up to \$75. Pyromorphite specimens are in demand at \$5 and up. Mineral dealers will always pay fair prices for really good specimens of mineral and will spend considerable money to control a particularly fine find.

50.—Minerals of Northern Arkansas.—Northern Arkansas offers magnificent opportunity to the mineral collector now that the transportation facilities are being improved. In the zinc deposits of Marion and other counties, mines are opened which produce from the same mine sulphide, carbonate, hydrocarbonate and silicate of zinc specimens, a combination, it is safe to say, never met in one mine before. Beautiful specimens of smithsonite are found, kidney-shaped specimens of this mineral, grey and greenish in color, with velvet-like surfaces, were taken from a mine a few miles east of Yellville. Some splendid specimens of the comparatively new mineral, marionite, hydro-carbonate of zinc, or, more properly called, hydrozincite, have been taken from a mine near Marion and from a mine at Yellville, the usual combination with smithsonite not having been observed in some of the specimens. From Yellville there have been taken some very pretty specimens of the yellow smithsonite, commonly called "turkey fat" ore. A few of the specimens were colored an orange yellow by greenockite and would have delighted the eye of any mineral collector. Sphalerite, or the sulphide of zinc, occurs, but not in large quantity, and what is found has the appearance of changing to calamine or smithsonite. A systematic investigation of the Arkansas zinc territory would doubtless prove immensely valuable to the mineral collecting element, for not only does zinc occur in numerous shapes, but fine specimens of barite, calcite, gypsum in a number of colors, aragonite and other minerals have been found. The Kansas City, Fort Scott & Memphis Railroad now runs a daily stage line from West Plains, Missouri, to the zinc fields, and the Frisco Line has a stage from Eureka Springs to Yellville and Marion.

COAL TRADE OF BELGIUM.—Exports of coal from Belgium in 1899 were 4,563,458 metric tons, against 4,579,955 tons in 1898. The imports in 1899 were 2,839,428 tons, against 2,202,507 tons in 1898. This shows a decrease last year of 16,497 tons, or 0.4 per cent., in exports, and an increase of 636,921 tons, or 28.9 per cent., in imports.

QUESTIONS AND ANSWERS.

(Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert. Nor can we give advice about mining companies or mining stocks. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.—Editor E. & M. J.)

Gold in Mineral Springs.—Is there any scientific record of any mineral springs in the United States carrying gold in solution? I do not know but that it may be common for mineral springs to carry gold in very small quantities.—W. D.

Answer.—We believe that gold has been detected in very minute quantities in the waters of some mineral springs. We do not, however, know of any scientific record of the facts.

Locating on Patented Lands.—According to United States mining laws can land be staked upon where gold and silver have been recently discovered but where said lands have been bought under a railroad grant and have been occupied and partially used for agricultural purposes for over 20 years?—F. V. N.

Answer.—No locations can be made under the circumstances you mention. The land having been patented by the United States to the grantee and conveyed to others, it would be very difficult to attack the title. The only way, probably, in which it could be done would be by proving fraud in the original conveyance—that is, by proving that it was known to be mineral land at the time it was patented as agricultural land. As your discovery is recent, and the land was patented 20 years ago, you could not do this.

Coal in Cuba and Porto Rico.—Can you tell me whether there are any coal mines or coal deposits in our new possessions in the West Indies?—J. E.

Answer.—There are no coal mines in Porto Rico. Lignite is found in several places on the north shore of the island, but has never been worked to any extent. One or two outcrops have been tried, but there is said to have been so much sulphur or iron pyrites in the coal that its use was abandoned.

There are no coal mines in Cuba, and no coal is known in the island, though asphalt and bituminous shale exist, and there are some indications of petroleum. See "Engineering and Mining Journal," September 10th, 1898.

Manganese Ore Consumption.—Steel Works.—What is the quantity of manganese ore used by the steel works of the United States? Can you give me a list of the works in the United States manufacturing steel? Or tell me where such a list can be obtained?—F. I. C.

Answer.—The production of manganese ores and manganiferous iron ores in the United States in 1898 was 217,782 tons; imports, 14,885 tons; approximate consumption, 232,667 tons. The figures for 1899 are not yet complete. See "The Mineral Industry," Volume VII.

We could not possibly give a list of the steel works of the United States in the space at our disposal. You can obtain the names and locations of those works from the "Directory" published by the American Iron and Steel Association in Philadelphia. This gives a complete list.

Strontia.—Will you advise me whether there is a market for celestite or crude strontia in any form? If so, what is the price? Can you refer me to any source of information as to the commercial supply; also as to European production?—C. H. B.

Answer.—There is some market for strontia or strontium sulphate. That used in the United States is nearly all imported. In 1897 about 40 tons were mined at Put-in-Bay, Ohio; in 1898 and 1899 only small quantities were taken out for experimental purposes. No quotations can be obtained for the mineral in New York; but we are informed that not more than \$2.50 or \$3 per ton can be obtained for crude mineral in Liverpool or Antwerp. The production in Great Britain in 1898 was 12,491 tons.

Consult "The Mineral Industry," Volume VI.

The Bromo-Cyanogen Process.—I have noticed in the London "Financial Times," January 24th and 27th, favorable statements in regard to the Sulman-Teed bromo-cyanogen process of ore treatment in recovering the gold from the sulpho-telluride ores of Hannans, Western Australia, without previous roasting. Has anything been published on this matter or is definite information obtainable? I see also that it is quoted that the process is used successfully on auriferous mispickel ores in Ontario.—E. L.

Answer.—We have not yet received the particulars of the tests you refer to in the mines of Western Australia. Tests have been made in Ontario. An account of the tests at Deloro, Ontario, and also of earlier experiments in Western Australia, is given in "The Mineral Industry," Volume VI, pages 345-348. See also the "Engineering and Mining Journal," February 23d, March 30th, April 20th and May 25th, 1895; and

January 30th, 1897. Further information on this process, from any reader, who has facts or experience, would be acceptable.

Chrome Ore.—Can you inform me as to the New York value of chrome iron ore, 47 to 52 per cent.? Should such ore be shipped crude from the mine, and if so what price should it bring? Where can a market for chrome oxide be found?—T. K. B.

Answer.—The current value of chrome ore, running about 50 per cent. sesquioxide of chromium, in New York, is \$20 to \$21 per ton. Most of the ore sold in that city is imported, coming from Turkey, Canada, and more recently from Newfoundland. The market for the ore is found in New York, Philadelphia and Baltimore. The ore is sold in the lump as it comes from the mine; it requires no treatment beyond washing, or some similar treatment, to free it from clay and other foreign matters.

Formerly most of the ore was sold through importers and jobbers. At the present time the large chemical companies generally contract for their supplies directly with the mines.

Powdered Ore in the Open-Hearth Steel Furnace.—Is there any record of the use of fine or powdered iron ore in the open-hearth steel furnace?—A. K. E.

Answer.—In a paper read before the Iron and Steel Institute in Manchester, England, August, 1899, Prof. J. Wiborgh says: "Experiments on the substitution of powdered for lump ore in the open-hearth furnace were made by Dr. H. Molander in the basic open-hearth furnace at Hofors in September, 1897. The material used was concentrated ore from the Lulea magnetic separating works, which contains 72 per cent. iron and 0.1 per cent. phosphorus; the average size of the grains being about 1 mm. Four successive charges were made, the first three, pig iron, scrap and ore concentrates, which were worked in the same manner as those with the Kungsgrufra lump ore usually used in the furnaces; in the fourth, pig iron and concentrates alone were used, with some limestone, the final additions of ferro-manganese and ferro-silicon being made in the usual way. The final charge consisted of 11.1 tons pig iron and 1.22 tons of concentrates, which should, according to previous experience, have yielded about 92 per cent. of the weight in steel ingots, or 10.21 tons. The actual weight obtained was 10.87 tons, showing an excess of 0.66 ton recovered from the 1.22 tons of ore added; corresponding to a reduction of 57 out of the 72 units, or a utilization of 75 per cent. of the iron in the ore. The time required for making the charge was about one-half more than when scrap was used; but Dr. Molander considers that, with longer experience in working this method, the time might be reduced, and also the quantity of ore increased from 11 to 15 per cent. of the weight of the pig iron. . . ."

"Another application, due to I. A. Brinell, is an improvement on the Ellershausen process of incorporating the ore with the pig iron at the moment of casting. An ingot mold is partly filled with fluid metal from a ladle, and when it is about to solidify a quantity of fine ore is thrown on the surface, and this is repeated till the mold is full. From 12 to 15 per cent. of the ore can be added without notably lessening the cohesion of the ingots, which are to be used instead of pig iron in the open-hearth furnace charge. Rich and heavy concentrates are admirably adapted for this use."

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

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

Week Ending January 30th, 1900.

- 642,150. PUMPING MECHANISM.—John Olsen, Salt Lake City, Utah. The combination with separate fluid conveyors, and means for applying pressure alternately to the contents of said conveyors, of a compensator or pressure-equalizing device connecting said conveyors, having relief valves and a common compensating lever connected with the stems of said valves.
- 642,152. STAMP FOR CRUSHING ORES. Frederick A. Parnell, London, England. The combination with a shoe and a base, A, of a frame, C, rising from said base and consisting of inclined braces connected together at top and diverging at bottom, and respectively connected to said base at front and rear, a cross beam, D, carried by the upper side of said frames at one side of the vertical axis of the die, a cylinder, G, carried by said cross beam, a piston, L, in said cylinder, connected to said shoe for reciprocating it, and means for revolving said piston.
- 642,157. MANUFACTURE OF COMPOUND INGOTS. James C. Russell, Pittsburg, Pa., assignor of one-third to Charles A. Fagan and Joseph G. Vilsack, same place. The method consists in bending transversely a plate of low-carbon metal into U shape so as to form a protecting or inclosing end portion, inserting metal of greater carbon content than the plate into the cavity formed by the bending, heating the body thus formed, and then rolling the same.
- 642,158. COMPOUND INGOT. James C. Russell, Pittsburg, Pa., assignor of one-third to Charles A. Fagan and Joseph G. Vilsack, same place. A compound ingot composed of a plate of low-carbon metal transversely bent to U shape to form outside layers and but one protecting end portion, and a layer of high-carbon metal or alternate layers of high and low-carbon metal cast between the arms of said U-shaped plate.
- 642,175. EXCAVATING APPARATUS. John Titus, Oyster Bay, and William Titus, North Hempstead, N. Y. The combination with a movable excavating apparatus, of a movable platform, a drum carried

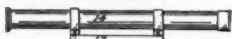
thereon, a drum independent of the platform, a frame for carrying the two drums constructed with side pieces arranged to move longitudinally upon each other, idler pulleys carried by said frame, and a carrier apron carried by the drums and looped around the idler pulleys so that its carrying length may be varied by the shortening or lengthening of the frame.

642,200 and 642,201. **MINE GATE.** Newton K. Bowman, North Lawrence, Ohio. In a self-closing mine gate, rock shafts disposed upon opposite sides of the plane of the gate, positive interlocking means between said rock shafts for effecting a simultaneous movement thereof in opposite directions, means connecting one of the rock shafts with the gate to compel an opening thereof when the rock shafts are operated, and actuating means operatively connected with each of the rock shafts, and adapted to be engaged by a moving car.

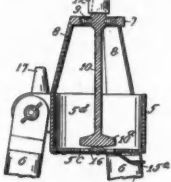
642,202. **AMALGAMATOR.** John L. Bradbury, San Francisco, Cal. The combination with a closed receiver or vessel for the material to be treated, having flat interior sides, of a drive shaft extending



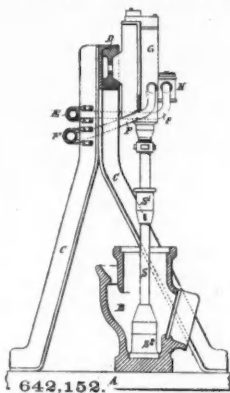
642,202.



642,203.



642,208.



642,152.

through, a frame within which the shaft is mounted, means for imparting rotary motion to the shaft and receiver or vessel, and of a series of breaking arms arranged within the receiver and securely attached to the sides thereof.

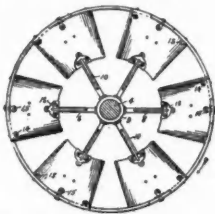
642,203. **COMBINED TRANSIT AND GRAVITY LEVEL.** Frank C. Brown, Loveland, Colo., assignor to John Beal and Oscar J. Smith, Berthoud, Colo. The combination of a supporting frame, of a weighted rod mounted to vibrate freely therein, its upper extremity being fashioned to support a telescope, and a spring attached to the casing and adapted to engage the weighted extremity of the rod for locking the latter in the desired position.

642,234. **APPARATUS FOR VENTILATING MINES.** Charles P. Kenyon, Scranton, Pa. The combination of a fan wheel, having fans and ring encircling and engaging with the outer ends of said fans; with curved bolts and a collar provided with set screw, the collar adapted to engage with a radial arm of the fan wheel, and in such relation as to give the fans or blades a twisted or varying slope when their outer corners are secured by the curved bolts.

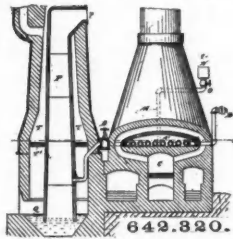
642,237. **STEAM PUMPING ENGINE.** Henry M. Lane, Norwood, Ohio. In a pumping plant, a tower composed of a number of vertical supporting frames braced together, side by side, around a polygonal area; in combination with pumps within said frames and a driving engine supported over each pump by its enclosing framework.

642,288. **CENTRIFUGAL SEPARATOR.** John J. Berrigan, Avon, N. Y., assignor to the De Laval Separator Company of New Jersey. The combination with the revolving bowl of a centrifugal separator, of a shaft connected with the lower portion thereof for driving the same, means to drive said shaft, an independent hollow shaft projecting from the top of the bowl, and yielding bearings for said last-mentioned shaft.

642,320. **PROCESS OF PRODUCING ALLOYS OF HYDROGEN AND IRON.** George W. Gesner, New York, N. Y. The process consists in first puddling the iron, subsequently reducing it to a form presenting



642,284.



642,320.

a greatly extended surface, heating such iron in the presence of free hydrogen and allowing time for the latter to be absorbed, and subsequently detaching and melting the scale thus produced.

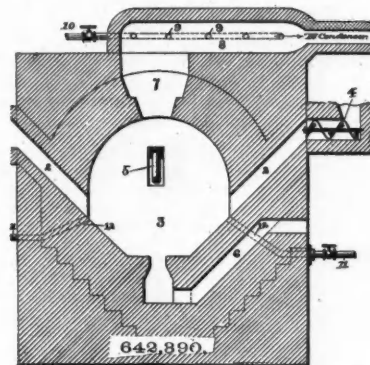
642,334. **ORE-ROASTING AND DESULPHURIZING FURNACE.** Albert C. Johnson, Baltimore, Md. In a furnace, longitudinal side beams having intersecting lateral and vertical slots, in combination with a reciprocating rake, the latter comprising a head with right-angled ends, and a rake pivoted to said head, endless chains or cables connected with the angular ends of the rake heads and supported in the slots and on exterior idlers, and means for reciprocating the chains or cables.

642,356. **FURNACE FOR BRICK KILNS.** Otto C. Oehler, St. Louis, Mo. A combustion chamber provided with grate bars, an outlet leading from said combustion chamber to the kiln or other object to be heated, a coking table situated in said combustion chamber and above said grate bars, an unobstructed space between said coking table and outlet, and a fire-wall situated between said grate bars and outlet and leaving an opening between said coking table and fire-wall.

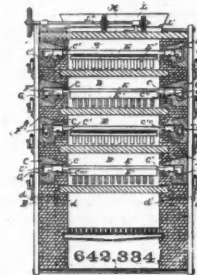
642,358. **PROCESS OF MAKING ALUMINUM PAINT.** Leonhardt Ott and Hans Riffelmacher, Roth, Germany, assignors to the Bronzefarbenwerke Actien Gesellschaft, vormals Carl Schlenk, same place. The process consists in pouring fluid aluminum into water and then comminuting the thin irregular-shaped pieces so formed.

642,373. **COAL CONVEYOR.** Rugeley D. Seymour and Howard N. Elmer, Chicago, Ill. The combination of two cables arranged to be laid parallel with each other and detachably anchored at or near their outermost position, two winding drums arranged to wind up, pay out and support the cable tracks at one end, auxiliary mechanism between the drums and cables arranged and operating to take up the slack of the cable tracks, a mast arranged to support the outer end of the cable track in a raised position, a trolley car for each track provided with a conveying bucket, a hauling line secured to each trolley car and passed around the mast, and a second set of winding and unwinding drums around which the ends of the hauling line are passed for advancing one car and receding the other.

642,390. **PROCESS OF MAKING SULPHURIC ACID.** Frank P. Van Denbergh, Buffalo, N. Y. The process consists in subjecting a material containing sulphur—such as calcium sulphate or gypsum—to heat



642,390.



642,334.

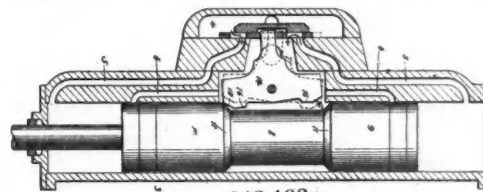
and electrolysis produced by an electric current within a furnace, and applied directly to the material while in a molten condition, in the presence of an excess of free oxygen, thereby forming sulphur oxide, and subsequently hydrating this.

642,433. **APPARATUS FOR MANUFACTURING IRON AND STEEL.** Thomas Doherty, Sarnia, Canada. The combination, with a cupola and a converter in communication with each other, the former above the latter, of rockable tuyeres situated at one side of and extending down into the interior of said converter, and a slag opening opposite said tuyeres, so arranged that the bottom will be approximately on a level with them at the highest point of their movement and above the level at the lowest point of their movement, whereby air blasts may be directed over the surface of the molten metal to free it of slag, and through the body of the same to free it of carbon.

642,446. **DUPLEX PUMPING APPARATUS.** George B. Hiett, Atlanta, Ga., assignor of one-half to Samuel Louis Brewer, Tuskegee, Ala. The combination with a bed plate and a frame, of two pump cylinders, two power cylinders, arranged vertically above said pump cylinders, the piston rods of said pump and power cylinders being connected at their adjacent ends to cross heads, a walking beam journaled intermediate its ends in said frames, links connecting the opposite ends of said walking beam to the respective cross heads, a crank shaft, a connecting rod attached to one end of the walking beam and to the crank shaft, a rocking arm actuated from the crank shaft and pivoted to the frame, a horizontal rock shaft arranged below the power cylinders and carrying two oppositely-extending crank arms attached to the valve stems, and a connecting rod attached at one end to the rock shaft by a universal joint and at its other end directly to said rocking arm.

642,449. **ROLLING MILL.** Charles M. Horton, West Superior, Wis. The combination with a suitable frame, of upper and lower feed rolls mounted therein, means for rolling the material inserted, and means for raising and lowering the upper feed rolls, and mechanical means for moving the upper feed rolls to different distances from each other.

642,463. **ROCK DRILL.** Henry Koch, North Tarrytown, N. Y. A rock drill, having a cylinder, a steam chest attached to the cylinder, the cylinder having a chamber formed therein, such chamber communicating with the atmosphere and with the interior of the cylinder,



642,463.

the chamber also communicating with the steam chest, a slide valve commanding communication between the steam chest and the chamber of the cylinder, and means for driving the valve in time with the piston.

642,482. **WELDING MACHINE.** Andrew K. Peterson, Sleepy Eye, Minn. The combination with a longitudinally-slotted table provided at one end with a removable anvil and at the opposite end with two fixed brackets, of a shaft carrying a lever and an eccentric for moving the anvil block toward or from the fixed brackets.

642,483. **OIL-WELL PUMP MECHANISM.** Marquis T. Pew, Parker's Landing, Pa. A pump mechanism having a valve piston carrying a tubular shell which is provided with a tortuous liquid passage and spaced sand pockets or traps.

642,537. **METHOD OF APPLYING LINING MATERIAL TO CONDUITS, PIPES, OR THE LIKE.** Andrew Thoma, Cambridge, Mass., assignor to Amanda M. Lougee, Boston, Mass. The method consists in directing into the lining, after its assemblage within the pipe, a blast to act progressively on said lining at successive points throughout its length and force it into intimate contact with the inner walls of said pipe.

642,538. **ARMORED INSULATING CONDUIT.** Andrew Thoma, Cambridge, Mass., assignor to Amanda M. Lougee, Boston, Mass. A conduit consisting of an armor tube and an inner lining of an extensible, highly-flexible composition of matter in intimate contact with the inner walls of said tube.

GREAT BRITAIN.

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

Week Ending December 30th, 1899.

- 16,050 of 1899. **CEMENT MANUFACTURE.** C. Von Forell, Giessen, Germany. Making Portland cement by heating blast-furnace slag and limestone in a calcining furnace, instead of mixing pulverized slag with lime.
- 20,035 of 1899. **REVOLVING SCREEN.** T. C. Donnelly, Dunedin, N. Z. Series of concentric revolving screens for classifying the products of gold-dredging apparatus.
- 21,137 of 1899. **CASTING ALUMINUM.** W. A. McAdams and D. W. Book, New York, U. S. A. A rapid method of casting aluminum bronzes so as to prevent the segregation of metals.
- 21,871 of 1899. **TREATMENT OF ZINC-BEARING PYRITES.** F. A. Gasch, Honningen, Germany. A method of preparing zinc solutions free from iron and manganese, from zinciferous spent pyrites.

PERSONAL.

Mr. H. W. Oliver, of the Oliver Iron Mining Company, Pittsburg, is now in Florida.

Mr. E. T. Bradford, manager Southern Smelter Company, has been in Portland, Oregon, to investigate a smelter proposition.

Mr. W. H. Wiley of Idaho Springs, Colo., is in Mexico examining property for the Montana copper people, whom he represents.

Mr. J. J. Campbell, of the Carnegie Steel Company, Limited, has been appointed auditor and assistant secretary of the company.

We wish to know the present address of Mr. Henry Willard, interested in a metallurgical process, who was in New York in 1888.

Mr. G. G. Vivian of Idaho Springs, Colo., has gone to the southern part of old Mexico to examine mining property and report on a smelter.

Mr. Ben Williams, for many years superintendent of the Copper Queen Mine, Bisbee, Ariz., is now in British Columbia. Mr. Lewis Williams is in San Francisco.

Mr. Robert Scott of the Almaden Quicksilver Mines of California, the inventor and builder of the Scott quicksilver furnace, is now in Mexico for rest and recreation.

Mr. J. G. Berryhill and E. C. Finkbine of Des Moines, Ia., stockholders in the Colorado-California Mining and Milling Company, visited the property near Central City, Colo., last week.

Mr. Enox Taylor of Ketcham, Ida., who has been East for some 2 weeks past, left Monday last on a 3 or 4 weeks' trip to examine mining property in British Columbia for Philadelphia parties.

Mr. H. L. Brown, formerly superintendent of the Reforma Mine for the Guggenheim Smelting Company, has been appointed superintendent of the Macatona Consolidated Mining Company of Mexico.

Mr. F. S. Roumage, mining engineer, of Auburn, Cal., has accepted the superintendency of the Omecima Mine, on the Naas River, British Columbia. The mine will be worked by the hydraulic elevator process.

Mr. Walter Hovey Hill, of Grangeville, Ida., formerly superintendent of the Big Buffalo Mine, in the Buffalo Hump Camp, has been elected general manager of the Newsome & Leggett Hydraulic Mining Company, Limited.

President E. T. Schoen, of the Pressed Steel Car Company, Pittsburg, is now in London. Mr. Schoen will try to induce English railway companies to adopt the American standard 8-wheel car. Frank N. Hoffstot, of Pittsburg, accompanied Mr. Schoen.

Mr. Alexander J. Peacock, first vice-president and general sales agent of the Carnegie Steel Company, has been granted an extended vacation, and will spend it in California. Mr. Homer J. Lindsay, his assistant, will assume his duties during his absence.

Mr. Titus Ulke, Government Inspector at the Laffin & Rand Powder Works, at Pompton, N. J., and Mr. W. C. William, chief chemist at the Frankford Arsenal, Philadelphia, were badly though not dangerously burned by sulphuric acid while making some tests at the arsenal on February 7th.

Mr. Frank E. Fellows of Corning, O., secretary and treasurer of the Fidelity Oil Company and cashier of the Sunday Creek Coal Company, departed suddenly for parts unknown on February 2d, taking with him about \$3,000 which did not belong to him. As yet he has not been apprehended.

Mr. Edwin R. Holden, Vice-President of the Delaware, Lackawanna & Western Railroad, recently tendered his resignation and it is expected will retire from office on March 1st. Mr. Holden entered the employ of the coal department of the road in 1860, and has been a prominent figure in the anthracite trade.

Mr. William Larimer Jones, general manager of Jones & Laughlins, Pittsburg, has been appointed general manager of the blast furnace plant of Laughlins & Company. Mr. Henry A. Laughlin, head of the ore interests of Laughlin & Company, has had charge of the work in the illness of his son, Mr. J. B. Laughlin, now in Italy, whom Mr. Jones will succeed.

Mr. George Collins, who has been looking after the mining interests of an English company in Georgia, has returned to Central City, Colo., where he will resume his former position with the Central Development Company. Edgar Collins, his brother, who has held the position with the Central Development Company, has accepted a position with the Smuggler-Union Mining Company at Telluride, Colo.

Mr. W. O. Jacquette, formerly treasurer, has been appointed comptroller of the Pressed

Steel Car Company of Pittsburg, Pa. Mr. A. R. Fraser, formerly auditor, becomes treasurer; Mr. H. J. Gerhart, formerly assistant auditor, is made auditor; Purchasing Agent L. W. Jones becomes assistant to the president, and Mr. W. H. Schoen, formerly second vice-president, now occupies the position of vice-president.

Gov. Otero, of New Mexico, has appointed the following delegates to the International Mining Congress at Milwaukee: Ex-Gov. L. B. Prince, A. A. Newbery, N. B. Laughlin, Charles F. Easley, O. B. Steen, Santa Fe; J. E. Sheridan, W. H. Newcomb, Silver City; A. B. Fitch, Magdalena; L. S. Preston, Elizabethtown; Hon. J. T. McLaughlin, San Pedro; W. S. Hopewell, J. W. Webster, Bernard Martin, Hillsboro; W. H. Lewellyn, Florence Luna, Las Cruces; J. A. Wiggs, Jr., H. B. Ferguson, T. J. Curran, Albuquerque; T. A. Schomburg, Raton; William Watson, White Oaks; H. S. Church, Jarilla; Frank Staplin, Taos; Christian A. Wiegand, East Las Vegas; E. B. Thomas, Cerrillos; C. T. Brown, F. A. Jones, Socorro; A. W. Harris, Kingstone; J. B. Mayo, Golden; M. Cooney, Cooney.

OBITUARY.

William Clarke Catlin died at his home in Johnstown, Pa., on February 2d, in his 33d year. He was the eldest son of Henry G. Catlin, and was born in Burlington, Vt. He graduated with honors in 1888 from the Sheffield Scientific School of Yale University and immediately entered the employ of the Illinois Steel Company. In 1891 he was made assistant superintendent of the Union Works of the Illinois Steel Company at Chicago, and in 1893 he was appointed general superintendent of the Joliet Works. Resigning in 1897, he went to Johnstown, Pa., and assumed charge of the drafting department of the Cambria Iron Company. In October, 1898, he was made assistant superintendent of the mechanical department, and was made superintendent of the Bessemer department on January 26th last.

SOCIETIES AND TECHNICAL SCHOOLS.

Civil Engineers' Society of St. Paul.—At a regular meeting of the society on February 5th there were present 14 members and 4 visitors. Mr. C. F. Loweth read a paper on "Moving Horizontally a 361-ft. Railroad Bridge Span With Oak Wedges." Mr. A. W. Munster described his experience in raising heavy weights with wedges. To cite one case: A steel tower 130 ft. high supporting deck spans and resting on masonry pedestals, 2 of which had settled. To plumb the tower thin steel wedges, 42 to a pedestal, were alternately driven and shimmed by eighths of an inch, thus lifting about 300 tons an inch and a half without damage to bridge, masonry or wedges. The wedges were 18 in. long, 3 1/2 in. wide, rising 3/4 in. in 12 in., and were forged under steam hammer from locomotive springs taken from scrap heap.

Engineers' Club of Philadelphia.—At the meeting on February 3d, 68 members and visitors were present. Prof. A. C. Abbott gave an address upon the "Utilization of Bacteria and Bacteriological Methods in Modern Sanitary Engineering." He gave a description of nature's method of filtering water and sewage through the soil, and showed how this has been applied and improved by the engineer in artificial filtration. The bacteriologist has taught the engineer, however, that in sand filtration the sand is simply a framework to support the filtering material, which consists of a gelatinous felt formed by the collection of micro-organisms. The modern method of sewage purification by septic tanks and coke filters was dwelt upon in detail, with blackboard illustrations. At the close of this address the subject was discussed by Messrs. William Easby, Harvey Linton, J. C. Trautwine, Jr., Edgar Marburg and others.

American Chemical Society—New York Section.—The February meeting was held on the 9th inst., Dr. C. F. McKenna presiding. In his paper on "The Technical Analysis of Rope and Twine," Dr. D. Woodman described the chief commercial grades of cordage, "oiled" and "un-oiled," "tarred," "plum-bazoned," etc., and the method used in his laboratory for determining the amount of oil, tar, or plumbago contained in any given sample of the various kinds of rope. Dr. M. T. Bogert described a new method of preparing the salts of the Phen-miazin series as developed in the organic laboratories of Columbia University. Mr. Maximilian Toch described briefly the progress in photo-chemistry, and illustrated the method of printing and developing some of his more rapid bromide papers. His paper was followed by remarks and reminiscences from several members.

INDUSTRIAL NOTES.

The Graham Furnace of the Virginia Iron, Coal and Coke Company, at Graham, Va., idle

since 1892, will be ready for blast about March 1st.

The Bavarian State Railways, which recently purchased 2 freight locomotives from the Baldwin Locomotive Works of Philadelphia, is now using some passenger locomotives built by the Baldwin Company with satisfactory results.

H. C. Frick has brought suit against the Carnegie Steel Company. His complaint makes a number of charges against Mr. Carnegie and prays for the appointment of a receiver. The influences behind Mr. Frick in his suit are not yet known definitely.

The Union Smelter Manufacturing Company of St. Louis, Mo., states that in addition to the plant it is erecting at Sumpter, Ore., it has in construction a 50 to 70-ton plant for the Copper Belle Mining Company, of New York, for its works near Wilcox, Ariz. It is also about to ship a 5 to 10-ton plant to the School of Mines of Lima, Peru, S. A.

A movement has started to consolidate the 3 pig iron casting machine companies, Heyl & Patterson, Pittsburg; Davies Pig Iron Casting Machine Company, Warren, O., and the firm controlling the Uehling patents and for which Mr. George H. Ginther of Pittsburg is special agent. A meeting was held recently but no definite conclusion was reached.

A shaft which is said to be second only in size to that used in the Ferris wheel, is being produced by the Cleveland City Forge and Iron Company of Cleveland, O., for the Glasgow Street Railway Company of Glasgow, Scotland. When finished the weight of the shaft will be 35 tons. It is 25 ft. long and from 26 to 37 in. in diameter. It is being drilled with a 10-in. bore.

The entire plant of the Virginia Iron, Coal and Coke Company at Middlesboro, Ky., is to be remodeled. Included in this work is the building of 2 new soaking pit furnaces and the remodeling of the seven 25-ton open hearth furnaces. Mr. E. E. Erikson, who has the contract, is also rebuilding the gas producers. The Virginia Iron, Coal and Coke Company are successors to the Watts Iron and Steel Syndicate, Limited, which formerly owned the plant.

The Cling-Surface Manufacturing Company of Buffalo, N. Y., has been incorporated under the laws of the State of New York, retaining the same name as heretofore, with Albert B. Young as president and general manager and Wm. D. Young vice-president and secretary. The company now has 3 branches, one each in Boston, New York and Chicago, with others just opening in St. Louis and New Orleans, while the well known importing house of W. J. Moxham & Company of Sidney, Australia, has ordered a large shipment of Cling-Surface with the exclusive right to handle it in Australia.

The Hercules Gas Engine Works, of San Francisco, Cal., reports a number of important contracts for gas and gasoline engines, among others may be mentioned 6 hoisting engines ranging from 10 to 50 H.P.; 1 15 and 1 25 mine pumping engines; 3 automobiles, 5, 7 and 12 H.P.; 4 40 H.P. heavy mill engines; 1 130 H.P. blowing engines (3 cylinder vertical); 3 30 H.P. stationary engines of the 3-cylinder marine type; 1 50 H.P., 3 85 H.P., 1 150 H.P., also 3 15 H.P. marine hoisting engines, and 4 150 H.P. 3-cylinder heavy duty engines, and several lots of standard sizes for stock. A catalogue describing some new uses for large gas engines will soon be issued.

The Berlin Iron Bridge Company of East Berlin, Conn., is putting up 2 large buildings for the National Coal Tar Company at Everett, Mass.; a gas plant for the Peekskill Gas Company at Peekskill, N. Y.; a retort house for the Penn Yan Gas Light Company at Penn Yan, N. Y.; a large car barn and power house for the Electric Railroad at Montville, Conn.; the iron roofs for the new plant of the Nichols Chemical Company at New York; 2 large buildings for the J. H. Horn & Sons Company at South Lawrence, Mass.; a machine shop for the Wheeler & Wilson Manufacturing Company at Bridgeport, Conn.; a new power station at Tariffville, Conn.; a new machine shop for the Norwalk Iron Works at South Norwalk, Conn.; a large steel building covering Pier No. 13 at New York; a power house for the Middletown Gas and Electric Company at Middletown, N. Y. The company is running its plant full time and reports business exceedingly brisk.

The Webster, Camp & Lane Machine Company, of Akron, O., is building for the Pittsburg & Conneaut Dock Company a Carnegie concern, 2 more Hulett ore unloaders, duplicating the machine already on the ore docks at Conneaut. The new machines are to be ready for use by May 15. It will be possible to operate the 3 machines at once in unloading a single vessel, and with the use of a revolving derrick to clean up the last of the ore under each hold, very rapid work can be done. Each machine can unload from 250 to 300 tons an hour. The

Webster, Camp & Lane Machine Company has also taken important contracts recently for the Hulett equipment for handling ore at blast furnaces. The National Steel Company has ordered for its new Mingo Junction, O., furnaces a duplicate of the car dumper, ore bridges and other equipment for unloading, stocking and putting ore in bins, installed at its Youngstown furnaces. A similar order has been given by the American Steel and Wire Company for its new Neville Island plant.

TRADE CATALOGUES.

The Graphite Lubricating Company of Bound Brook, N. J., is issuing printed matter calling attention to the merits of the graphite and bronze bushings it manufactures. Bushings that need no lubricant are often of use about a mining plant or where long lines of wire cable must be carried over ground, as in the case of aerial tramways.

Conveying machinery and devices particularly intended for use about mills and shops are illustrated in a 30-page catalogue published by the New Jersey Foundry and Machine Company, Havemeyer Building, New York City. The company states that it makes a great variety of tracking and conveying machinery, chains and contractors' supplies. The company also makes a variety of self dumping buckets and steel and wood dump cars.

The Stewart Heater Company of Buffalo, N. Y., issues a neat and attractive 48-page pamphlet describing the company's tubular and sectional feed water heaters and purifiers, also the Otis double system, or combination water heater with automatic regulator. The merits of the various heaters are clearly shown and a long list of testimonials is given from users. The company states that in spite of higher cost for materials it has not advanced prices at all.

A great variety of steam, horse and hand-power hoisting machinery is described in a large 140-page illustrated catalogue published by the Contractors' Plant Manufacturing Company, of Buffalo, N. Y. Single and double cylinder friction and geared hoists are shown, also hand and power derricks, sheave and tackle blocks, etc. The company manufactures a horse-power whim built entirely of iron and steel that is stated to be small, light, easily controlled and very durable—hence is particularly adapted to the use of prospectors or small miners. All parts of the whim are interchangeable and no part weighs over 250 lbs.

The Westinghouse Electric and Manufacturing Company of Pittsburgh, Pa., continues to issue its excellent series of illustrated circulars describing special machines which it manufactures. No. 1,008, which supersedes No. 236, describes belt-driven single-phase alternators of 16,000 alternations per minute for pressures of 1,100 and 2,200 volts. No. 1,007 describes direct current arc lighting generators superseding catalogue No. 149 C, while No. 1,006, which supersedes catalogue No. 223, treats of lightning arrestors for alternating current and direct current circuits, while No. 1,009 shows the construction of belt-driven polyphase alternators taking the place of catalogue No. 192 C. The alternators are designed for 7,200 alternations per minute and pressures of 220, 440, 1,100 and 2,200 volts. Circular No. 1,011, succeeding No. 222A, describes the company's connected railway generators, while No. 1,012, succeeding No. 158C, treats of the Shallenberger Ampere-Hour Meter.

MACHINERY AND SUPPLIES WANTED.

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

We also offer our services to foreign correspondents who desire to purchase American goods of any kind, and shall be pleased to furnish them information, catalogues, etc.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, and have no pecuniary interest in buying and selling goods of any kind.

GENERAL MINING NEWS.

Oil Exports.—In January the United States exported 10,904,231 gals. crude oil; 2,165,261 gals. naphthas; 55,955,960 gals. illuminating; 6,107,004 gals. lubricating and paraffin, and 188,160 gals. residuum; total, 75,320,616 gals., valued at \$6,339,185, as against 62,385,776 gals., valued at \$3,817,129, in January, 1899.

ALABAMA.

(From Our Special Correspondent.)

Coal Production.—State Mine Inspector J. de B. Hooper has given some official figures as to the coal output in 1899. All the companies in the State have not yet reported, and the figures are not complete, but the following output is accounted for: Bibb County, 4 mines; output,

904,887 tons; 1,168 employees. Blount County, 1 mine; output, 12,699 tons; 32 employees. Etowah County, 2 mines; output, 9,378 tons; 30 employees. Jefferson County, 41 mines; output, 4,150,379 tons; 6,758 employees. Marion County, 1 mine; output, 17,395 tons; 95 employees. Shelby county, 9 mines; output, 343,213 tons; 435 employees. St. Clair County, 2 mines; output, 52,252 tons; 143 employees. Tuskaloosa County, 6 mines; output, 209,749 tons; 709 employees. Walker County, 18 mines; output, 904,179 tons; 2,134 employees. Total to date, 86 mines; output, 6,613,256 tons; employees, 11,529. The complete figures may show a total of 7,500,000 tons. It is believed that with no accidents or strikes the output during 1900 will be about 10,000,000 tons. Republic Steel and Iron Company will be a big producer.

The Ivey Coal and Coke Company, which has mines at Horse Creek, in Walker County, will probably increase its production when the Louisville & Nashville and Southern Railway systems run into its locality.

Tennessee Coal, Iron and Railroad Company.—This company produced in 1899 3,024,681 tons of coal, 2,470,866 tons of which were mined in Jefferson County. The other 553,825 tons were mined in Bibb County.

ALASKA.

Dougllass Island.

Alaska Treadwell.—The December report is as follows: 27,092 tons ore crushed of a value of \$33,360, and 513 tons sulphurets of a value of \$14,379. Gross receipts were \$52,054 and expenses \$32,173. The ore averaged 1.95 per ton. One of the mills ran only 5 days and the stamps of both have been hung up because of the cold weather.

ARIZONA.

Cochise County.

Copper Belle Mining Company.—The shipments of ore, made from this company's mine in the Turquoise District, near Pearce, to the El Paso Smelter, have been returned as follows: No. 1, 40,320 lbs. ore, 13.5% copper and 1 oz. silver to the ton. Net value, \$31.28 per ton. No. 2, 55,350 lbs., 6.9% copper and 2.2 oz. silver to the ton. Net value, \$15.54 per ton. No. 3, 37,100 lbs., 10.9% copper and 1 oz. silver. Net value, \$24.29 to the ton.

Graham County.

Arizona Copper Company, Limited.—The directors have received a cable message from Clifton that the production for the month of January was 875 tons of copper.

Yavapai County.

United Verde Copper Company.—The Appellate division of the Supreme Court last week handed down a decision restraining United States Senator William A. Clark, of Montana, from selling the mines and other property belonging to the corporation. As the sale took place on January 9th, a month before the decision of the Appellate division was handed down, the ruling seems practically valueless.

CALIFORNIA.

Amador County.

(From Our Special Correspondent.)

Amador Queen No. 2.—The shaft at this mine, near Jackson, is down 1,050 ft., and sinking progresses at from 7 to 15 ft. per week, according to the hardness of the rock. Drifting will begin at the 1,200-ft. Within the past 2 years the mine has produced over and above expenses, about \$500,000. J. R. Phillips is superintendent.

Keystone.—Over 100 men are employed at this mine, at Amador City, and 2 Griffin mills and 40 stamps are crushing ore. The high grade ore is not yet exhausted.

Calaveras County.

(From Our Special Correspondent.)

Sheep Ranch.—This mine, 12 miles northeast from San Andreas, is again in successful operation. There is a new 20-stamp mill on the property.

Kern County.

(From Our Special Correspondent.)

King Solomon.—The shaft on this property, which lies between Randsburg and Johannesburg, is down 500 ft. and good ore is being stopped.

Rustler & San Diego.—This group of mines $\frac{3}{4}$ of a mile from Randsburg, near the Olympus Mine, has reached a depth of 100 ft. and shows ore resembling that from the Yellow Aster Mine.

Val Verde.—This mine, near Randsburg, has been leased to Wilson, Hammond & Company. There is some good ore on the dump. The last mill run averaged over \$15 per ton.

Yellow Aster.—In the new well being sunk, 8 miles northwest from Randsburg, water is coming so fast that new pumps will be put in in order to permit deeper sinking. The company will have water enough to run double the number of stamps.

Nevada County.

(From Our Special Correspondent.)

Hudson.—The shaft at this mine in the Nevada City district has been cleaned out and repaired down to the water level. The mill has also been repaired and a new concentrator and pump put in.

La Suerte.—The incline shaft at this mine, formerly known as the Kirkham, 2 miles northwest from Nevada City, is down 100 ft., and drifting has begun. The ledge, which has been uncovered for 160 ft., shows free gold, said to average \$20 per ton.

Surveys are being made by F. M. Miller and W. F. Englebright, to determine whether the W. Y. O. D. Mining Company, of Grass Valley, now incorporated as the Grass Valley Exploration Company, has crossed the line and encroached upon the property of the Pennsylvania Mining Company. Both of the companies have engaged attorneys.

San Bernardino County.

(From Our Special Correspondent.)

It is reported that Monhan & Murphy have contracted for the erection of a smelter at The Needles. The capacity will be 120 tons.

Desert Chemical Company.—This company has made arrangements to erect a lixiviation plant with a capacity of 300 tons per day, at Copper City, to treat ore in that vicinity.

San Joaquin County.

(From Our Special Correspondent.)

R. G. Hanford is arranging to transfer the 2 dredgers at Folsom to the 577 acres of placer land, which lie along the south bank of the Mokelumne River in the northwestern part of this county. This property was purchased by a San Francisco company for about \$50,000.

The dredger "Brittania," built at Stockton, began work February 5th, on the Government contract of removing 125,000 cu. yds. of material from the Stockton channel, and 10,000 cu. yds. from the Mormon channel. The dredger is the largest in the State, and is capable of excavating over 300 yds. an hour, moving the material 200 ft.

Shasta County.

(From Our Special Correspondent.)

Swasey Ranch.—Several gold-bearing ledges have been opened up on this patented ground, southwest from Shasta. Considerable work has been done on 3 strong ledges, which assay from \$3 to \$15 per ton. The property adjoins the Thompson Mine.

Siskiyou County.

(From Our Special Correspondent.)

Knownothing.—This mine, on Knownothing Creek, 8 miles southeast from Forks of Salmon, has been purchased by Geo. W. Grayson, who has men at work. The old workings consist of 3 tunnels. The vein, 18in. wide, was lost several years ago.

Tuolumne County.

(From Our Special Correspondent.)

Bonanza.—The dump on Piety Hill is being hauled to the mill and crushed. The property has produced over \$1,000,000.

Buchanan.—The work of draining the old workings of this mine, 12 miles southeast from Sonora, is progressing rapidly. The tunnel will tap the water below the 200 ft. level. The management hope to have the mine in condition to continue the new shaft by April 1st.

Densmore.—The sale of this property, 2 miles from Parrot's Ferry, to H. G. Dodds, of San Francisco, has been closed, and a payment of \$20,000 has been made. The shaft is down over 225 ft. in ore rich in free gold and sulphurets. The vein is about 10 ft. wide. One of the conditions is that no ore shall be milled until the final payment is made. One of the ore shoots has been reserved by the sellers, Messrs. Fischer, Littlefield & Company.

Eleanor.—The pay shoot at this mine, $\frac{1}{2}$ mile north from Tuttle town, was found in the crosscut. The vein cut was large, carrying a small quantity of free gold and about 30% of sulphurets, valued at \$300 per ton. Geo. Bowen is superintendent.

Gagnere.—The new shaft at this mine at Tuttle town is now passing through the old stopes. Robert Long is superintendent.

Longfellow.—The Glasgow Company, which owns and works this mine, on the north side of Big Oak Flat, contemplates increasing its milling capacity, and the erection of a cyanide and canvas plant on the property. A. P. Dron is manager.

Marryatt.—A new shaft is being sunk on the extension of this mine at Tuttle town, and an air compressor and hoist will be put in. The pumps have been running in the old shaft to keep it dry. The 20-stamp mill has been running on custom ore for some time.

Mount Hood.—This property, near the Rawhide Mine, is developed by a San Francisco company, under the management of Joseph

Morris. The 6-ft. vein shows some rich quartz stringers at a depth of 20 ft.

Patterson.—This mine, ½ mile west from Tuttle-town, is reported sold to A. E. Davis, C. Fitzgerald and W. McGinn, who will continue the shaft down to the 1,000-ft. level. The property has been closed down for some years.

COLORADO.

Clear Creek County.

(From Our Special Correspondent.)

Little Richard Mining Company.—The shaft house has been destroyed by fire and the machinery, including compressor, hoist and boiler, damaged. The loss is \$3,500, with insurance of \$1,500. The shaft house is being rebuilt.

Perkins Tunnel Company.—Crosscutting on this property at Idaho Springs is at a standstill until the return of Manager C. J. Stubbs from France.

Tropic Mining Company.—Contracts have been let for raising on this vein in the Newhouse Tunnel. It is the intention to also sink and connect the surface and tunnel blocks. The vein is about 12 ft. wide, showing fully 10 ft. of ore from the surface to 2,000 ft. below.

Princess of India Tunnel Company.—Work has resumed at Lawson and, it is claimed, will go on to the Joe Reynolds and other mines. The owners claim they are to put in a power plant.

Cavode Company.—This company has been reorganized to work the property at Empire. A compressor has been installed and it is intended to drive the tunnel to some of the known veins ahead.

Massachusetts Mining Company.—This company, working the Freeland Extension Mine at Idaho Springs, is sinking the shaft with 3 shifts.

Gilpin County.

(From Our Special Correspondent.)

Ore Shipments.—During January there were shipped 269 cars, or 4,977 tons of ore, showing a slight increase over January, 1899.

Mining Deeds and Transfers.—E. S. Perrin to J. B. Phillips, Rosebud lode; S. J. Habegger to J. E. Day, 1/6 interest in Ideal, Klondike and Denver lodes; C. Rarden to C. R. Baer, ½ interest in 4-11-44 lode; L. J. Moulton to J. C. McCormack, the Jack lode; R. Hazelwood to H. J. Hawley, 1/10 interest of 120 ft. on Nimrod lode and 1/10 interest of 1,000 ft. on French lode; C. T. McElhinney to E. J. Adams, the Keystone lode claim; J. C. Nelson to J. J. Sams, the General Logan lode; and Henry P. Waterman to the Kansas-Burroughs Consolidated Mining Company, 150 ft. on Kansas lode, consideration \$1,750.

Colorado-California Mining and Milling Company.—This company's capital stock is \$350,000, with offices in Denver and Des Moines, Ia. The incorporators are: J. G. Berryhill, W. O. Finkbine, E. C. Finkbine, L. Harback, W. H. and W. A. Welch and L. Ward Bannister. The company is working the Crown Point & Virginia near Russell Gulch and will mine in other counties and in California.

East Boston Gold Mining and Milling Company.—This company, with capital stock of \$500,000, with offices in Boston and Central City, incorporators W. H. Stimpson, A. R. Hahn and Elisha Thayer, has been formed to work the East Boston Mine near Central City.

Fisk.—Connection with the Bobtail workings has unwatered the property and ore is coming from the lower levels.

Golden Gate Leasing Company.—This pool has struck a crevice of ore assaying 3.7 oz. gold with proportionate values of silver and copper, at 70 ft. in its Golden Gate claim. J. Carlos, Central City, is manager.

Hillhouse.—A good strike of peacock iron has been made in the 450 ft. east level, giving assay values of \$100 per ton, and shipments will soon begin. F. A. Rice of Russell Gulch, Colo., is manager.

Kansas-Burroughs Consolidated Mining Company.—During January this company shipped 4,157 tons for treatment, all but 70 tons of which was milling or concentrating ores. The company is testing its low grade ores at concentrating plants. Employment is given to 170 men. Pat McCann, Central City, is manager.

Notaway Gold and Copper Mining Company.—Manager A. J. Vivian of Central City reports finding the lost vein on the 400 ft. level, which carries better values than in the 200 ft. The last smelting ore went \$50 per ton.

Whitcomb Mill.—This 25-stamp mill at Nevada ville burned down on February 9th. It had been idle for several years and was owned by the Vendome Gold Mining Company.

Ouray County.

(From Our Special Correspondent.)

American-Nettie.—The contract for the new mill has been let to Denver parties, and work has started.

Camp Bird Mines and Mills Company.—A new cyanide mill is being erected for treating the tailings, and J. L. Murphy is constructing 6 immense tanks.

Ouray Electric Power and Light Company.—A contract was signed February 8th for a dam just below Bear Creek Falls. About 350,000 ft. of timber will be used for the dam, which will be 100 ft. high and 80 ft. wide.

Queen of Ouray.—In this abandoned claim a streak 8 in. wide was found February 5th by Prevost & Stevens, which gives very rich returns in silver and 40 to 50% lead. Much excitement prevails, and preparations are being made to work numerous contiguous properties.

Treasury Tunnel Mining and Reduction Company.—Work is pushed, the tunnel being in 10,000 ft. During January it was driven 247 ft., the best month's record yet.

San Juan County.

(From Our Special Correspondent.)

Copper King.—Bunce & Reedy have encountered a body of rich copper ore at Red Mountain, and are preparing to begin shipments.

Iowa Gold Mining and Milling Company.—At a special meeting on January 29th, the capital stock was increased from 100,000 to 1,666,667 shares, for the purpose of purchasing the properties of the Tiger Company, the purchase following immediately. At the same meeting officers were elected as follows: G. H. Stolber, president; R. W. Watson, vice-president, and manager; J. H. Robin, secretary-treasurer.

San Miguel County.

(From An Occasional Correspondent.)

Silver Pick.—It is learned from reliable sources that a big strike has been made in this mine in the Mt. Wilson District. During the smelter strike last summer Supt. Mason began exploring a vein on the Tam o' Shanter claim, where surface showings were so favorable that large contracts for opening up the vein were let. At least \$300,000 worth of ore is now in sight and further contracts have been let. The ore yields from 4 to 12 oz. gold per ton, principally free-milling. In addition there is silver, copper and lead that will add from \$10 to \$25 per ton. The old Silver Pick is by no means exhausted, but this great vein will make it again one of the leading shippers of the county.

Teller County—Cripple Creek.

(From Our Special Correspondent.)

Alert Gold Mining Company.—A strike of considerable importance is reported on the Kalamazoo claim, recently acquired on Bull Hill, near the Pharmacist.

Anaconda Gold Mining Company.—Something appears to be up in Anaconda. A great number of rumors are afloat as to what it is. It seems to be a pretty well established fact that the control has gone out of the hands of the Moffat people but it is not known to whom it has gone. The stock has scored a heavy advance during the year and a large amount has been sold.

Nugget Gold Mining Company.—This company has filed a suit against the Doctor & Chief Mining and Leasing Company, and the Advance Gold Mining Company. The Nugget Company asks that these companies be enjoined from taking ore from the ground covered by the extralateral rights of the Elizabeth Cooper claim of this company and also asks for \$300,000 damages. This suit is another step in the legal tangle on Raven Hill. Manager Hobbs, of the Nugget, has a number of men at work opening up the apex of the vein. It is understood that the suit will be tried very soon. It is thought by quite a number of mining men in a position to know that the Nugget has a very good chance to win.

Portland Gold Mining Company.—The annual meeting of the stockholders of this company was held the early part of the week in Council Bluffs, Ia., and the following directors elected for the ensuing year: J. F. Burns, F. G. Peck, Irving Howbert, W. S. Stratton and John Harner. Mr. Burns was chosen president, Mr. Howbert vice-president and Mr. Peck secretary and treasurer. The official reports of the officers of the company were well received and show the affairs of the company to be in excellent shape. The amount of work done during the year amounted to 4,072 ft. of shaft winze and upraise, 176 ft. of tunnelling and 16,814 ft. of drifting and crosscutting, making a total of 21,062 ft. of development work, as well as 43,744 sq. ft. of stoping and 1,719 ft. of surface trenching; \$1,951,219 worth of ore was taken out during the year and \$720,000 was paid in dividends; \$216,547 for new property and the cash in the treasury on the first of the year amounted to \$602,672. The total receipts of the company including sales of ore and royalties, amounted to \$1,972,378. The total expenditures amounted to \$1,101,471, leaving a net profit for the year of \$870,907. The law suit between this company and the Strong is about in the same condition as it was a year ago. The total amount of ore produced by the company since April 1st, 1894, to Dec. 31st, 1899, is 148,140 tons of the value of \$3,378,733. The tonnage for the years are as follows: April 1st to Dec. 31st, 1894, 7,826 tons, value \$553,976; 1895, 31,516 tons, value \$1,700,095; 1896, 23,598 tons, value \$1,116,128;

1897, 18,852 tons, value \$1,177,642; 1898, 37,799 tons, value \$1,879,682; 1899, 38,548 tons, value \$1,951,219.

Roxanna.—The injunction against the Doctor people asked was denied by Judge Hallett in the United States Court and also a motion for a rehearing. This seems to knock out the Roxanna as far as the Doctor is concerned, thus rendering somewhat less complicated the Raven Hill muddle.

Specimen Gold Mining Company.—At the annual meeting the following directors were elected: D. Chisholm, vice-president; Ward Hunt, second vice-president; John J. Key, secretary and treasurer, and B. N. Beal assistant secretary and treasurer. The number of directors was reduced from 7 to 5. The official reports show that \$26 tons of ore of the gross value of \$35,000 was mined during the year. The property at present is worked by 2 main leases, the Joint shaft and the Pratt shaft. Cash in the treasury at present amounts to \$1,125. The company owns the Specimen lode on Bull Hill, crossing the Union Company's property.

Spicer.—Michigan capitalists have obtained a bond and lease on this claim which is situated in the town of Victor. This comprises about 7 acres and the bond and lease runs for 18 months. The amount of the bond is given as \$125,000. The ground is close to that recently acquired by the Mary Cashen Company. Mr. Lute Johnson, of Cripple Creek, represents the Michigan people.

Work Mining and Milling Company.—The large new working shaft on the Woods lease on the Morning Glory claims of this company is steadily going down and is now over 500 ft. The shaft is a three compartment one and is well timbered. The plant consists of a double geared hoist bought from the Mine and Smelter Supply Company, of Denver. The cylinders are 12 by 14 in. The work is done with air drills, the power being furnished by a 4-drill Ingersoll-Sergeant compressor. A crosshead is used with the bucket. A large shaft-house, boiler room and blacksmith shop have also been erected. On the whole this plant is quite an ornament to that part of Raven Hill where it is situated. The Woods people have a three years' lease on a part of this company's property and one for the same length of time on Rose Maud claim adjoining. It is the intention to work this claim through the latter shaft.

FLORIDA.

(From Our Special Correspondent.)

Phosphate Industry.—The output of rock in 1899 was 680,356 tons, compared with 554,218 tons in 1898. Investors and promoters have repeatedly suggested schemes of consolidation, and wondered why such an apparently satisfactory solution should not be effected. But they all display a lack of knowledge of the actual state of the industry. Plans which would probably work admirably under certain conditions appear ludicrous to the experienced Florida miner. He has upon several occasions been led into various mutual agreements to come out worse off in the end. An industry controlled and operated by a cosmopolitan class of miners and brokers, and where the miner, the broker and the European agents may be equally interested in one another's affairs cannot be handled harmoniously by mutual agreements.

At present 3 syndicates are endeavoring to control the large mines of the Florida hardrock region. Should any one of these 3 companies succeed, there may be better prices and no overproduction. One of these companies is the Central Phosphate Company, of Paris, France; one is reported to be the Virginia-Carolina Chemical Company, which last year was accredited with assuming control of the Dunnellon Phosphate Company, and the Peace River Phosphate Mining Company. The third syndicate is reported to be a New York concern, with very strong backing. The miners enjoyed a very good year during 1899, but this was due largely to the small stocks left from the previous year, about 10,000 tons, which were unexpected to the brokers, and to the fertilizer men in Europe, who probably expected a much larger production and were caught short. The stocks left over in 1897 were 50,000 tons.

MAINE.

Rockland County.

Rockland & Rockport Lime Company.—This company, with authorized capital of \$2,000,000, has taken over lime properties. The directorate is as follows: Fred E. Richards, Portland; Robert Winsor and Alfred Winsor, Boston; A. F. Crockett, Rockland; H. L. Shepherd, Rockport; Henry H. Skinner, Springfield, Mass. Ex-Governor Henry B. Cleaves, Portland. The officers chosen are Mr. Richards, president; Joseph Remick, of Boston, treasurer. The property acquired by the new corporation is the Cobb Lime Company; the properties owned and controlled by the A. F. Crockett Company; ¼ of the Williams quarry; Ulmer quarry; Bartlett quarries; Lime Rock Railroad Company; S. E. and H. L. Shepherd Company, Rockport, and ½ the capital stock of the Rockport Railroad.

MICHIGAN.
Copper.

Baltic Mining Company.—This company has let a contract to the Milwaukee Bridge Company at \$55,000 for steel structure of new 4-stamp mill at mouth of the Salmon Trout River, Lake Superior, opposite mill of the Atlantic Company. Cost of grading, foundations, etc., will bring net cost of mill to about \$85,000, exclusive of machinery. All four stamps will probably be erected with necessary jigs, etc., as soon as mill is completed, which should be about the end of the year, barring accidents.

Iron—Marquette Range.

Starr West.—Corrigan, McKinney & Company, of Cleveland, O., are mining ore at this mine on the Cascade Range near Palmer. Harry Whitburn is in charge.

Iron—Menominee Range.

Oliver Mining Company.—This company is to change the course of Iron River to get at ore opened in the Riverton and Dober shafts, near Iron River. A new channel 40 ft. wide and 2,300 long is being opened, but will not be finished for fully 5 months.

MINNESOTA.

(From Our Special Correspondent.)

The annual meetings of the various companies associated under the Lake Superior Consolidated Iron Mines, at Duluth, resulted in the re-election generally of the old officers and directors. For the Consolidated company itself these were chosen: F. T. Gates, New York, president; C. H. Rogers, New York, vice-president; C. E. Schiede, New York, treasurer; W. J. Olcott, Duluth, superintendent of mines. For Duluth, Missabe & Northern road the officers are: F. T. Gates, president; W. J. Olcott, vice-president and manager; S. R. Payne, secretary; E. S. Kempton, treasurer; G. W. Murray, New York, general counsel; J. B. Cotton, attorney. For the Mountain Iron, Missabe Mountain Iron, Biwabik Mountain Iron, Rathbun, Adams, Great Northern, Great Western, Shaw, Wahkootah, Missabe & Northern, and Consolidated Missabe iron companies the officers are: W. J. Olcott, president; J. B. Cotton, vice-president; G. D. Swift, secretary. J. B. Cotton is also managing director for the Bessemer Steamship Company, of Minnesota.

The Oliver Iron Mining Company has opened a general office in Duluth, with Mr. Powell, late of the Dunn Iron Mining Company, in charge. The Pittsburg Steamship Company will also be managed from this office, so far as the insurance and loading of its ships are concerned.

Sales of Mesabi ores are made from week to week, to an extent that makes it probable that by the opening of navigation little will be left unsold of the assured output of mines now open. But there will be, if nothing unexpected occurs, a number of mines with a larger output than they are at present willing to sell, as well as mines not yet open that hope to ship from a few thousand to 50,000 tons this year.

Iron—Mesabi Range.

(From Our Special Correspondent.)

Explorations.—M. L. Fay is drilling on State 40 in section 6, T. 58, R. 17, where he has 6 holes in ore just west of the Alpena. Fay has a 50-year lease from the State. W. C. Yawkey is exploring lands in sections 1, 2, 11 and 12, T. 57, R. 18, just southwest from Eveleth. Two drills are working there, and a third will be set up as soon as it can be had. Explorations will be carried out in lands in section 2, T. 58, R. 17, west of Biwabik. The Oliver Company is working drills on lands near the center of T. 58, R. 19, where it has several leases and options. The same company has 2 drills working in section 10, T. 58, R. 18, close to Mountain Iron.

American Mining Company.—This company, the mining branch of the American Steel and Wire Company, is opening the Clark Mine, 3 miles east of Hibbing, and expects to ship 100,000 tons this year. The ore carries a 25c. royalty, to M. J. Clark, of Grand Rapids, Mich., and has an additional charge of about 1½c. a ton to the recent option holders, Roberts and others. Capts. Thomas and Goldsworthy, formerly of the Chandler, have resigned to take charge of the Clark. The American Mining Company has decided that it can use 500,000 tons of its Saunty and Alpena the present year and is preparing to mine that much. It will also get 100,000 tons from Sellers, under a contract from the purchase of the Shoebarger and Spear works. This will give the company 700,000 tons of Mesabi ores for 1900. The company has bought 100,000 tons of Brotherton at \$5.50 and will get 200,000 tons more Gogebic ore at about the same price. Its own Negaunee mine will give it 200,000 tons, and its new properties on the Menominee some, so that most of its ore will come from its own mines. Nearly all of this will probably be carried in its ships by the American Steamship Company, placing the company in a pretty independent position.

Republic Iron and Steel Company.—This company is exploring some options lately taken, and

will probably increase its holdings of ore property around Virginia.

P. L. Kimberly has 3 40-acre tracts north of the Republic mines that are now under option for a very large sum. Explorations are starting a few miles west of Eveleth. The State has a large acreage in that vicinity on which there is supposed to be some ore.

Stevenson.—At this property a working shaft 8 by 16 ft. (3 compartments), has reached the ore at a depth of 50 ft. It will be sunk in one level, 50 ft., and drifts run at once. A considerable stockpile will be on surface by the opening of navigation.

MISSOURI.

Jasper County.

(From Our Special Correspondent.)

Joplin Ore Market.—There was an excellent output of ore, considering the severe weather, and good demand. Some ore yet remains in the bins and some of the producers of high grade zinc ore are holding for better prices. On account of the surplus buyers have been able to pick up what ore they needed at prices slightly below the 7 to 1 scale adopted several months ago.

The corresponding week last year was very cold, and much of the ore was frozen in the bins and had to be blasted out. The output was the smallest for 10 years, but the prices were the highest known till then, top grade zinc ore selling for \$45 per ton, and lead at \$27 per 1,000 lbs. The turn-in was less than last week by 5,200,150 lbs. of zinc and 468,560 lbs. of lead, and the value was less by \$72,663. For the first 6 weeks last year the turn-in was less than this year by 3,484,720 lbs. of zinc and 1,072,650 lbs. of lead, and the value was less by \$81,133. As compared with the previous week the lead sales were greater by 113,020 lbs., but the zinc sales were less by 895,770 lbs., and the value was less by \$3,580. The Colonial Zinc Company, at Belleville, sold its output at \$34.50 per ton, the ore from Neck City sold at \$33.50 and the Oronogo ore sold at \$33 per ton. Following is the turn-in by camps:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin.....	1,366,650	507,770	\$35,272
Cartersville.....	1,481,500	208,290	28,003
Webb City.....	455,690	32,390	7,318
Oronogo.....	821,710	.....	12,437
Belleville.....	359,290	18,160	6,028
South Jackson.....	93,710	8,720	1,474
Central City.....	137,730	10,770	2,217
Duenweg.....	208,950	21,010	3,404
Carthage.....	156,940	.....	2,249
Aurora.....	1,169,000	9,580	17,264
Stotts City.....	288,330	.....	4,618
Neck City.....	126,510	.....	2,119
Alba.....	.....	44,490	634
Lehigh.....	72,780	.....	1,143
Granby.....	342,000	9,000	4,600
Cave Springs.....	23,890	4,270	449
Galena Empire.....	1,704,230	179,180	.....
District total....	9,265,806	970,080	\$167,842
Total 6 weeks	57,465,920	6,225,170	\$1,027,312

Mining Land Sales.—The Blue Goose Mine and Idaho lease at Tuckahoe have been sold to Davie & Company, of Colorado Springs, for \$30,000. Corwin H. Spencer, of St. Louis, has purchased of Byron Ash, of Carthage, a 4-16 undivided interest in 80 shares of mineral land, 2 miles east of Joplin, for \$6,000. George McCullagh, of Galena, has sold his 34-acre lease and 2 mills for \$140,000. Franklyn Greenwood, of Joplin, has sold his 5-acre lease between Leadville and Chitwood Hollows, west of Joplin, to E. Z. Wollower, of Harrisburg, Pa., and others, who form the Jackdaw Mining Company, for \$10,000. C. E. Ayres, of Parkersburg, W. Va., has bought a 40-acre lease and fee near Lehigh, for \$22,000. Brintzler & Hodge, of Decatur, Ill., are the new owners of the Tyler & Chapman mines. George H. Redell and Chris. Steinbach, of Joplin, have sold the Mascot Mine to C. S. Hayden, W. W. Slocum and A. S. Burnett, of Des Moines, Ia., for \$20,000.

The following new companies have been incorporated: Duluth Zinc Company, Duluth, Minn., capital stock \$100,000; incorporators, A. R. Wolvin, W. Ames, C. F. Leland and F. E. Searle. The Colorado Zinc and Lead Mining Company, capital \$100,000; incorporators, H. M. Corvin, T. M. Miles, R. F. Clark, J. N. Rogers and J. W. Dickelman, all of Denver, Colo. The Little David Mining Company, capital \$25,000; incorporators, J. C. Harvey, Kirkwood, Mo.; J. E. Hereford, Ferguson, Mo., and ex-Congressman J. R. Waddill, of St. Louis. The Federal Zinc and Lead Company, capital \$150,000; incorporators, H. K. Green, J. M. Marsh, A. Case, S. Clark, G. F. Nash and others. Sutton Mining Company, incorporated at Augusta, Me., capital \$1,000,000; incorporators, A. C. Burnett, G. A. Browlett, L. E. Chester and J. W. Jackson, of Boston; C. S. Beatty, Belmont, Mass.; R. W. Babson, Gloucester, Mass., and R. Kimball, of Ipswich, Mass.

The Old Colony Zinc and Smelting Company has filed evidence of its incorporation under the laws of West Virginia, with a capital stock of \$1,100,000. The office and headquarters will be in Kansas City. The company owns 237 acres of land at Neck City, 37 acres being under development, the Arkansas Mine and 100-ton mill on

the ground of the Missouri Zinc Fields Company at Cartersville, and is just completing 2 new mills on the Southside ground at Galena, Kan.

Washington County.

(From an Occasional Correspondent.)

Renault Lead Company.—This company has taken a new lease of life under the present aggressive administration. The magnificent estate is of over 10,000 acres and an active shipper of lead, with a promising future.

MONTANA.

Broadwater County.

(From Our Special Correspondent.)

East Pacific.—This Winston property has been closed down by a strike, which involves all the miners and machinery men.

Jefferson County.

Basin & Bay State Mining Company.—James and Alexander Glass have brought suit against this company, owning the Katie Mine, to recover 1,400 shares of stock held by the company, and for the appointment of a receiver.

Montana Leasing and Mining Company.—This company, composed of Montana and Eastern men, has acquired an old mine at Lump Gulch, and will reopen it. John W. Fulton, of Helena, represents the Eastern parties.

Lewis & Clarke County.

(From Our Special Correspondent.)

Columbia Gold Mining Company.—About 40 men are employed on the properties of this company at York. The claims producing are the Little Dandy, Golding, Messenger and the Columbia. The ore is milled at the Dandy 10-stamp mill. Duluth, Minn., parties bought the properties last fall and organized under the above name.

Howard.—Shelton & Lowe are working this property in the lime belt 2 miles from Helena. The ore body is small, but rich in gold and occurs as an irregular pipe.

Old Amber.—This property at York is again worked by the Eastern Company who purchased it 3 years ago. It is in charge of Tom Travis, who has 2 of the Huntington Mill working on a new field of m.ling ore. If the tests are satisfactory ample capital is ready to put mill and mines on a solid footing.

Poorman.—This property in the Stumple District, 30 miles north of Helena, has closed down owing to the great volume of water encountered. Ben Webster, of Helena, has it under bond.

U Bet.—James Allen has on exhibition some very rich specimens of free gold ore from this claim, 2 miles from Helena, in the dolomite belt.

Madison County.

Madison Canyon Electric Light and Power Company.—The principal stockholders in this company are A. W. Maibly, of Chicago; Robert Campbell and O. B. Suhr, of St. Louis; L. L. Nunn, of Telluride, Colo., and John F. Cowan. The company has a big dam at Madison canyon, a few miles above Norris, and intends ultimately to put in a plant, furnishing the Madison Mine, Revenue mines, Red Bluff, Norris, Pony, Sand Creek and ultimately Butte with electric power. The coming spring, it is stated, the company will install a plant of 1,000 H.P. for immediate use. An alternating current of 20,000 volts will be used.

(From Our Special Correspondent.)

Alaska.—This Bear Gulch property, owned by Gov. Pollinger, has been bonded by T. D. Hinds, of Butte. The ore is copper, with good values in gold and silver. Developments are promising.

Grouse.—This property, under lease and bond to Wm. Owsley & Company, of Twin Bridges, is keeping 2 4-horse hauling to the smelter.

Lake Shore Mining Company.—President E. L. Shafney, of Cleveland, who has been inspecting their property on Wisconsin Creek, 7 miles from Sheridan, has said that the intention is to build a 20-stamp mill in the spring. He was much pleased with the property.

Mountain View.—This property, in Tidal Wave District, under the management of Ed Baxter for the Johnson Brothers, of Butte, is situated 7 miles from Twin Bridges. Several cars of high grade copper ore are on the dump. A wagon road will be built to the mine, and regular shipments made to the Butte Reduction Works.

Twin Brides Smelter.—These works are to start running again by February 15th, is said, with the intention to keep going. W. E. Terhune, of Salt Lake, will succeed Tom Graves as foreman, under Wm. Owsley, general superintendent. Ore is coming in quite freely, and there are fully 3,000 tons in the bins. Several changes have been made recently, one in the method of disposing of the lead fumes and another in handling the slag from the furnace, all tending to reduce the cost of operation.

Missoula County.

Copper Bell Mining and Milling Company.—This company has been recently incorporated at

Spokane, Wash., with a capital stock of \$2,500,000. It proposes to develop copper claims in the Wallace District, east of Missoula. The company controls 9 claims back of Clinton. The officers are: President, H. M. Benjamin, of Milwaukee, Wis.; vice-president, W. D. Carrick, of Milwaukee; secretary, Joseph Shrek, of Milwaukee; general manager, W. M. Williams, of Milwaukee; resident agent, W. P. Ketcham, of Missoula. General Manager Williams promoted the organization of the company.

NEW JERSEY. Morris County.

Copperas.—The Carteret Steel Company is opening this iron mine on Copperas Mountain, near Marcella, that has been idle 15 years. A large amount of money has been spent in improvements. It is said that preparations are underway for an output of 1,000 tons daily, much of which will go to the furnace at Hackettstown.

NEW MEXICO. Santa Fe County.

Silver Bar Copper Mining Company.—This concern, with P. McCreery manager, is working the old Cooney Mine at Cooney. A 5-stamp mill and 2 Frue vanners are used. The high grade ore is sacked and shipped direct to the Silver City Reduction Works. The output is about 50 tons monthly.

NORTH CAROLINA.

Cabarrus County.

(From Our Special Correspondent.)

Union.—At this copper mine several hundred men are employed taking out ore for the concentrating plant, which is nearing completion. Earl C. Bacon of New York is erecting the plant.

PENNSYLVANIA.

Anthraccite Coal.

Delaware Valley & Kingston Railroad.—The railroad commissioners of New York State are still giving hearings to those who are in favor of or opposed to the construction of this road along the Delaware & Hudson Canal. Much of the testimony is very contradictory.

Bituminous Coal.

Labor Troubles.—Fully 3,000 miners in the Barnesboro, Spangler and Hastings Districts struck for an immediate advance in wages on February 10th, refusing to wait until April 1st, the limit set by the Indianapolis convention. The strike was of very short duration, the officials of the United Mine Workers calling it off next day.

SOUTH DAKOTA.

Custer County.

(From Our Special Correspondent.)

Grand Junction.—This mine is being developed under bond to Eastern parties. The ore body is one of the largest in Custer County.

Black Hills Fort Reserve.—A division of the forest surveyors is soon to make a careful examination of the standing timber in the Black Hills forest reserve. An estimate of the life timber will be made, its growth, and plans will be made for meeting the demands of the people without exhausting the supply.

Lawrence County.

(From Our Special Correspondent.)

Bingham.—It is stated that John Pierce, of Sioux City, has bonded the Bingham Mine, owned by Tom Hart and associates, of Lead and Deadwood. There is one claim and a fraction immediately north of the Grantz ground, in North Lead Mining District. A tunnel has been driven nearly 200 ft.

Boston-South Dakota.—At a meeting of the directors at Boston, it was decided to put in a cyanide annex at the old Minerva stamp mill, which is now running on ore from the Minerva-Guston mines. The company has enlarged the stamp mill to 40 stamps.

Champion.—Ore has been found in this mine, in Spruce Gulch, in a 200-ft. tunnel, on quartzite. From the upper ore contact, about 4,500 tons of ore were mined and milled, but the ore did not amalgamate. The mine is owned by the Highland Chief Mining Company.

Colorado & Deadwood Mining Company.—This company has elected John Harnan a director of the Portland Gold Mining Company, of Colorado Springs, as general manager of the Ironsides Mine, to succeed Frank A. Waters. Jesse Simmons, of the State School of Mines, has been appointed assayer for the company.

Dakota Maid.—James King has run a crosscut at the end of a 1,000 ft. tunnel. The crosscut is in ore, said to be well adapted to the cyanide process.

Garden City Cyanide Plant.—E. Faust and his son, of Lead, sold the Esmeralda Mine and Mill last week to a Boston party.

Gold Hill Mining Company.—This company, composed principally of Omaha men, is installing a steam hoist near the mouth of Johnson's Gulch, in Spearfish Canyon. The old shaft is being retimbered and enlarged to 2 compartments.

Highland Chief.—This company is retimbering the shaft in the new tunnel in Spruce Gulch. A body of ore 40 ft. wide was crosscut, but it was found to fault in the quartzite.

Homestake Company.—The steel piping for the water ditch on the Little Spearfish is arriving in carloads, and it is being delivered over the new Burlington spur. The heavy machinery is expected to begin to arrive next week. The company has sunk the Star shaft 1,030 ft., the deepest shaft in the Black Hills.

Manchester.—C. D. Wood, of Cripple Creek, Colo., has bonded this group of 8 claims at the head of Squaw Creek, 1 mile northeast of Crown Hill Station. The ground was until recently bonded by P. N. Hanson, of Minneapolis, who bought the Gushurst, lying south. Mr. Wood has also bonded 12 claims lying to the west of the Manchester group, making 18 claims in all. The Minneapolis parties spent considerable money in opening up some ore shoots on the Manchester.

Murray.—The Murray group of claims, on the west side of Poorman Gulch, 3,000 ft. from the Grantz Mine, has been bonded to W. G. Crabtree, of Iowa. The ground is to be patented.

Portland Companies.—The Portland, Clinton and Buxton Mining companies, of Clinton, Ia., have appointed George D. Waugh, formerly foreman, to act as general manager in the place of John Greenough, resigned. The Portland and Clinton companies are shipping 35 tons of ore to the cyanide plant in the First Ward of Deadwood and 40 tons of ore to the Golden Reward Smelter. An air compressor has been installed at the Decorah Mine.

Ragged Top Cyanide Plant.—The cyanide plant in Calamity Gulch, in the Ragged Top District, owned by Allen, Small and associates, is treating 15 tons daily of lime ores.

Two Bears.—This mine, the property of the Golden Reward Company, is being equipped with machinery from the Addie plant, and the lower workings are to be pumped out to determine the site for a new hoisting plant.

Union Hill.—Men are steadily at work on the different properties in Strawberry Gulch.

Pennington County.

(From Our Special Correspondent.)

Eldorado.—The machinery is about installed at this mine, near Hill City, which was recently bonded to 2 New York men.

UTAH.

(From Our Special Correspondent.)

Bullion and Ore Shipments.—During the week ending February 10th, the different smelters sent forward 24 cars, or 1,014,560 lbs. lead-silver bullion; 5 cars, or 266,877 lbs., copper bullion. In the same period there were shipped from the different camps 79 cars, or 3,125,910 lbs., ore and concentrate products to smelters outside of the State.

New Smelter Projects.—American Smelting and Refining Company is growing. Nearly every ore producer has a grievance or imagines one, and there is renewed talk of a large independent smeltery for Salt Lake Valley. Three separate moves toward this are under way.

Beaver County.

(From Our Special Correspondent.)

Horn Silver.—A test shipment of 500 tons 30% zinc ore is being made to Hamburg, Germany, via Galveston. Horn Silver zinc ores carry little or no lead, and in concentrating the low grades by Wilfleys a high zinc product can be cut out. Working force is 160 men; ore and concentrate shipments average 1,000 tons per month, of which 125 to 150 tons are high grade copper—over 20%. Exploration goes on at 1,100 and 1,600 levels, where signs favor the opening of copper ore bodies.

Juab County.

(From Our Special Correspondent.)

Tintic Shipments.—In the week of February 10th the shipments from the 3-rail points of the district were 105 cars of ore, 4 cars of concentrates and 2 bars of bullion, made up as follows: Centennial-Eureka, 35 cars; Swansea, 12 cars; Gemini, 11 cars; South Swansea, 9 cars; Bullion-Beck, 5 cars; Uncle Sam and Humbug, 5 cars; Mammoth, 4 cars ore, 4 cars concentrates and 2 bars bullion; Grand Central, 4 cars ore; Godiva, 3 cars; Carissa, 1 car; New Imperial, 1 car; Sunbeam, 1 car; Tintic Iron, 14 cars hematite for flux.

Bullion-Beck.—President-Manager Philo T. Farnsworth states that vigorous prospecting is inaugurated. The mill is to be reconstructed into a model concentrating plant.

Centennial-Eureka.—On February 9th the first loaded buckets passed over the Bleichert tram. The production of 100 tons per diem is more than maintained.

Eureka Hill.—On February 20th the stockholders meet in Salt Lake City to extend the life of the corporation. It is probable that the mill will go in commission again soon, and part of the ores will come from Gemini territory. The workings of the 2 mines are connected and the

personnel of the control is largely the same. Since the mill has been idle new bodies of second-class ore have been opened.

Mammoth.—On February 6th the annual meeting at Salt Lake City resulted in the following officers and directors being elected; Samuel McIntyre, president; Samuel McIntyre, Jr., vice-president and treasurer; R. M. Wilkinson, secretary; Thomas W. Jennings, W. W. Riter, J. R. Winder, Jr., James T. Donohue, directors.

Shoebridge Bonanza.—Col. Heffron reports cutting some fine copper ore. It is in the north drift from 450-level.

Yankee Consolidated.—The week's Tintic sensation was an ore body carrying good copper values—something out of the common for Godiva Hill. Assays from 9 to 33% copper were had.

Salt Lake County.

United States Mining Company.—At a special meeting on February 13th the stockholders ratified the financial plan adopted by the Pooling committee by a vote of 126,000 to 21,000. Treasurer Batchelder has issued a circular in which stockholders of record on February 13th are invited to subscribe for \$500,000 7% first mortgage gold bonds of an authorized issue of \$1,000,000. The balance of \$200,000 will remain in the treasury. The bonds are to become payable 10 years from the date of issue, or, at the option of the holder, to run 5 years longer, subject, however, to the right of the company to redeem all or any of the outstanding bonds at any time at 105, with interest.

(From Our Special Correspondent.)

Dalton & Lark.—The proposed transfer of a large part of the company's holdings to P. T. Farnsworth, et al., was ratified by more than 2-3 of all the shares. According to the terms of sale—\$300,000—the shares will go at 12c., double the current market price. Some minority holders are out in opposition, and plan to have a receiver appointed. Should the Farnsworth regime work these mines, the new company will be known as the Mascot.

Fortune.—Mill building is ready for the machinery, the first car-load being expected next week. Manager Hill hopes to have the mill in commission in April. There is a very large supply of concentrating ore awaiting treatment.

United States.—It is difficult to learn what is going on at the mines, though the miners talk of some important ore uncoverings. In January there were over 3,000 ft. of development done. There appears no doubt that the plan of reorganization, which Mr. Neill has been endeavoring to consummate in Boston, has been backstopped by lies sent from Utah.

Utah Consolidated.—Since February 1st the smelter has handled an average of 215 tons of ore a day. The fourth reverberatory will be ready by March 1st. There is nothing new from the mine.

Summit County.

(From Our Special Correspondent.)

Park City Shipments.—For the week ending February 10th the ore and concentrate products sent forward aggregate 4,625,630 lbs., contributed as follows: Daly-West, crude, 1,818,730 lbs.; concentrates, 259,380 lbs.; Silver King, crude, 1,429,340 lbs.; concentrates, 330,710 lbs.; Ontario, crude, 486,190 lbs.; Anchor, concentrates, 212,080 lbs.; Apex, crude, 89,200 lbs.

Daly.—Although there is nothing official or tangible on which to base it, the belief gains ground that at the annual meeting on February 20th directions will be given to resume work.

Daly-West.—Rarely is a mine turned over to a new management in finer physical condition than Daly-West on February 19th, when the officers for the current year will be selected. Manager Daly has kept every promise and more. The concentrating mill is doing work; its capacity is 130 tons daily.

Ontario.—In March the mine will have worked back, so far as general activity is concerned, where it was at the close-down in 1897. The coming season will establish a new record for ore tonnage for Park City.

Silver Key.—This 80-acre tract on the hill back of Silver King and next to the Apex and Crescent is being systematically explored.

Tooele County.

(From Our Special Correspondent.)

De La Mar's Mercur Mines.—Manager Cohen, who has been in the camp, avers that all the difficulties of the men are entirely overcome. The Jacking roasting furnace gives satisfaction and calls out many favorable comments.

Mercur.—President Dern was at Manning to witness the enlarged mill start. It will be some weeks before 600 tons per diem are treated.

WASHINGTON.

Ferry County.

(From Our Special Correspondent.)

Republic Consolidated Gold Mining and Milling Company.—About 3,500 sacks of first class ore await teams for haulage to the railroad at Myers Falls, and transportation to the Grand

Forks, B. C., smelter. Machinery for the new 200-stamp mill has been ordered from the East, but nothing can be learned at the company's office about the structure except that it will be built about 225 ft. southeast of the entrance to No. 4 tunnel. D. C. Jackling has charge of the mill experiments. Herbert W. Fox, formerly at the Golden Gate Mill, Mercur, Utah, has been for 2 or 3 months conducting various tests and will continue.

San Poil.—The south drift on No. 2 tunnel level is in 451 ft. After passing 40 or 50 ft. much broken vein stuff of very little value, the vein now shows 5 ft. of clean ore.

Tom Thumb.—A new shaft, expected to strike the vein at 400 ft., has been started 305 ft. east of the No. 2 shaft. The south drift on No. 2 level has run 150 ft. on the pay shoot, the ore surrounding the drift having an average value of about \$30 per ton. After the instalment of the steam hoist and pump, now in transit, development will be pushed.

Zala Consolidated Company, Limited.—A contract has been let to raise on the vein 170 ft. to the upper tunnel.

FOREIGN MINING NEWS.

CANADA.

British Columbia—West Kootenay District. (From Our Special Correspondent.)

In accordance with the circular recently issued by Edmund B. Kirby, manager of the War Eagle and Center Star mines, and addressed to the head office of both companies in Toronto, Ont., both mines have suspended production. According to Mr. Kirby, in the case of the War Eagle "The shortage of hoisting capacity, and of air for the machine drills made it impossible to maintain the tonnage and at the same time to keep up development. We have for months been mining from hand to mouth." With regard to the Center Star Mr. Kirby says: "The stoppage of War Eagle shipments makes it necessary also to suspend shipments from the Center Star, where equipment is only temporary, and was intended merely to bridge over the interval until new machinery and head works are in place. This new machinery has been delayed, while construction is being pressed against unusual difficulties. The new equipment will not be in place for several months. Both mines employed about 350 men and about 200 have been discharged. The remainder are retained on development."

Rosland Ore Shipments.—The shipments for January and the first 8 days of February amounted to 30,000 tons, valued at \$500,000 gross. This shows an increase of 24,000 tons over the corresponding period of 1899.

Le Roi.—The company is shipping about 2,500 tons weekly.

Suspension of Ore Shipments.—There were 25 drills in the War Eagle and 20 in the Center Star, but only 10 will be run by the War Eagle and 5 by the Center Star. The effect of this is to throw about 350 men out of work, while 200 will be retained to do development.

Ontario—Rainy Lake District.

(From Our Special Correspondent.)

A deposit of graphite, it is said, was cut through by the laborers on the grade of the Ontario & Rainy River road, east of the Sawbill, last week.

Foley.—This mine, now under an English corporation, will probably be managed by J. C. Foley, its original promoter and discoverer.

Golden Star.—This mine is now down 520 ft., and the mill is running quite steadily.

Gold Winner.—This company, in Sawbill District, is working a double shift, and has exposed the rich pay streak for several hundred feet. The dyke gives average results of over \$6, while the pay streak is thickly shot with visible gold in many places.

Hammond Reef.—This company has not started its 40-stamp mill owing to delays in getting in machinery.

Headlight Mining Company.—This company has started its 2-stamp Tremain mill, and is pushing development underground.

Scramble.—This mine, in Lake of the Woods District, has been taken by an English company, which will explore the ore body. It is regarded as a promising prospect.

COAL TRADE REVIEW

New York. Anthracite.

Feb. 16.

It is now too near spring to expect any great increase in the consumption of hard coal. Cold waves will bring out a certain amount of buying for immediate needs, storms may interfere with the movement of coal for a few days, but generally speaking the prophecy of a mild winter made in this column 6 weeks ago has been amply

fulfilled. For the next few months the anthracite trade is going to be quiet. The January production of 3,700,000 tons, though a trifle larger than some people expected, shows a big drop from December. Stocks, however, are likely to accumulate, and there will probably be no such occasion to mine coal as last spring, when the upper lake docks were bare. Reports from Duluth and Chicago show that there is coal enough on hand now to supply all probable needs before navigation opens.

The coming retirement, on March 1st, of E. R. Holden from the Delaware, Lackawanna & Western management will be the final step in the reorganization that started when Mr. Truesdale took control. Mr. Holden's peculiar ideas about agreements, with his intimate knowledge of the trade, has caused him to be much criticised, but the Delaware, Lackawanna & Western coal department has in some respects been well managed.

Buying is quiet at both Eastern and Western points. Prices at New York, of course, show no improvement and may be expected to weaken more, unless a cold wave comes soon. We quote free burning white ash f. o. b. New York: Broken, \$3.25; egg, \$3.65; stove, \$4, and nut, \$4. Stove coal mined by independent concerns is selling as low as \$3.65. The steam sizes continue in great demand, with good pea at \$3; buck-wheat, \$2.25.

Bituminous.

The demand for soft coal along the Atlantic seaboard continues. Legitimate trade shows no let-up, but the Pennsylvania Railroad's action in charging demurrage on cars standing over an average of 5 days at shipping ports has demoralized speculators and brought the speculative price of Clearfield coal down from \$3.50@3.75 at New York to \$3@3.25. It has also thrown a lot of the poorer grades on the market, the small dealers rushing to dispose of what coal they had standing. Regular trade has benefited by this shake-up of the speculators, which removes a disturbing element from the New York Harbor shipping trade.

The embargo on shipments to New York Harbor ports is raised, but it will be several days before producers get shipments to those ports in full swing again.

Trade in the far East and along Long Island Sound shows a strong demand, New York Harbor trade is taking coal up to the limit of storage capacity.

With heavy shipments all contract consumers will be in an easy condition in 2 or 3 weeks and producers will then be able to look after those consumers who are regular buyers though not contractors. A great feature of the market now is the continued demand for coal for export. It is the impression of men best able to judge that Europe will need all the coal the mines there can mine for home consumption, and consequently the United States will be able to take all the South American trade heretofore supplied by England.

No contracts are reported for the coming season. Consumers seem perfectly willing to wait and take chances. Producers are cleaning up the contracts still in force.

Transportation has been erratic, but just now coal is coming through with a rush. Car supply has been controlled by the embargo at New York, but is now 3/4 of the demand. In the coastwise vessel market, vessels are still scarce and in demand. Freight rates are \$1.80@2 from Philadelphia to Boston and \$1.75 to Providence, New Bedford and Long Island Sound ports. It is getting to be a regular thing for vessels to charter with a 5 days' demurrage clause—that is, 5 days for loading, and after that a demurrage of 6c. a day. Such demurrage charges started several months ago owing to the great delays in loading at the Chesapeake Bay ports, and are now very frequent.

Birmingham, Ala.

Feb. 12.

(From Our Special Correspondent.)

The coal industry in Alabama is enjoying phenomenal prosperity and the number of new mines being opened, and the production at the old mines is something wonderful. State Mine Inspector J. de B. Hooper states that there is no telling how much coal will be produced in Alabama during the year 1900, so many new mines being opened and the output of many of those in operation being increased so rapidly. There are no less than half a dozen new mines opening up in this State right now, and when the Louisville & Nashville and the Southern Railway build their prospective lines through the coal fields of Walker, Jefferson, Blount and Tuscaloosa counties, a half dozen more mines will be opened. It is certain that these two systems of railroads will do considerable construction in Alabama this year. Just as sure as the roads are built a number of new mines will be opened.

There is absolutely no trouble among the miners in this State. The District President, George Young, announces that there are 48 locals now, and that everything is progressing nicely. No intimation is given as to any trouble in making a new contract in July.

Chicago.

Feb. 13.

(From Our Special Correspondent.)

Anthracite Coal.—Rapid rises and falls in temperature have kept the anthracite coal market in rather a doubtful condition, trade see-sawing one way or the other. The movement of coal to out of town places has not been nearly up to expectations, and it is hoped that February will yet develop cold weather. The general market, however, appears to remain very steady, orders though none large, are fairly numerous and amount in the aggregate to a good tonnage. Prices are strictly held, the circular yet showing \$5.50 for broken and \$5.75 for egg and stove, while chestnut still commands \$6.

Bituminous coal is being bought by large consumers, a demand having shown up during the week that has strengthened the situation considerably. The colder weather started the buyers and in consequence the over accumulation is being eaten into quickly. There continues a splendid call for steam coal from all over this territory from railroads and manufacturers. Coals for domestic purposes are in ample supply, while the demand almost keeps pace, the continued use of soft coal in place of hard creating a big market for West Virginia and Kentucky coals. Prices are firmer, but to no great extent, but after March may soon become of higher cost of mining coal.

Coke continues as it has for a long time to be a scarce article. All grades are rapidly absorbed and the market appears sold for months ahead.

Pittsburg.

Feb. 14.

(From Our Special Correspondent.)

Coal.—No change in prices has yet been announced by the two coal combinations but it is reported that an advance of 20c. a ton will be made on April 1, when the new mining rate goes into effect. The miners of the Pittsburg District are holding a convention this week to discuss the local deadwork scale. If it is decided to demand a reduction of the differential between thick and thin vein mining or wiping it out altogether, there may be some trouble in this district. For years the price of digging coal in the thick vein mines has been 13.2 cents a ton below the price for mining in the thin vein mines. The coal is easier to mine and has always sold at a lower price than thin vein coal. Since the formation of the two combinations there has been but little difference in prices. The operators will vigorously oppose any change in the differential. About 5,000,000 bushels of coal were shipped down the river this week and about as much more is ready to be sent out as soon as the tow boats get back.

Connellsville Coke.—The production of coke last week was 214,757 tons, a slight falling off compared with the previous week. The shipments aggregated 10,943 cars distributed as follows: To Pittsburg and river points, 3,404 cars; to points west of Pittsburg, 5,470 cars; to points east of Connellsville, 2,069 cars. This is a decrease of 546 cars compared with the previous week.

SLATE TRADE REVIEW.

New York.

Feb. 16.

The list of prices per square for No. 1 slate, standard brand f. o. b. at quarries in car-load lots, is given below:

Prices of Roofing Slate.

Size, inches	Monson or Br'ville.	Bangor.	Bangor Ribbon.	Alb'n. or Jackson Bangor.	Lehigh.	Peach Bottom.	Sea Gr'n.	Unfaded Green.	Red.
24 x 14	6.10	3.50	3.00	3.25	3.10	5.10	3.15	3.75	.....
24 x 12	6.60	3.50	3.00	3.25	3.10	5.25	3.15	3.75	.....
22 x 12	6.60	3.50	3.25	3.50	3.25	5.25	3.15	3.75	.....
22 x 11	6.50	3.75	3.25	3.50	3.25	5.25	3.15	4.00	.....
20 x 12	6.90	3.75	.....	3.50	3.25	5.25	3.15	3.75	.....
20 x 11	6.80	.....	.....	3.75	3.50	5.25	3.15	.....	.....
20 x 10	6.80	4.50	3.50	3.75	3.50	5.35	3.15	4.25	11.00
18 x 12	6.80	3.75	.....	3.50	3.25	5.25	3.15	3.50	.....
18 x 11	7.00	.....	.....	.....	.....	.....	3.15	3.75	.....
18 x 10	7.20	4.50	3.50	3.75	3.50	5.35	3.15	4.00	11.00
18 x 9	7.10	4.50	3.50	3.75	3.50	5.35	3.15	4.25	11.00
16 x 12	6.80	3.75	.....	3.50	3.50	.....	2.95	3.50	.....
16 x 10	7.10	4.25	3.50	3.75	3.50	5.25	2.95	4.00	11.00
16 x 9	7.00	4.25	.....	3.75	.....	5.35	2.95	4.25	11.00
16 x 8	7.20	4.50	3.50	3.75	3.10	5.35	2.95	4.25	11.00
14 x 10	6.60	3.75	3.25	3.25	.....	5.25	2.85	3.75	11.00
14 x 9	6.50	.....	.....	.....	.....	.....	2.85	3.75	11.00
14 x 8	6.60	3.75	3.25	3.25	3.10	5.10	2.85	4.25	11.00
14 x 7	6.40	3.75	3.25	3.25	3.10	5.10	2.60	4.25	11.00
12 x 10	5.80	.....	.....	.....	.....	.....	2.60	3.25	.....
12 x 9	5.60	.....	.....	.....	.....	.....	2.60	3.25	.....
12 x 8	5.50	3.50	.....	3.00	2.80	4.85	2.60	3.50	9.50
12 x 7	5.00	3.25	.....	3.00	2.80	4.85	2.50	3.50	9.50
12 x 6	4.80	3.25	.....	3.00	2.80	4.75	2.50	3.50	9.50

A square of slate is 100 sq. ft. as laid on the roof.

In Brownville and Monson delivery quotations can be had somewhat lower than above, which is also true of other brands. No. 1 Bangor are 50c. extra when full 16 in.

Business is generally quiet, while prices are practically unchanged. Occasionally one hears

of cutting to accommodate a promising purchaser, especially for roofing slate.

Shipments from Slatington and Walnutport, Pa., for the first 8 days of this month were as follows: Roofing slate, 2,745 squares; school slates, 774 cases; blackboards, 266 crates.

Export business is dull, while freight rates are strong and high.

IRON MARKET REVIEW.

NEW YORK, Feb. 16, 1900.

Pig Iron Production and Furnaces in Blast.

Fuel used	Week ending				From	
	Feb. 17, 1899.	Feb. 16, 1900.		Jan., '99.	Jan., '00.	
	F'ces.	Tons.	F'ces.	Tons.	Tons.	Tons.
An'racite & Coke.	178	233,700	264	291,825	1,619,843	1,943,893
Charcoal.	17	5,150	32	8,125	38,774	53,667
Totals..	195	238,850	296	299,950	1,658,617	1,997,560

While there has been a partial break in the waiting attitude of the market, there is still much hesitation about contracts, and much new business is in the balance. In raw iron and steel there have been some transactions in Bessemer pig at close to current rates. In foundry iron a good deal of dickering is going on, but very little disposition to make concessions is shown by the furnacemen. In steel billets also there is no apparent yielding, though several large contracts are held back in hopes of yielding.

Upon the whole, the advantage is with sellers. The demand for finished material is so large that they can afford to be stiff. On top of this also there have come a number of inquiries for export, and there is little doubt that a large tonnage can be placed if deliveries can be made as wanted.

The Carnegie-Frick suits furnish plenty of material for talk in the trade. Some deprecate the giving away of so much information as to profits and the like; but very little has been told which was not known—at least in a general way. Meantime we must remember that only one side has been told, and that Mr. Carnegie's answer is yet to be filed. It promises to be an interesting case, for both sides are good fighters.

Notes of the Week.

Shipments of iron ore from the Lake Erie docks are heavy, and it is expected that the docks will be bare before the opening of navigation.

The first of the big blast furnaces at the Ohio plant of the National Steel Company was started February 14th. The stack is 106 ft. high and 23 ft. bosh; it is expected to make 600 tons of pig iron a day. There are two other stacks of the same size nearly completed.

Birmingham, Ala. Feb. 12.

(From Our Special Correspondent.)

There is no change to be noted in the pig iron market in this district this week. The shipments are still very heavy. Prices continue firm, but so far no advances have been noted, as has been anticipated. The furnacemen still hold a stiff upper lip as to sales of iron, and there are no concessions to be had. Immediate delivery cannot be secured to any extent, the furnacemen being taxed now to get out the product on orders on hand. Waybills for iron delivery covering a good period have been filed with the various trunk lines out of here, and it is certain that the shipments will be heavy for some time. The iron is going to the domestic market almost exclusively. There are some inquiries being received for export iron, but so far this year there has not been much of the Alabama product sent abroad.

There were no other furnaces to go into blast during the past week. The Hattie Ensley furnace at Sheffield is being repaired and will be ready for the torch about the last of next month, possibly a little sooner. This furnace belongs to the Sloss-Sheffield Steel and Iron Company. This company has some heavy orders on hand, and is said to be refusing orders for certain grades for delivery before September.

There have been no changes in the prices recently. The following figures are still given: No. 1 foundry, \$18.50; No. 2, \$17.50@18; No. 3, \$16.50@17.50; No. 4, \$16@16.50; gray forge, \$16; No. 1 soft, \$18.50; No. 2, \$17.50@18.

The local consumption is still large. The rolling mills here and at Gate City, near here, are working well. There is no telling now when the Bessemer mills will begin operation. Reports from Anniston and Sheffield are to the effect that demand for finished iron at the mills at those places is very good. A long, steady run is anticipated.

The big pipe works at Bessemer are using much iron. The Dimmick pipe plant at North Birmingham will shortly begin to show signs of completion. The steel plant at Ensley and the steel wire and rod mill have not as yet got into full operation. There is no definite date set for these plants to begin work. The fifth fur-

nace at Ensley is nearing completion rapidly, and it is believed that before 30 days shall have passed the iron makers will be ready for the torch.

Buffalo.

Feb. 14.

(Special Report of Rogers, Brown & Co.)

There has been no material change in the iron market during the past week. Furnaces are exerting every effort to keep abreast with orders already on their books, and very little product is being sold for early delivery. There seems to be no expectancy of any decline in the market, and prices remain firm as mentioned below. We quote on the cash basis, f. o. b. cars Buffalo: No. 1 Strong Foundry Coke Iron, Lake Superior Ore, \$24@24.50; No. 2 Strong Foundry Coke Iron, Lake Superior Ore, \$23.50@24; Ohio Strong Softener, No. 1, \$24.25@24.75; Ohio Strong Softener, No. 2, \$23.25@23.75; Jackson County Silvery, 8%, \$31; Southern Soft, No. 1, \$23.50; Southern Soft, No. 2, \$22.50; Lake Superior Charcoal, \$26@27; Coke Malleable, \$24.50@25.

Chicago.

Feb. 13.

(From Our Special Correspondent.)

Pig Iron.—Some good sized orders have been placed during the past week, manufacturers of pipe having bought from 2,000 to 6,000 tons of iron each, while other lines took amounts from 100 tons up. The Northern furnaces not being in a position to take much business, the Southern furnaces are, therefore, booking most of the orders now being placed. Local furnaces are still unable to make deliveries of any amount for at least six months to come. Prices are considered firm at quoted prices, which are: Lake Superior Charcoal, \$25.50@26; Local Coke Foundry, No. 1, \$24.50@25; No. 2, \$23.50@24; No. 3, \$22.50@23; Local Scotch, No. 1, \$25@25.50; Ohio Strong Softeners, No. 1, \$24.50@25; Southern Silvery, \$25.50@27; Southern Coke, No. 1, \$22.85@23.35; No. 2, \$21.85@22.35; No. 3, \$20.85@21.30; No. 1 Soft, \$22.85@23.35; No. 2 Soft, \$21.85@22.35; Foundry Forge, \$20.75@21.

Cleveland, O.

Feb. 15.

(From Our Special Correspondent.)

Iron Ore.—The past few days have disclosed the first signs of a revival of activity in the sales market. For weeks past, or indeed even since the general activity when the market opened several months ago the sales of ore have been few in number and small in volume for the reason that the furnacemen have had under contract all the ore which they will require to run through the year. With the first sales of pig iron for the third quarter, however, some of the consumers who follow the policy of covering their needs as far in advance as possible have been putting forth feelers on the subject of the ore supply for the forepart of 1901. The ore-men, as a rule, seem to be of the opinion that present prices ought to rule in the disposal of next year's supply, and while some of the furnacemen may hold off as long as possible in the hope that the market will break, it would not be at all surprising to see an aggregate of very fair size represented in the transactions during this month and next. For a market that is supposed to be entirely closed up there has been quite a few charters of vessels for the ore carrying trade. As a rule the tonnage secured has been a special class, that is suited to special unloading requirements at docks and furnaces, while other charters have been made in connection with contracts for carrying coal, thus offering the vesselmen the inducement of a round trip cargo. Vessels continue to change hands, and so many of the transfers bring additional tonnage into the ore carrying trade that it is really something of a mystery where sufficient vessels are to be procured to carry the usual quantity of other commodities. The additional season charters which have been closed since the first of the year would also seem to indicate that there will be little "wild" tonnage on the market for single trips or to meet emergencies. Taking this view of the situation there is possibly some justification for the prediction of some of the vesselmen who have refused to charter their vessels that \$2 per ton will be paid for ore carrying before the season is done.

Pig Iron.—The market in this district has been behind and is still behind that in some others in the volume of buying. This may not be taken as an intimation that buyers are any better supplied, but simply that they have been willing to hold out longer and possibly take slightly greater risks in the hope that the market would break. The case now seems hopeless, however, and quite a few buyers of foundry iron have within the past week covered their requirements for the second quarter, although the heaviest buyers have not even yet closed for large quantities. The recent sale of Bessemer of course cleans up all the iron available to July 1st, and the talk is now on the matter of a price for the third quarter, although none has as yet been fixed. The market on gray forge and Lake Superior charcoal continues strong, but inactive.

Plates, Bars, Etc.—Some fairly heavy transactions in sheet bars have been up for consideration during the past seven days, but the

order has not as yet been definitely placed. An inquiry for 4,000 tons of plates for the use of a lake shipbuilding yard, early delivery being specified, seemed to have little effect in strengthening the market, which is decidedly uncertain. The volume of actual transactions was only fair.

Structural Material.—The market which showed some signs of activity a week or two ago has received a set-back as a result of the cold weather. This is likely to be only temporary, however, inasmuch as considerable building is projected for the early spring. A local street car company will, within a few days, close contracts for several hundred tons of material for a new car barn.

Scrap.—The market is unmistakably dull, with quotations somewhat weaker than they were at the opening of the year. The delay in the opening of the pig iron buying is having an unmistakable effect and practically no buying is reported, save in one or two lines. The supply coming in is limited, but dealers are making no effort to increase it.

Philadelphia.

Feb. 15.

(From Our Special Correspondent.)

Pig Iron.—While there is much more inquiry during the past 48 hours in pig iron the actual orders have been very few and unimportant. The inquiries referred to come from large consumers and some of them from the West, who are wanting basic and Bessemer pig iron. A fair amount of business has been done in forge and No. 1 foundry at about \$25. Some inferior grades of No. 1 can be had but the present demand is for the better. Forge iron is under inquiry but the prices named do not suit the buyers who are anxious to cover for summer and two or three for as late as fall requirements.

Muck Bars.—Two or three small orders for muck bars have been accepted but makers decline to state at what price.

Steel Billets.—A large amount of business is likely to be done in steel billets at a very early date. The consumers of billets throughout the East are getting quite short and will be obliged very shortly to come into the market.

Merchant Bar.—Quotations for merchant bar are still 2.20; common iron 2.10 and some business has been done in common iron at 2c. and even under. Special brands of steel bars are also in better request this week although in very small quantities.

Sheet Iron.—The mills are getting a little more business for summer delivery and particularly on corrugated. Quotations are unchanged.

Merchant Steel.—For certain lines of merchant steel there is a good deal of inquiry but buyers insist upon lower quotations and manufacturers' agents here refuse to make any.

Plate Iron.—Plate iron orders are slowly coming in. A good deal of local work is coming up, which will amount to several thousand tons in all, but the impression is that quotations are likely to be shaded and buyers are awaiting developments.

Structural Material.—Several small orders for structural material have been placed since Monday. Quotations range as usual at 2.40@2.80c.

Steel Rails.—Another inquiry has just come up from abroad for steel rails but particulars are withheld. The amount is supposed to be some 10,000 tons and the rails will be wanted as soon as they can be delivered. Repairing requirements are now being covered; quotations \$35 to \$36.

Scrap.—It is useless to give quotations of scrap as every transaction rests on its own merits. There is a great deal of inquiry for scrap and dealers say that it is impossible to meet the demand.

Pittsburg.

Feb. 15.

(From Our Special Correspondent.)

The long expected improvement in the sheet market has come at last and prices are likely to advance rapidly and may soon reach the 3.50 cent mark. As anticipated for the last two months a strong combination of the sheet interests was effected. It was practically formed at a meeting in this city yesterday but the final details will not be completed for about thirty days. It is to be called the American Steel Sheet Company and the capital has been fixed at \$52,000,000, one-half preferred and one-half common stock. Of this amount \$10,000,000 is to be retained in the treasury and the common stock is to be deposited in a New York bank where it will remain for a year, when it is to be determined what disposition will be made of it. Dividends are to be paid on \$16,000,000, which is the actual value of the plants taken into the combination. No stock is to be put on the market. About 160 mills, owned by about twenty-five concerns, are included in the new company. There are but four large companies on the outside. They are the Apollo Iron and Steel Company, of Vandergrift, Pa.; W. Dewees Wood Company, of McKeesport, Pa.; Zug & Company, of Pittsburg; and the Whitaker Iron Company, of Wheeling, W. Va. It was decided

at the meeting yesterday to fix the minimum price of Nos. 27 and 28 gauge at 3.10 cents, and galvanized sheets at 75% off with 15c. freight allowance. The manufacturers agreed not to sell below those figures, but a compact to that effect was not necessary as most of the sheet men in the new combine refuse to sell at less than 3.20c. at the mill.

There has been a noticeable strengthening in conditions in all branches of the iron and steel industry but there has not been any material change in prices. The sales of Bessemer pig iron during the week aggregated 15,000 tons. Of this 10,000 tons were contracted by a Pittsburgh concern at \$24 in the Valleys, and it is to be delivered in March and April. The balance of the sales is in small lots at prices ranging from \$24.90 to \$25.25 delivered in Pittsburgh. Foundry iron continues strong but there was not much buying this week. Most of the makers have sold their output for the greater part of the year. There is a strong inquiry for structural material which promises to increase as the building season approaches. The National Tube Company did not advance the prices of black pipe to correct the existing inequality with galvanized pipe but cut the price of galvanized 25%.

Pig Iron.—Sales were not as large this week as last, not more than 15,000 tons being contracted for. Prices are firm and unchanged, the minimum being \$24 at Valley furnaces, or \$24.90 delivered in Pittsburgh. Foundry iron prices are the same as last week, but sales have fallen off.

Steel.—The market continues quiet and but few sales were made during the week. Bessemer steel billets are quoted at \$35 and open-hearth billets at \$42@43. A sale of 1,000 tons of slabs was made this week at \$35. Sheet bars are quoted at \$36. Tank plates are quoted at 2.40c.

Sheets.—Prices are stronger and likely to go higher on account of the formation of a combination of the sheet interests. Manufacturers refuse to sell No. 28 at less than 3.20c. and it is believed that in a short time from 3.50 to 3.60c. will be asked. Galvanized sheets are quoted at 75% off with a 15c. freight allowance.

Ferro-manganese.—There is no change in price and the demand is good. Several small lots were sold at \$125.

New York, Feb. 16.

Pig Iron.—There is as yet little change in the situation. Reports of concessions are heard, while furnace agents speak of advances. We quote for delivery to July, Northern brands, tidewater delivery: No. 1 X foundry, \$24.75@ \$25.25; No. 2, \$23.25@ \$24; No. 2 plain, \$22.50@ \$23; Southern brands, New York delivery: No. 1 foundry, \$22.75@ \$23.25; No. 2 foundry, \$21.50@ \$22; No. 1 soft, \$21@ \$21.50; No. 2 soft, \$20@ \$20.50; No. 3 foundry, \$20.25@ \$20.75.

Warrant Irons are featureless and transactions are of no account. No. 2 Alabama foundry \$17½; No. 3, \$15; No. 4, \$15; gray forge, \$15.

Bar Iron and Steel.—Demand is good. We quote refined iron at 2.30c. on dock, and common up to 2.15c. Soft steel bars, 2.45c.

Plates.—Orders are coming in fairly well, but prices have fallen, and the market is weak. We quote for large lots at tide-water: Tank, ¼-in. and heavier, 2.40c.; tank, 3/16-in., 2.50c.; shell, 2.60c.; flange, 2.70c.; marine, 2.90c.; firebox, 2.90c.; universals, 2.50c.

Structural Material.—Contracts continue to be placed and the outlook is excellent. We quote beams, 2.45c.; angles, 2.45c.; channels, 2.45c.

Steel Rails and Rail Fastenings.—The local market shows little change and is generally quiet. We quote for standard sections \$35 f. o. b. Eastern mills. Smaller rails are quoted: 12-lb., \$39; 16-lb., \$39; 20-lb., \$39; 30-lb. to 40-lb., \$37; 40-lb. to standard, \$36, with the usual advance for small orders. We quote angle bars, 2.45c.; fish plates, 2.40c.; spikes, 2.75c.

Nails.—Buying is quite free. Wire nails are quoted at \$3.55 in large lots on dock; cut nails at \$2.75 for large lots.

METAL MARKET.

NEW YORK, Feb. 15, 1900.

Gold and Silver.

Gold and Silver Exports and Imports
At all United States ports in January and year.

Metal.	January.		Year.	
	1899.	1900.	1899.	1900.
GOLD.				
Exports	\$1,755,451	\$5,691,290	\$1,755,451	\$5,691,290
Imports	6,392,344	1,988,272	6,392,344	1,988,272
Excess I.	\$4,636,893	E. \$3,703,018	I \$4,636,893	I \$3,703,018
SILVER.				
Exports	5,389,808	4,599,199	5,389,808	4,599,199
Imports	3,128,852	2,130,335	3,128,852	2,130,335
Excess E.	\$2,251,954	E. \$2,468,864	E. \$2,251,954	E. \$2,468,864

This statement includes the exports and imports at all United States ports, the figures being furnished by the Treasury Department.

Gold and Silver Exports and Imports, New York

For the week ending February 15th, 1900, and for years from January 1st, 1900, 1899, 1898, 1897.

Pe-riod.	Gold.		Silver.		Total Ex-cess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
We'k	\$272,587	\$11,665	\$721,870	\$36,320	E. \$956,472
1900.	1,962,375	670,321	4,986,625	475,159	E. 5,813,520
1899.	374,831	3,659,678	4,069,629	416,229	E. 398,553
1898.	3,371,475	3,939,866	6,486,776	445,697	E. 5,472,688
1897.	341,199	290,575	5,442,754	292,474	E. 5,200,866

Exports of gold were chiefly to the West Indies; Imports were in small parcels, from different ports. Exports of silver were mainly to London; imports were from Central and South America.

The United States Assay Office in New York reports the total receipts of silver at 96,000 oz. for the week.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	\$.47½	.48
Peruvian soles and Chilean pesos.....	.43½	.45
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.86	4.88
Twenty marks.....	4.75	4.78
Spanish 25 pesetas.....	4.78	4.82

Average Prices of Silver per oz. Troy.

Month.	1900.		1899.		1898.	
	Lond'n Pence.	N. Y. Cents.	Lond'n Pence.	N. Y. Cents.	Lond'n Pence.	N. Y. Cents.
January...	27.30	59.30	27.42	59.36	26.29	56.77
February...	27.30	59.30	27.44	59.42	25.89	56.07
March.....	27.48	59.04	27.48	59.04	25.47	54.99
April.....	27.65	60.10	27.65	60.10	25.95	56.02
May.....	28.15	61.23	28.31	56.98	27.77	58.61
June.....	27.77	60.43	27.09	58.61	27.77	59.06
July.....	27.71	60.26	27.32	59.06	27.62	59.54
August.....	27.62	60.00	27.48	59.54	27.15	58.68
September	27.15	58.89	28.05	60.68	26.70	57.98
October...	26.70	57.98	27.90	60.42	27.02	58.67
November...	27.02	58.67	27.93	60.60	27.21	58.99
December.	27.21	58.99	27.45	60.42	Year...	27.44 59.58 26.76 58.26

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

Average Prices of Metals per lb., New York.

Month.	COPPER.		TIN.		LEAD.		SPELTER.	
	1900.	1899.	1900.	1899.	1900.	1899.	1900.	1899.
Jan.....	16.33	14.75	27.07	22.48	4.65	4.18	4.65	5.34
Feb.....	18.00	17.54	24.20	23.82	4.49	4.37	4.62	6.28
March...	17.54	17.54	23.82	23.82	4.37	4.37	4.62	6.31
April.....	18.43	18.43	24.98	24.98	4.31	4.31	4.67	6.67
May.....	18.25	18.25	25.76	25.76	4.44	4.44	4.68	6.88
June.....	17.93	17.93	25.85	25.85	4.43	4.43	4.68	6.88
July.....	18.33	18.33	29.63	29.63	4.52	4.52	4.68	6.88
August...	18.50	18.50	31.53	31.53	4.57	4.57	4.68	6.88
Sept.....	18.46	18.46	32.74	32.74	4.58	4.58	4.64	6.64
October...	17.76	17.76	31.99	31.99	4.575	4.575	4.64	6.64
Nov.....	16.93	16.93	28.51	28.51	4.575	4.575	4.64	6.64
Dec.....	16.40	16.40	25.88	25.88	4.64	4.64	4.66	6.66
Year.....	17.61	17.61	25.12	25.12	4.47	4.47	4.66	6.66

The price given in the table is for Lake Copper; for electrolytic copper the average for January, 1900, was 15.58c.

Financial Notes of the Week.

Silver has continued firm but dull, with small fluctuations around 27½d. Continental orders and English Mint demands have caused firmness in price.

The amount of money in the United States on February 1st is estimated by the Treasury Department as below:

	Total stock.	In treasury.	In circulation.
Gold coin.....	\$1,022,943,682	\$218,613,617	\$804,330,065
Gold certificates.....	477,046,563	12,639,499	464,407,064
Silver dollars.....	80,346,414	4,917,001	75,429,413
Silver certificates.....	87,871,280	1,544,540	86,326,740
U. S. Notes.....	346,681,016	14,600,704	332,080,312
Currency certifi.....	24,068,743	6,182,982	17,885,761
Nat. Bank Notes.....	24,068,743	6,182,982	17,885,761
Total.....	\$2,261,957,698	\$258,808,343	\$2,003,149,355

For the redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the Government. The total amount in circulation on February 1st shows an increase of \$22,751,185 over January 1st, and of \$84,888,798 over February 1st, 1899. The circulation is estimated at \$25.98 per capita.

The statement of the United States Treasury on Wednesday, February 14th, shows balances in excess of outstanding certificates as below, com-

Imports and Exports of Metals.

Port.	Week, Feb. 14.		Year 1900.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum..... long tons			2	10
Antimony ore.....	1130		367	37
regulus.....				
Chrome ore.....			10,895	2,844
Copper, fine.....	1,869	275	276	440
matte.....	7			15
ore.....			115	10
ash.....				90
Ferro-Chrome.....	110			5,100
Ferro-mangan'se				
Iron ore.....				1,199
pig, bar, rod.....	108	1187	1,165	826
pipe.....	180		24	24
plates, sheets.....	70			
Lead.....	686	825	6,617	6,375
ore.....				2,100
dross.....			24	
Manganese ore.....	1198		1,198	1,161
Metals, old, scrap.....	17	1310	157	1,161
Composition.....	58		794	
Nails.....	701		4,024	
Nickel.....	75	115	185	30
matte.....		167	67	
§ Rail'd material.....			914	393
Rails, old.....		1130		130
Spiegeleisen.....				
Steel bars, plates.....	222	1184	900	2,833
rails.....	771		5,579	18
hoops.....				
wire.....	454		1,834	
not spec'd.....	48	1197	1,005	516
Tin.....		505		3,725
dross or ashes.....			3	
and black plates.....		1683		4,327
Zinc.....		111		6
dross.....	22		22	50
ashes, skim.....			183	10
ore.....	2,025		3,531	
oxide.....	74		407	
† Baltimore.				
Antimony regulus..... casks				2,930
Chrome Ore..... long tons				1,204
Copper, fine.....	390	351	5,237	
matte.....				
pipe.....				
Ferro-manganese.....				2,250
Ferro-silicon.....			601	
Iron pig, bar, etc.....		14,550		74,294
ore.....				
pyrites.....			2,879	
Manganese ore.....				33,110
Metals, old & Rails.....				499
Nails.....				937
Pipe, iron & steel.....	138		774	37
Spiegeleisen.....			237	6
Steel, bars, pl'es.....				9,513
wire.....				
rails.....				
not specified.....			20	66
Tin.....				442
and blackplates.....				
other.....				
Zinc.....				
dross, skim.....				
oxide.....				
* Philadelphia.				
Antimony..... long tons				
Chrome ore.....			472	
Copper, fine.....			3,108	6,879
ore.....				
old.....				
Ferro-manganese.....				
Ferro-silicon.....				
Iron, pig.....			13,400	34,890
ore.....				
pyrites.....				
Manganese ore.....				3,500
Steel sheets.....				3,500
Spiegeleisen.....			130	65
Tin.....			188	662
and black plates.....				
Zinc dust.....				
Total United States. §§				
Articles.	December.		Jan.—Dec.	
	Expts.	Impts.	Expts.	Impts.
Antimony..... long tons		61	8	1,411
ore.....				1,778
Copper fine.....	15,704	3,110	111,572	31,904
ore & matte.....	700	10,199	5,219	31,637
Iron, pig & bar.....	12,526	8,337	239,891	60,163
ore.....	17,857	113,679	40,680	674,098
Iron & steel plates.....	2,007	1,069	56,981	7,044
Iron & steel rails.....	25,894		177,714	2,134
wire.....	8,312	116	116,332	2,363
Steel, billets.....				
rods, etc.....				

parison being made with the statements of the corresponding day last week:

	Feb. 7.	Feb. 14.	Changes.
Gold.....	\$216,456,623	\$220,634,396	I. \$4,177,763
Silver.....	12,177,734	10,438,535	D. 1,739,199
Legal tenders.....	13,967,449	14,190,977	I. 223,528
Treas notes, etc....	2,052,469	2,173,233	I. 120,766

Totals..... \$244,651,275 \$247,437,131 I. \$2,782,856
Treasury deposits with national banks amounted to \$111,880,900, an increase of \$314,899 during the week.

The statement of the New York banks—including the 63 banks represented in the Clearing House—for the week ending February 10th gives the following totals, comparison being made with the corresponding weeks in 1899 and 1898:

	1898.	1899.	1900.
Loans and discounts.....	\$639,834,400	\$750,043,300	\$720,785,000
Deposits.....	738,683,800	880,050,100	814,788,900
Circulation.....	13,914,700	14,533,609	17,028,200
Reserve:			
Specie.....	114,967,700	198,500,300	165,029,600
Legal tenders.....	102,140,340	59,025,300	66,564,700
Total reserve.....	\$217,108,000	\$257,525,600	\$231,594,300
Legal requirements.....	184,670,950	222,014,775	203,696,725

Balance, surplus.... \$32,437,050 \$35,511,825 \$27,897,755

Changes for the week, this year were increases of \$21,152,000 in loans and discounts, \$18,869,600 in deposits, \$165,000 in circulation and \$2,264,500 in specie, decreases of \$520,800 in legal tenders, and \$2,973,700 in surplus reserve.

The foreign merchandise trade of the United States in January is reported as below by the Bureau of Statistics of the Treasury Department:

	1899	1900.
Exports.....	\$115,591,446	\$117,620,930
Imports.....	58,239,771	75,826,975
Excess, exports.....	\$57,351,675	\$41,793,955
Add excess of exports, gold.....		3,703,018
silver.....		2,468,864
Total apparent balance.....		\$47,965,837

The gold and silver movement in detail will be found in the usual place, at the head of this column.

Shipments of specie by water from San Francisco in January are reported as follows:

	Gold.	Silver.	Totals.
Hong Kong.....	\$4,005	\$510,804	\$514,809
Samoa.....	680	680	1,360
Central America.....		4,250	4,250
Total foreign.....	\$4,685	\$515,054	\$519,739
Honolulu.....	100,000	51,000	151,000
New York.....	236,748	30,200	266,948
Total.....	\$341,433	\$596,254	\$937,687
Totals, 1899.....	7,576,525	714,589	8,291,114

Shipments to Honolulu, in addition to the above, included \$200 in nickel 5-cent pieces. The shipments of silver included \$234,197 in Mexican dollars, against \$156,259 in January, 1899.

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 date last year:

Banks.	1899.		1900.	
	Gold.	Silver.	Gold.	Silver.
N.Y. Ass'n.....	\$198,501,300		\$165,029,600	
England.....	167,000,420		177,581,225	
France.....	364,530,545	\$239,775,945	380,010,045	\$228,802,590
Spain.....	55,310,000	43,665,000	68,000,000	74,100,000
Aus.-Hun.....	149,215,000	51,885,000	189,425,000	44,880,000
Neth' Ids.....	21,570,000	33,920,000	23,135,000	30,005,000
Belgium.....	16,170,000	8,085,000	15,085,000	7,040,000
Italy.....	75,145,000	11,720,000	77,060,000	7,530,000
Russia.....	505,195,000	22,005,000	423,970,000	29,375,000

The returns of the Associated Banks of New York are of date February 10th, and the others are of date February 8th, as reported by the "Commercial and Financial Chronicle" cable. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England reports gold only.

Shipments of silver from London to the East for the year up to February 1st, 1900, are reported by Messrs. Pixley & Abell's circular as follows:

	1899.	1900.	Changes.
India.....	\$411,500	\$437,727	I. \$26,227
China.....	205,380	71,200	D. 134,180
The Straits.....	5,000		D. 5,000
Totals.....	\$621,880	\$508,927	D. \$112,953

Arrivals for the week, this year were £128,000 in bar silver from New York, £21,000 from the West Indies, and £20,000 from Australia; total, £169,000. Shipments were £90,000 in bar silver to Bombay, £17,194 to Hong Kong, and £4,135 to Port Said; total, £111,329.

Indian exchange is steady and such council bills as were offered in London were taken at 16.13d. per rupee. No further buying of silver for India is reported.

Other Metals.

Daily Prices of Metals in New York.

February.	Sterling Exchange	Silver.			Copper.				
		Fine oz. Cts.	Lon-don, P'nce	Lake, cts. @ lb.	Electro-lytic, @ lb.	Lon'd'n stand-ard @ ton.	Tin, cts. @ lb.	Lead, cts. @ lb.	Spel-ter, cts. @ lb.
10	4.87½	59½	27½	16½	15½	74 7 6	30	4.67½	4.65
12	4.87½	59½	27½	16½	15½	74 7 6	30	4.67½	4.62½
13	4.87½	59½	27½	16½	15½	74 10 0	30½	4.67½	4.62½
14	4.87½	59½	27½	16½	15½	74 15 0	30½	4.67½	4.60
15	4.87½	59½	27½	16½	15½	75 0 0	30½	4.67½	4.60
16	4.87½	59½	27½	16½	15½	74 15 0	31	4.67½	4.60

The quotations given for electrolytic copper are for cakes, ingots and wirebars; the price of electrolytic cathodes is usually 0.25c. lower than these figures.

Copper.—A fairly large volume of business has been transacted during the week, at prices varying but little from those recorded when we last rendered report. The sale of Lake which we then alluded to appears to have been consummated at 16c. and the quantity involved we understand to be very large; in the neighborhood of 15,000,000 lbs., for delivery spread over April, May and June.

We quote the market as follows: Lake, 16@16½c.; electrolytic in cakes, bars or ingots at 15½@15¾c.; electrolytic copper in cathodes at 15¾c.; and casting copper at 15¾c.

In London the price for G. M. B.'s has improved still further, there having been a steady and gradual advance to £75, which was the price quoted yesterday; the closing figure today being £74 12s. 6d. @ £74 15s. for spot, and £1 5s. less for three months.

Copper statistics for the first half of February show an increase in the visible supplies of 1,400 tons.

We quote refined and manufactured sorts as follows: English tough, £76 @ £76 10s.; best selected, £76 10s. @ £77; strong sheets, £83; India sheets, £81 10s.; yellow metal, 6¾d.

Copper production, as reported by Mr. John Stanton, who acts as statistician for the companies, was as follows for the month of January, stated in long tons (2,240 lbs.) of fine copper:

	1898.	1899.	1900.
U. S. reporting mines.....	16,544	16,774	17,613
U. S. outside sources.....	1,200	1,850	3,400

Total United States.....	17,744	18,624	21,013
Europe reporting mines.....	5,566	5,852	.....
Total.....	23,300	23,476	.....
Exports, United States.....	11,030	9,204	14,035

The United States production shows a gain over last year of 2,389 tons, or 12.7%; of this increase 839 tons came from the reporting mines and 1,550 tons from the outside sources. The report of European production has not yet been received.

Tin is still pursuing an upward tendency. The demand is rather active and the prices quoted are as follows: Spot, 31c., 30½c. for March and 30c. for April.

Values in London have ruled higher also, spot having advanced to £141 10s. @ £141 12s. 6d., but three months' delivery is quoted at a heavy discount, the price for this being £135 @ £135 2s. 6d. This heavy backwardation does not speak very well for the future of the market.

Lead remains entirely unchanged at 4.65 @ 4.70c. New York and 4.60c. at St. Louis.

The foreign market continues firm at £16 12s. 6d. for Spanish lead and £16 15s. for English lead.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Pig lead presents no novelty. The market is very quiet and prices remain at 4.57½ @ 4.60c. for ordinary Missouri, 4.62½c. for chemical and 4.65c. for argentiferous brands.

Spanish Lead Market.—In January the average price of lead was \$5.20 reales per qtl. (£14 14s. 9d. per long ton) f. o. b. Cartagena, on an average exchange of 32.34 pesetas to £1. The average price of silver was 13.87 reales per oz. Messrs. Barrington & Holt report the exports in January at 1,113,196 kg., of which 604,916 kg. went to Marseilles, and 508,280 kg. to London.

Spelter.—Business has not revived as yet, consequently the market for this metal remains rather dull and neglected, with prices again somewhat easier than when last recorded.

The London market is also somewhat easier, good ordinaries being quoted at £22 10s. and special brands at £22 12s. 6d.

Spanish Zinc Market.—Messrs. Barrington & Holt, of Cartagena, advise us that prices continue flat. The export of blende and calamine in January has been more than the previous month, being 5,100,000 kg. to Antwerp.

Antimony.—Prices are unchanged at 10½ @ 11c. for Cookson's, 9¾ @ 9½c. for Hallett's and 9½ @ 9¾c. for U. S. Star.

Nickel continues firm and demand very brisk. Quotations are firm at 40 and 45c., according to size of order.

The British ship "Westgate" arrived at New York February 15th with 2,750 tons of nickel ore from New Caledonia, consigned to the Oxford Copper Company. This is the second cargo of New Caledonia ore received within a year, one of 3,000 tons having been reported in May, 1899. The New Caledonia ore averages about 7% nickel.

Platinum.—Demand is good, and prices are firmer. In large lots we quote \$17.75, and for smaller quantities, \$18 per oz., in New York.

For chemical ware (crucibles and dishes), best hammered metal, we quote as follows: In lots of 250 grams or more, 67½c. per gram, and for smaller quantities, 70c. per gram; unmanufactured platinum will be supplied in same quantities at 2c. less per gram.

Quicksilver.—Quotations remain unchanged at \$51 per flask for large lots, New York. For small orders the prices are \$52.50 @ \$54. The London price continues at £9 12s. 6d., with the same figure named from second hands.

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

Aluminum.	Per lb.	Per lb.
No. 1, 99½ ingots.....	33@37c.	Bismuth..... \$1.60
No. 2, 99½ ingots.....	31@36c.	Magnesium..... \$2.75@3
Roll'd sheets.....	42c. up	Phosphorus..... 40@50c.
Alum.-bronze.....	20@23c.	Tungsten..... 70c.
Nickel-alum.....	33@38c.	Ferro tungsten, 60%..... 60c.

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

LATE NEWS.

(From Our Special Correspondent.)

Mr. Henry E. Wood, one of the oldest assayers in Colorado, has just completed an ore testing plant in Denver, designed with a view of ascertaining economical methods of treatment for ores. The equipment consists of a 40 H. P. engine, 70 H. P. boiler, one 9 x 15 in. Blake crusher, two pairs of rolls for wet crushing, one pair for dry crushing, one battery of five 800 lb. rapid dry stamps, one Wilfley concentrator, single deck, one Wilfley concentrator, double deck, one small Wilfley concentrator, two 36 in. amalgamating pans, one Vezin automatic sampler, elevators, revolving screens of several sizes for wet and dry work, several small crushers, sample grinders, cyanide tanks, small reverberatory furnace, steam dryers, etc. The whole plant is heated by the Webster steam heating system. A Wetherill magnetic separator will be put in shortly, and as soon as possible other features, including jigs and chlorination barrel will be added, in order to make this the most complete plant of its kind.

Whatcom County, Washington.

(From Our Special Correspondent.)

Slate Creek District.—At the Eureka, Lane & Hayward, of San Francisco, have 2 shifts at work, with 10 stamps dropping on rich ore—iron sulphide, sylvanite and free gold. The mill is equipped with concentrating and chlorinating plant; a ½-mile covered tram connects mine and mill. During the past year upward of \$50,000 has been expended. The 5-stamp mill at the Mammoth has shut down until spring because of a broken cam. The mill crew has been transferred to the mine, where a 150-ft. winze is being sunk and a 500-ft. level driven. The ore is similar to that in the Eureka. A pay streak 130 ft. long is cut, varying from 2 to 4 ft. wide.

Leadville, Colorado.

(From Our Special Correspondent.)

New work, including 16 large shafts and involving an expenditure of over \$1,000,000 is now under way from Leadville to the eastern known limits of the gold belt at the head of Big Evans Gulch. Work on a large scale is under way on properties partially developed or formerly producers, such as the A. M. W. Pyrenees, Golden Lamp, Banker, Elk and Donovan, Fanny Rawlings, etc.

Developments along the East side of Adelaide Park, between the South shaft of the Mike & Starr and the Penn (better known as the Old Bruce), will be watched with interest. In the South Mike seams of rich gold ore are being found in the lime, and it is reported one sack alone worth \$800 was taken out in January. Lessees on the Park No. 1, north of the Lady Alice are finding ore identical with the gold ore on the Penn, indicating that a mineralization extends south or southwest along the faults and dykes which separates the so-called gold belt from the ore depositions to the west.

Home Mining Company.—This company is outputting fully 400 tons daily, leading everything in the camp for tonnage. The capital stock is almost certain to be increased from \$50,000 to \$1,000,000.

Lida.—This company, on the north slope of Little Ellen Hill, is preparing to sink to the sulphides. Manager Tim Goodwin has already opened up valuable ore bodies on the lime.

Amie.—A strike of old-fashioned chloride and lead carbonates in this mine on Fryer Hill is reported.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 230.)

New York. Feb. 16.

Heavy Chemicals.—Regular contract deliveries receive most attention. The scarcity of freight room and subsequent high rates limit imports.

Sal soda is in fair request. Bicarb. soda finds more inquiry both for home and export consumption.

We quote in large lots per 100 lbs., as below:

Table with columns: Articles, Domestic (F.o.b. Works, In New York), Foreign (In New York). Rows include Alkali, Caustic Soda, Sal Soda, Bicarb Soda, Bleach, Chi. Pot Cryst.

Acids.—Blue vitriol is in good request for export. Acetic business is only fair on contract.

Quotations are in large lots delivered in New York and vicinity, per 100 lbs. unless otherwise specified.

Table with columns: Article, Price. Rows include Acetic No. 8, Blue Vitriol, Aqua Fortis, Muriatic 15%, Muriatic 20%, Muriatic 22%.

Brimstone.—This market is firmer. An arrival of 1,050 tons at this port is noted. Two charters reported from Sicily for February—1,600 tons—

Pyrites.—Improve ordering by fertilizer people. Prices are nominally unchanged. We quote American pyrites as follows: Mineral City, Va., lump ores, \$4.50 per long ton (basis 42%),

Fertilizing Chemicals.—Moderate buying of the leading ammoniates by fertilizer manufacturers, owing to firmer prices resulting from limited stocks in the hands of producers.

and holders quote \$18 1/2 and up per ton f. o. b. Chicago. Concentrated tankage holds at \$17 1/2 @ \$18 per ton.

Azotine is selling at \$2.20@2.30 per unit. Fish scrap is nominal at \$20.50@21.50 per ton for dry f. o. b. factory, and \$11.50@12 for wet.

Nitrate of Soda.—The "Sirius" arrived last week with 21,000 bags. Quotations from dock at \$1.95 per 100 lbs., and from store at \$2.

Messrs. Jackson Brothers of Valparaiso, Chile, advise us under date of December 29th that their market is comparatively quiet. Sales of 95% for January shipment were made at 4s 11 1/4d@4s 10 1/2d (\$1.18@1.16), while 96% fetched 5s 2 1/4d@5s 2d (\$1.24), both alongside terms.

Salt peter.—Limited request at \$3.80 per 100 lbs. for crude, and \$4.50@4.62 1/2 for refined, according to grade and quantity.

Phosphates.—Florida miners are firm with their prices; in fact, some anticipate more money on export business. Tennessee rock shipments from Pensacola, Fla., in January, are reported at 15,392 tons, as against 11,448 tons last year.

Messrs. Swift & Company, also of Chicago, are expected to combine with Armour & Company in their new venture. It appears that the fertilizer combination has had the upper hand in purchasing the leading ammoniates from these two firms at practically its own valuation.

Ocean freight rates from Florida ports are about as follows. To Baltic ports, \$4.80 per ton; Continental, \$5.64, and Mediterranean ports, \$5.28, while from Savannah, Ga., to the United Kingdom, \$3.60 is asked.

Table with columns: Phosphates, F. o. b. Am. Ship. Port, C. i. f. U'n'd Kingdom or No Sea Ports, Per Unit, Per long ton. Rows include Pla. hard rock, Pla. land pebble, Peace River, Tem. rock, So. Car. rock, etc.

* F. o. b. Fernandina. † Punta Gorda. ‡ Mt Pleasant. § Fetteressa. Concentrated phosphates, 13@15%, average P2O5, 60c. per unit (\$3.40 per ton) at sellers' works.

Liverpool. Jan. 30.

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

In heavy chemicals buyers continue to find a difficulty in filling orders for prompt delivery, owing to makers being so fully sold, especially in the case of caustic soda, the price of which marks a further advance this week.

Bleaching powder is strong at about £6 15s. @ £7 per ton net cash for hardwood packages.

Chlorate of potash is in fair request at 3 1/2d. per lb. net cash. Bicarb. soda is quiet without change in price,

Sulphate of ammonia is rather firmer at £11 15s. @ £11 17s. 6d. per ton, less 2 1/2% for good gray, 24@25% in double bags f. o. b. here,

Nitrate of soda has improved, holders now asking £8 10s. per ton, less 2 1/2% for prime quality in double bags f. o. b. here.

MINING STOCKS.

Complete quotations will be found on pages 217 and 218 of mining stocks listed and dealt in at:

Table with columns: City, Stock Name. Rows include Boston, Colo. Springs, Denver, New York, Philadelphia, Spokane, Salt Lake, San Francisco, London, Mexico, Paris, Toronto, Valparaiso.

New York. Feb. 16.

In the coppers Amalgamated Copper showed good trading and advanced to \$95 1/4 on reported buying by Bostonians identified with Standard Oil interests. Anaconda made regular sales around \$45.

In the Colorado group Little Chief of Leadville sold at 18c. and Leadville Consolidated at 8c., and Small Hope at \$1.15. Mollie Gibson made a sale at 24c.; Work, at 33@34c.; Alma, at 18c.;

Quicksilver, common, of California, sold at \$2, and Plymouth at 20c.

American Smelting and Refining common brought \$41 1/4 @ \$42 1/2, and the preferred \$91 1/4 @ \$92. Federal Steel common was in demand as a dividend of 2 1/2% will be paid March 15th.

Boston. Feb. 14.

(From Our Special Correspondent.)

Much more activity has been apparent this week, though a boom is a long way off yet. The business has been chiefly in the blind pool stocks and shows signs of a preconcerted movement.

Today the market has been narrower, but prices generally steady. Mining stocks have been very quiet. Amalgamated touched \$95 1/2; Montana, \$278; Osceola, \$76; Franklin, \$15 1/2; Calumet, \$755 bid; Tamarack, \$193 bid; Arcadian, \$18 1/2; Old Dominion, \$20 1/2; Butte, \$66 1/2; Centennial, \$19 1/2; Mass., \$6; Copper Range, \$26 bid; Parrot, \$45 1/2; Utah, \$30 bid; Centennial-Eureka, \$25; United States, \$9 1/2 bid; Santa Fe, \$7; Isle Royale, \$27; Michigan, \$6 bid; Ysabel, \$3; Victoria, \$33 1/2; Cochiti, \$11 1/2; Baltic, \$21; American Zinc, \$17 1/2; Adventure, \$5.

Dominion Coal sold at \$42 1/2; New England Gas and Coke, \$19 1/2 @ \$20; Central Oil, \$17 1/2 @ \$18; United States Oil, \$19 1/2.

Denver advices say that the Animas Smelting Company has been incorporated to build another

large smelter in the Silverton district, where Boston capital is heavily invested. The new smelter will be adapted to handling low grade ore that is now dumped on account of the expense of shipment.

Treasurer Batchelder, of the United States Mining Company, in a circular to the stockholders, states that the directors have authorized the issue of \$1,000,000 first mortgage 7% bonds redeemable in ten years at 105, or exchangeable at or before maturity for stock at par, of which \$800,000 bonds will be issued at once. Each \$500 subscription entitles the stockholder to \$500 in bonds and 20 shares of full-paid stock, the same to be paid for at a rate not exceeding 10% per month upon call. Stockholders of record February 13th, will have the right to join in the subscription, each 133 shares of stock giving the right to subscription for \$500. All bonds not subscribed for by February 17th will be taken by a syndicate without commission. Rights are assignable. Stock transfer books will be closed February 13th-19th.

In an answer to an inquiry from a correspondent about a certain stock the Boston Herald says: "Whoever enters into partnership with trustees of a concern who never give an accounting of their trust has only his original folly to blame if the partnership turns out unsatisfactorily to himself. Shareholders who endure these things and the laws which permit them to continue are all at fault." This is what "The Engineering and Mining Journal" has always said; and it is good, solid truth, which ought to be specially appreciated in Boston just now.

Salt Lake City. Feb. 10.

(From Our Special Correspondent.)

Somewhat better prices prevail, particularly in the shares of producing mines, though most of the prospects rule dormant, while some buying for investment account is apparent. On the whole the signs of improvement previously noticed have a firmer foothold, lending encouragement that the market has reached bottom. A small sensation, bringing back a taste of old time to trading the past two days, was caused by a copper-gold strike in Yankee Consolidated. The shares jumped from 10 1/2 to 17, then back to 12 1/2 by an inside bear raid based on a report that the exposed ore body is in May Day territory. However, this afternoon all Yankee offerings are quickly taken and it is said over 150,000 shares were bought on orders from Tintic by people advised of the facts. An underground survey to locate this new development is being made.

Bullion-Beck shows further strength under the new regime. Centennial-Eureka did business between \$22 and \$23. Daly is in some demand in expectation of renewal of active mining after the annual meeting on the 20th. Dexter softens apace. Four Aces remains weak with prospect of another assessment. Grand Central is again under \$6; nothing was said about the dividend at the directors' meeting this week.

Mammoth's annual meeting was very much a McIntyre family affair. Mr. Samuel McIntyre does not believe in a treasury reserve and a \$40,000 dividend is promised March 1st, which has given the shares a little strength. May Day is higher and stronger. Independent of the Yankee Consolidated ore uncovering the mine is in fine form. Mercur has put on more strength by inside boosting; there are no outside offerings and but little demand.

San Francisco. Feb. 10.

(From Our Special Correspondent.)

The market was enlivened this week by an advance, which for a little while gave it a show of brightness and activity. This did not last long, but it left prices rather higher than before. It was an inside movement altogether.

The point of discussion now is cheap power and the milling of low-grade ores from the Comstock. No returns are in sight from the experiments made in that direction, and the public does not seem to take any interest in the matter.

Work in the Belcher, Challenge, Confidence and Consolidated Imperial mines has been suspended since January 1st.

Business on the Oil Exchange has been rather moderate. Sales are noted of Home Oil at \$3.80; Anaconda, 55c.

London. Feb. 3.

(From Our Special Correspondent.)

The South African mining market opened very weak this week, owing to the failure of the Spion Kop operations in the Natal campaign, and quotations fell all round. Afterward there was a good deal of buying from France and Germany on the part of operators there who considered it probable that Great Britain would abandon the war. Consequently prices firmed up considerably. These rises and falls are comparatively trifling incidents, for the business done is almost infinitesimal, and hardly any one thinks of embarking in speculation or in launching new ventures.

News as to the condition of the mines in the Transvaal during the war comes through very seldom, and is not always reliable. A cable re-

cently received in London, however, seems to be sent in good faith. This is to the effect that the Goerz group of mines, including the Geldenhuis Estate, May Consolidated, Lancaster and others, have so far suffered very little. These mines are so far uninjured by water, and the machinery is being kept in good order. This group of mines would naturally receive more consideration from the Transvaal government, as they are controlled chiefly in Berlin. The same report from Johannesburg mentions that at other mines, where there is no pumping operations, very little damage has been done by water entering the works so far, and that where the machinery has suffered it has been due more to neglect than actual violence.

The West Australian section really comprises the chief part of the mining market, and the discussion and speculation is centered as usual on the sulphide problem at Kalgoolie. The Associated Gold Mines, Limited, owning the Australian leases—formerly a Bottomly company—is acquiring quite an unenviable notoriety on account of the conspiracy of silence on the part of the directors. The output has greatly fallen off, the accounts are not clearly set forth, and the metallurgical problem of treatment of the ores appears to have stuck the board and managers. John Taylor & Sons have resigned their positions as consulting engineers to the company without giving any reason, and refuse to be drawn out on the subject. Vague circulars are sent out by the board attempting to reassure the shareholders, but definite information is entirely withheld. The Lake View Consols is also attracting considerable attention, and the publication this week of the report for the year ended August 31st, 1899, has revived interest in the shares, in spite of the recent reduction of the output. The profit for the year in question was over £600,000 on a capital of £250,000, which is more than twice as much as in the previous year, and it is not likely to be sustained.

The shares of the International Zinc Company, of Joplin, Missouri, are being introduced in London. This company was referred to in your columns recently as having been introduced in New York. The shares are being introduced here by a company called the Foreign Syndicate, Limited, which was registered as an English corporation in June last. The managing director is Mr. A. W. Wells, and the chief shareholder is Mr. O. P. Simpson, of 89 Stake Road, Boston, Massachusetts. Circulars offering shares in this International Zinc Company are being sent out by this company, and the \$1 shares are being offered at par. What they are being sold at in America we are not informed, nor is any information given on which to form an independent judgment.

Paris. Feb. 3.

(From Our Special Correspondent.)

The mining stock market continues rather strong and is active in most departments. The copper shares are generally higher and promise to remain so for the present. The metallurgical shares are also active and maintain their high prices. The announcement of dividends for 1899 is looked for with much interest. The Russian group, however, are rather uncertain, as the recovery from the crisis in the Empire is slow.

The market for the Transvaal gold shares has been much disturbed by the news from South Africa and has been in a doubtful state. News has been received from Johannesburg that the Government has issued an order authorizing the operation of the pumping machinery at certain mines in which French and German stockholders are largely interested, as well as certain other operations necessary for the care of the machinery. The list of mines named is as follows: Langlaagte Deep, Salisbury, City & Suburban, Champ d'Or, West Rand Mines, York, Violet Consolidated, Lancaster West, Lancaster, Rodepoort United Main Reef, Princess Estate, Rodepoort Central Deep, Bantjes Consolidated, Meyer & Charlton, New Goch, Geldenhuis Estate, May Consolidated, Glencairn, Reitfontein Colliery Springs (Transvaal Coal Trust), French Rand, Durban Rodepoort Deep, Main Reef Consolidated, Paarl Central, Langlaagte Estate Crown Deep, Jubilee, Henry Nourse, Jumpers Deep, New Kleinfontein, New Modderfontein, New Primrose, Van Ryn Gold Mines Estate. As to all the other mines, the officers and employees—such as remained—are ordered to leave the mines and to remain at such points as the Government may direct.

The output of coal from the districts of the Nord and the Pas-de-Calais is reported by the Comite Central des Houilliers as follows, in metric tons:

Table with 4 columns: Mine Name, 1898, 1899, Changes. Rows include Nord, Pas-de-Calais, and Totals.

The fact that the production of the Nord shows a decrease in the face of extraordinary demand and high prices, is not encouraging.

Some of our iron companies have resolved to arrange for their own supplies of coke, and thus

make themselves independent of the syndicates.

The Societe Lorraine de Carbonisation, with a capital of 3,000,000 francs, is in course of formation by eight of the chief iron-smelting companies in the Longwy District of France, which contribute in proportion to their share capital, for putting up coke ovens near Douai, in the Department du Nord—in a district very favorably situated as regards transports for obtaining coal and forwarding coke. Three hundred ovens are to be built at once; and if the supply of French coal should fail, coal from Great Britain will be used.

This action is looked upon as a warning to the coal mining syndicates, and may lead to an interesting fight. Azote.

ANNUAL MEETINGS.

Table with 4 columns: Name of Co., Locat'n., Date, Place of Meeting. Lists various companies and their meeting details.

* Special meeting.

DIVIDENDS.

Table with 4 columns: Name of Company, Latest Dividend (Date, Per share, Total), Total to date. Lists companies and their dividend information.

ASSESSMENTS.

Table with 5 columns: Name of Company, Location, No., Delinq, Sale, Amt. Lists companies and their assessment details.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Adams, Alamo, Alice, and various industrial stocks with columns for location, par value, and prices for Feb. 9, 10, 11, 12, 13, 14, 15.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Aetna, Adams, Alamo, and various industrial stocks with columns for location, par value, and prices for Feb. 9, 10, 11, 12, 13, 14, 15.

COAL AND INDUSTRIAL STOCKS.

Table of coal and industrial stock quotations, listing companies like Am. Sm. & Ref., Am. S. & W. Con., Am. Tin Plate, and various coal companies.

* Official quotations Boston Stock Exchange. Total sales, \$1,229. * Holiday.

SAN FRANCISCO, CAL.

Table of stock quotations for San Francisco, Cal., listing companies like Belcher, Best & Belcher, Caledonia, and various industrial stocks.

Official telegraphic quotations of San Francisco Stock Exchange

CALIFORNIA OIL STOCKS.

Table of California oil stock quotations, listing companies like Anaconda, Barker Ranch, Burlington, and various oil companies.

* California and Producers Oil Exchanges. Total sales, 6,125 shares.

PHILADELPHIA, PA.

Table of stock quotations for Philadelphia, Pa., listing companies like Am. Alkali, Bethlehem Iron, Bethlehem Steel, and various industrial stocks.

TORONTO ONT.

Table of stock quotations for Toronto, Ont., listing companies like Ontario, Alice A., Empress, Golden Star, and various industrial stocks.

SALT LAKE CITY, UTAH.

Table of stock quotations for Salt Lake City, Utah, listing companies like Ajax, Alice, Buckeye, Bullion-Buck & Co., and various industrial stocks.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing various companies like Anaconda, Am. Con., and others with their respective prices and sales figures.

Colorado Springs Mining Stock Exchange. Total sales, 1,932,613 shares.

DENVER, COLO.

Table of stock quotations for Denver, Colo., listing companies like Anaconda, Am. Con., and others.

Official quotations Denver Stock Exchange. Total sales, 111,460 shares.

SPOKANE, WASH.

Table of stock quotations for Spokane, Wash., listing companies like Butte & Boston, Conjunction, and others.

Official quotations Spokane Stock Exchange. Total sales, 3,300.

MEXICO.

Table of stock quotations for Mexico, listing companies like Chihuahua, Durango, and others.

PARIS.

Table of stock quotations for Paris, listing companies like Aciéries de Crésot, Boleo, and others.

LONDON.

Table of stock quotations for London, listing companies like Alaska Goldfields, Alaska-Mexican, and others.

*Ex-dividend.

DIVIDEND-PAYING MINES.

Table with columns: Name and Location of Company, Authorized Capital Stock, Shares Issued, Dividends (Paid, Total to Date, Latest), Name and Location of Company, Authorized Capital Stock, Shares Issued, Dividends (Paid, Total to Date, Latest). Lists various mining companies and their financial details.

G., Gold. S., Silver. L., Lead. C., Copper. Z., Zinc. This table is corrected up to Jan. 26. Correspondents are requested to forward changes or additions.

CHEMICALS, MINERALS, RARE ELEMENTS, ETC.—CURRENT PRICES.

Table with multiple columns listing various chemical and mineral products, their quantities, and current market prices. Categories include Abrasives, Acids, Alcohols, Aluminums, Ammoniums, Arsenics, Asphalts, Bariums, Bismuths, Borax, Bromines, Cadmiums, Calciums, Carbides, Carbonates, Chromes, Coppers, Cryolites, Explosives, Feldspars, Fluorspars, Gypsums, Graphites, Kaolins, Lead, Lime, Magnesites, Manganese, Mercuries, Micas, Monazites, Nickel, Nitrates, Oxides, Potashes, Potassiums, Silicas, Sulphates, Sulphur, Talc, Vanadiums, Zincs, and Zirconiums.

THE RARE ELEMENTS.

Prices given are at makers' works in Germany, unless otherwise noted.

Table listing prices for rare elements including Barium, Beryllium, Boron, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Germanium, Glucium, Indium, Iridium, Lanthanum, Lithium, Molybdenum, Niobium, Osmium, Palladium, Rhodium, Rubidium, Ruthenium, Selenium, Strontium, Tantalum, Tellurium, Thallium, Thorium, Uranium, Vanadium, and Zirconium.

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. This table is revised up to Feb. 3d. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Review of Chemicals and Minerals.