

ENGINEERING and MINING JOURNAL.

VOL. XXXII. No. 15.

RICHARD P. ROTHWELL, C.E., M.E., } Editors.
ROSSITER W. RAYMOND, Ph.D., }

NOTE.—Communications relative to the editorial management should be addressed to RICHARD P. ROTHWELL, P.O. Box 4404, New York.

Communications for MR. RAYMOND should be addressed to ROSSITER W. RAYMOND, P.O. Box 1485, New York. Articles written by MR. RAYMOND will be signed thus *; and only for articles so signed is he responsible.

SUBSCRIPTION PRICE, including postage, for the United States and Canada, \$4 per annum; \$2.25 for six months; all other countries, including postage, \$5.00 = 20s. = 25 francs = 20 marks. All payments must be made in advance. Parties accepting any other than our official receipt for subscriptions, from agents, do so at their own risk.

Advertising Rates.—See page ix.

Mr. D. B. Rich is our accredited representative for New York, Boston, and the Eastern States, and may be addressed at this office or 57 Clarendon street, Boston.

Mr. J. Viennot, 407 Walnut street, Philadelphia, is our accredited representative for Pennsylvania, Maryland, and Delaware.

Mr. A. H. Taylor, 159 Lake street, Chicago, is our accredited representative for Chicago and the Northwest.

REMITTANCES should always be made by Post-Office Orders or Bank Drafts on New York, made payable to THE SCIENTIFIC PUBLISHING COMPANY.

THE SCIENTIFIC PUBLISHING CO., Publishers,

P.O. Box 4404.

27 Park Place, New York.

CONTENTS.

EDITORIALS :	PAGE.		PAGE.
R. P. Rothwell.....	233	Production of Sulphur in Italy.....	240
Indian Gold Mines.....	233	Rail Tests in Germany.....	240
The American Institute of Mining Engineers.....	233	Dynamo-Electric Machines in Telegraphy.....	240
The British Iron and Steel Institute.....	233	The Volume of Air as Affected by Temperature.....	240
The Atlanta Cotton Exhibition.....	233	The Fluid Density of Metals.....	240
Dynamite Explosions.....	233	Barometric Pressure and the Discharge of Springs.....	240
Austrian-Alpine Iron-Works Consolidation.....	233	The Faure Battery and the Electric Light.....	240
Electricity and its Applications.....	233	Suspension-Bridges in France.....	240
The Position of Copper.....	233		
Capping the Climax.....	234	NOTE :	
The Waste of Anthracite.—II.....	234	Portable Electric Light.....	237
Santa Rosa, Mexico—A Mining District with Novel Features.....	236	GENERAL MINING NEWS :	
The Law as Affecting Mining and Metallurgical Interests.....	236	Arizona.....	240
The Magnetic Separating Machine at Pribram.....	237	California.....	241
On the Utilization of Wind as a Power.....	237	Colorado.....	241
Blasting in Fiery Mines.....	238	Dakota.....	242
Statistics of Tin.....	238	Georgia.....	242
Magistral in the Pato Amalgamation Process.....	238	Michigan.....	242
Petroleum Statistics.....	238	Montana.....	242
The Lemut Puddling-Furnace.....	238	Nevada.....	242
Specifications for Iron and Steel in Germany.....	239	PROPOSALS AND SALES.....	242
The Rozan Lead Desilverizing Process at Newcastle.....	239	FINANCIAL :	
The Krupp Gas Producer.....	239	Gold and Silver Stocks.....	243
Drilling Air-Holes in German Coal Mines.....	239	Philadelphia Mining Stocks.....	244
Electrolytic Deposition of Zinc.....	240	Copper and Silver Stocks.....	243
PROGRESS IN SCIENCE AND THE ARTS :		BULLION MARKET.....	229
The Lead Production of Italy.....	240	METALS.....	245
		IRON MARKET REVIEW.....	246
		COAL TRADE REVIEW.....	246
		FREIGHTS.....	247
		STATISTICS OF COAL PRODUCTION.....	237
		ASSAY DEPARTMENT.....	242
		Advertisers' Index.....	x

OUR managing editor, Mr. R. P. ROTHWELL, sails for Europe next week, and expects to be absent until the end of the year.

THE London *Mining World and Engineering Record* prints a table of 38 Indian gold mines, according to which the capital subscribed to date, presuming all the shares to have been taken up, is £4,099,705, of which £2,332,400 were paid to vendors, leaving £1,767,305 available as working capital.

THE fall meeting of the American Institute of Mining Engineers will be held at Harrisburg, Pa., on the 25th inst. The arrangements have not been fully completed; but we understand that the excursions will probably include a visit to the Pennsylvania steel-works at Steelton, to the Cornwall ore-banks, and other points of interest in the vicinity of Harrisburg.

THE announcement of the details of the coming meeting of the Iron and Steel Institute, to be held in London from the 11th to the 14th of the present month, shows that foreign metallurgists continue to take a very active part in its proceedings, quite a number of papers being submitted by them. We note that Capt. W. R. JONES, of the Edgar Thomson Works, will continue to enlighten our British rivals on the work performed in our iron and steel mills, and that Mr. J. HARTMAN, of Phila-

delphia, will give English metallurgists the benefit of his large experience in using anthracite as a blast-furnace fuel. The programme of the Institute is a promising one, and we shall return to it at an early date.

IN carrying the Atlanta Cotton Exhibition to a successful issue, the South has, for the first time, shown its earnest desire to go to work with a will. The awakening spirit of enterprise will, we trust, be carefully fostered and generally encouraged, and it is to be hoped that the movement already inaugurated of developing the enormous natural resources of the Southern States will grow in strength rapidly. With expanding local markets, and the aid of capital from other quarters, the mineral wealth of the South, its coal-fields, iron-ore deposits, and veins of base and precious metals will no longer lie idle, but will contribute to the wealth and resources of the country. Let the business men of the South take the helm.

THE terrific explosion of a whole car-load of dynamite in the yards of the Rock Island Railroad, at Council Bluffs, again calls attention to the conveyance of that explosive. Every occurrence of this kind naturally creates a feeling of insecurity, which finds expression in obstructive laws and strict regulations on the part of common carriers, and thus places additional burdens on our mining industries. The accident again proves the necessity of the greatest precaution in preparing for shipment and in handling, and should lead manufacturers to take such measures as effectually to protect the explosives in transit; for instance, by detailing an experienced employé to accompany every large shipment, or other means. Secrecy or the employment of fictitious bills of lading evidently does not pay.

AFTER considerable haggling, the various iron-works in the Austrian-Alpine district have been consolidated, forming possibly one of the largest "amalgamations" of recent times. A scheme for the capitalization of the shares of the various works at a rate into which they have been either cajoled or bullied is now approaching completion. Among those who have accepted are the Innerberg, Neuberger, Hüttenberg, Vordernberg-Kiflach, St. Egydi Kindberg, and Steier works, and the works of the once famous Baron Fridau will probably join also. As a striking instance of the growing tendency in the iron trade toward centralization and unity of management, this is worthy of attention, especially as in our own country similar movements are making in various quarters. Thoughtful observers are watching it with much solicitude, which the fact that the march of progress in metallurgy is evidently in the same direction is not calculated to allay.

THE application of electricity for many practical purposes has grown so rapidly within the last few years, and the success in some fields has been so startling and has suggested such possibilities, that the general public takes an eager interest in all that relates to it, and many busy and ingenious inventors and engineers are working in its various specialties. Appealing as they frequently do to the masses for aid, they have often allowed themselves, or others for them, to speak in a sensational style that has done much injury to the cause of real progress, and it is with much satisfaction that we note a tendency in a better and safer direction. Calm examination and the presentation of specific data are commencing to supersede the glowing generalities which often sounded very nearly like passages from one of JULES VERNE'S works. The public has learned that a very meritorious invention may be unscrupulously handled by speculators, and the early enthusiasm has given way to a desire to obtain more and better information on such matters. The Electrical Exhibition now being held at Paris is contributing much toward that end, and it gives evidence, too, of the efforts making to apply electricity to various departments of mining and metallurgy. At the present early stage of progress, many points are not thoroughly understood, and there is noticeable the absence of co-operation between the electrician and the engineer; and before the one has fully appreciated the requirements of the other, and has command of the means at his disposal, errors will be made, and the new inventions will not have assumed a practical shape. We hear of electrical hammers, rock-drills, elevators, tramways, and processes, and it is likely that they will in the near future claim and receive much attention. While there is much that gives promise of ultimate success, and developments ought to be closely watched, it should not be forgotten that all these appliances will have to go through a period in which means are adapted to the ends. As probably capable of adding valuable methods to those now in use for the utilization of our mineral wealth, engineers will welcome the electricians, but they should move forward with the caution that past experience has shown them to be necessary.

THE position of copper is the subject of much comment and speculation, and the outlook, as affected by present and prospective output of the mines of the various districts, is widely discussed. The consumption

Hence, as a guide in determining the causes of the waste and seeking remedies for it, their figures possess less value. They are very interesting, however, for the estimation of the value of coal-lands, and we therefore make room for them here. Mr. GAY holds that, in working the Mammoth vein in the Shenandoah-Girardsville basins, even 25 per cent of the amount of coal opened in mining is too high an estimate of the proportion which actually reaches the market, and in support of his views quotes figures from two collieries which showed only 17 and 24 per cent. Mr. STEARNS finds, as the result of measurements and computations made in reference to the Wyoming Valley, for veins ranging from 4½ feet to 12 feet, a waste going, in one case, as high as 69 per cent, but generally varying from 50 to 55 per cent. Since, however, all of the pea coal and most of the chestnut went to the waste-heap at the time when the areas he has chosen were worked, the percentage of loss ought to be decreased by from 7 to 9 per cent. Mr. JOSEPH S. HARRIS, in a recent report to the Philadelphia & Reading Railroad Company, on the basis of calculations made by the late Gen. HENRY PLEASANTS, estimates that 27 per cent fairly represents the proportion between shipment and content on the company's coal estate. Mr. PLATT, summarizing the data obtained, expresses the belief that the deep basins of the Schuylkill region, which hold the future reserve of the anthracite coal supply, will hardly yield more than 30 to 33 per cent of the total coal in the ground. He reserves for a future occasion a discussion of the question how far this waste may be overcome by changes in the system of mining. The report, however, contains a very valuable contribution on this subject, the clear presentation of which is of course the aim of the investigation so well begun under the auspices of the Geological Survey. Colonel BROWN, who, many years ago, under special circumstances, urged the adoption of the panel system of mining, republishes here a description written in 1870, and adds an account of the changes which ten years' experience has suggested. This sketch is accompanied with plates of drawings which clearly show the methods adopted. Colonel BROWN does not enter into details of comparative cost of the panel system and that in vogue in the district; but he states in a general way that the additional outlay for opening will be fully counterbalanced by a larger quantity of coal extracted; the waste, with moderate degree of skill in using the panel system, being only 20 per cent. He asserts that for mining the Mammoth vein on pitches varying from 15° to 35° that system is the best which he has tried, and that it is the only plan by which 60 per cent of the coal can be obtained when the top is rotten, the coal is free, and there is gas.

The most elaborate portion of the report before us is that relating to breaker waste, which includes chapters V., VI., and VII., and occupies 80 out of the 129 pages of the volume, a fact accounted for by the mass of figures readily available. The quantities of coal and rock delivered to the breaker are almost exclusively obtained by computation, the number of mine cars hoisted alone being known; and from the total weight of coal shipped and dust made in the breaker, it appears that the amounts of material brought out of the mines by cars are generally considerably overestimated. This is due to the presence in the coal hoisted of varying quantities of dust, which increases the weight. Thus the quantities going into the breaker are only roughly known for the great majority of cases, while the figures for prepared coal shipped and dust made are based on accurate weights. Generally no record is kept of the rock hoisted and thrown over the dump, and the waste is consequently understated; but on the other hand, it has been customary with many to charge as wastage to the breaker much loss due to the presence in large amount, in the coal taken from the mine, of impurities which are the necessary result of such a system of mining as "working by run." Account must also be taken of the coal used at the mines under boilers, amounting to about 4 per cent, coal sold to employes, and coal lost in getting from the colliery to the weigh-scales. Colonel BROWN has made an interesting series of experiments on a small scale, which are given in detail, but which it would lead us too far here to follow. From these he deduces the following, assuming that the coal has been freed from all refuse matter, such as slate, bone coal, and fine dirt: Waste in the mine due to coal-cutting, blasting, etc., by which dust that is afterward hoisted is formed, 10 per cent; waste in the breaker proper, in the breaker rolls, 11.27 per cent; in screening, 4 per cent; in loading over lip screens from chutes into cars, 2 per cent; a total of 27.27 of waste, which represents the loss by attrition in the mining and preparation of clean coal rendered too small to be marketable. In addition to this, 2½ per cent may be estimated for leakage of coal in loading, transportation, and unloading into yard or bin. For four collieries working hard white ash coals of the Mahanoy-Shenandoah basin, full details are given, which we tabulate. [See next column.]

All of these collieries worked Mammoth coal on pitches varying from 13 to 77 degrees, the average thickness varying from 20 to 40 feet.

A record of 27 collieries of the first and second basins shows that the percentage of coal shipped to market was subject to very wide variations, being in some cases as low as 44 per cent, and in others as high as 75 per

cent. In two instances, even more favorable returns have been made; but though the conditions of mining were such as to permit a high yield, Mr. PLATT hesitates in accepting them. The results of the working of the 27 breakers above alluded to are due to conditions varying so widely that a general summary would be insufficient and averages misleading. It is

COAL AND ROCK HOISTED AND ITS PASSAGE THROUGH THE BREAKER.					
	Colorado Colliery.	Shenandoah Colliery.	Lehigh Colliery.	Packer Colliery.	Continental Colliery.
<i>Hoisted from Mine.</i>					
Coal to breaker..... tons.	187,541	257,320	180,042	363,123	79,902
Rock hoist..... "	1,877	11,231	16,918	20,368	299
Total..... "	189,418	268,551	196,960	383,491	80,201
Coal shipped..... "	89,780	136,248	85,017	104,860	33,254
Boiler coal..... "	5,235	6,919	5,921	6,278	938
Rock dumped..... "	20,758	24,895	12,151	4,818
Dirt and slate dumped..... "	70,798	30,000	68,072	141,939	26,151
Dirt washed..... "	27,129	8,881	20,046	14,741
Rock hoisted..... "	1,877	11,231	16,918	20,368	299
Total..... "	188,446	268,551	196,960	383,491	80,201
Coal..... per cent.	50.4	53.3	46.2	52.4	42.6
Refuse..... "	49.6	46.7	53.8	47.6	57.4
<i>Waste Distributed.</i>					
Rock refuse..... "	12.0	13.5	14.7	13.5	20.0
Breaking and screening..... "	9.3	9.8	8.5	9.6	7.8
Slate picked at breakers..... "	4.0	4.0	4.0	4.0	4.0
Loading over lip screens..... "	1.2	1.2	1.1	1.2	1.0
Going to weigh-scales..... "	1.0	1.0	1.0	1.0	1.0
Blasting (10 per cent) and refuse..... "	22.1	17.2	24.5	18.3	24.6
Total..... "	49.6	46.7	53.8

* Including 1194 tons coal used for employes.
† Including 22,101 tons jig-dirt and slate.

necessary to note, however, that the coal obtained and the breaker-dust and slate only are given, no account having been kept of the rock hoisted from the mine and sent to the dump directly. This carries the waste lower than it would be if it were calculated on the whole output of the mine, as in the table given above.

For the Lehigh, Wyoming, and Lackawanna basins, the breaker-waste is difficult to get at, because the dust is usually washed from the breaker, and hence the figures given vary widely. For the Prospect Colliery, working the Baltimore vein, the proportion of dust was proved to be 21.4 per cent. In the Lackawanna region, it was found to be 14 per cent in one case, and was estimated as high as 30 per cent for other parts of the field. For the Wyoming Valley, Mr. JOSEPH S. HARRIS furnishes a series of results giving the actual breaker-waste, and at the same time showing the saving effected by modern steel-tooth crushers, and the importance of the physical structure of the coal as affecting the sources of loss.

Diamond breaker, Baltimore vein..	Loss..	11.88 p. c.	Steel-tooth crusher.
Empire " "	Loss	11.96 "	Old-style "
" " Hillman " "	Loss	8.03 "	New " "
" " " "	Loss	17.68 "	Old-style " "
" " " "	Loss	11.96 "	New " "
Ashley No. 6 " "	Loss	11.56 "	" "
" " " "	Loss	10.99 "	" "
" " " "	Loss	5.88 "	" "
Sugar Notch No. 10 breaker.....	Loss	18.75 "	Old-style rolls.
" " " "	Loss	13.75 "	New " "
Lance No. 11 " "	Loss	15.80 "	Old-style crusher,
" " " "	Loss "	prepared rolls.
Nottingham No. 15 " "	Loss	12.32 "	Old-style rolls.
Reynolds No. 16 " "	Loss	17.54 "	Old-style prepared
" " " "	Loss "	rolls.

Our attempt to present a summary of the mass of data collected for the report before us has led us beyond the limits of a review without enabling us to offer more than a few of the more important and suggestive facts, and to give a general idea of the many circumstances that seriously affect waste. It would be impossible, at the present stage of inquiry, nor has Mr. PLATT made the effort, to establish any laws or draw general conclusions as to the relations which the various causes tending to increase or modify waste bear to one another. He and those co-operating with him have reconnoitered the field, and in this preliminary work they have been eminently successful. Some light has been thrown on this difficult subject, and enough has been learnt to stimulate a desire for more information.

In conclusion, we may be permitted to say a few words on a map which accompanies this report, and which has also been added to the volumes recently issued by the State on the reports of the Mine Inspectors. In accordance with plans which Mr. C. A. ASHBURNER some time ago laid before the Institute in detail, he has drawn a map of the Mahanoy and Shenandoah coal-basins which, as a record of underground topography and mining operations, is unique. The system is likely to be generally adopted, although one of the advantages claimed for it, a closer estimation of the coal area contained in any field thus mapped, is not likely to be as important, at least as far as the anthracite regions are concerned, as Mr. ASHBURNER appears inclined to believe. Those who have experience in estimating coal areas hold that the amount to be added to

the surface acreage by reason of the heavy pitch of the veins is fully counterbalanced by the quantity of coal crushed in the folds and rendered unmarketable. Mr. ASHBURNER gives in his map the shape of the floor of the Mammoth bed by contour lines 50 feet apart, with the areas of top and bottom bench worked out and under development, and the slopes, shafts, tunnels, and gaugings constructed on the eight other beds of the region. Though involving an immense amount of labor and embracing naturally a very large mass of data, the map, which is made on a scale of 300 feet to an inch, is clear throughout, and as an admirable example of *multum in parvo*, achieved by the use of scientific and systematic symbolism, reflects much credit upon the Survey.

SANTA ROSA MEXICO—A MINING DISTRICT WITH NOVEL FEATURES.

Written for the Engineering and Mining Journal by W. H. Adams.

Considering the many difficulties met with in nearly every mining camp, in the business of extracting the precious metals from ores, I think you will be interested in the description of a mining region which has been little written about, and, lying as it does in the farthest habitable belt of the metalliferous ranges which make old Mexico famous, has escaped the attention of venturesome capital until very lately. That attention has not been drawn to so favored a section can only be accounted for, as we can account for its present very limited area, by the danger from Indians. In a belt of country about 100 miles west of the Rio Grande River, a spur of the great central Mexican sierras forms the natural barrier, in whose breaks or fissures lie hidden the deposits of metals, which, from Zacatecas on the south to Chihuahua on the north, constitute an irregular broken chain of mountains little known at present; prospected at intervals for several hundred years, worked spasmodically during times of peace, and coming into prominence very soon by reason of the great natural advantages they possess. At their base lie the fertile plains of Coahuila. These cattle-ranges have been the target for predatory bands of Indians; but, thanks to the energetic measures of the government troops, there seems now to be no remnant of a tribe remaining to vex our souls and ruin our plans.

The entire valley region is underlain by sedimentary limestone, and coal of varying density has been opened in many exposed points along the river-beds. At the base of the mountains which lie between Santa Rosa (called here Villa de Musquiz, to distinguish the town from others of like name in adjoining States) and a point probably fifteen miles lower down, this coal is thrown to the surface, and is mined in perpendicular veins which vary from three to eighteen feet in width. Here is the singular sight of coal mining and silver mining within a mile of each other. The coal is fine-grained, semi-bituminous, and cokes readily, yielding 60 per cent of firm coke, and carrying 20 per cent of ash. Lying next the coal is a vein of compact yellow clay, mined and delivered to yard for one dollar per ton, which on exposure disintegrates and is made into brick, capable of standing any ordinary test which our fire-brick are put to, such as furnace-linings, refining tests, boiler-walls, coke-ovens, etc. Also, underlying the coal, a sandstone is mined which is largely used by all Mexicans for their furnaces, and the volcanic rock of the table-lands is employed for the same purpose, standing heat very well. Below in the valley, marl and limestone are found in beds. The mines are generally found within half a mile of the upheaval line, and while the stratification is N. E. and S. W., the breaks across the stratification are always north and south. These breaks are of varying extent, and center in vast amphitheaters with sloping sides, formed of disintegrated rock, and rising layer on layer for a thousand feet above the basin slope in every direction outwardly. Naturally in such a breaking up of deposited rocks the fissures are of enormous proportions, and we now find there mines of low-grade ores almost without limit. The character of the ores varies somewhat, measuring from the volcanic centers. The nearest deposits are oxides of iron and lead, which form the largest proportion of the vein-matter, and outcrop in places so closely intermingled with blue limestone as to remind one of the jasper boulders at the New York iron mines, Lake Superior. At the Cedral mines, which are on the extreme southern end of the developed belt, the vein-matter consists of lead and iron oxides, shaded from black and brown up to brilliant red, near which latter the richest pay-streaks are found. This vein-matter is interspersed with boulders and nodules of heavy-spar, clay, and close-grained limestone. Pay-streaks are easily traceable in the vein-matter, and sprinkled over the surface can be seen the blue-black, partially decomposed sulphides of lead and silver, which in some places are massive and carry from 200 to 600 ounces of silver per ton. From one mountain I estimate that over half a million tons have been extracted to date, and at no place is the vein worked 60 feet below the bottom of the adjoining arroyo or creek-bed. No water is found in this mine, but all the Spanish and Mexican work was done by packing to surface on backs of men and then by "burros" to the water springs half a mile below in the cañon.

Other mines belonging to the Cedral Company, nearer the foot-hills, disclose solid vein-matter of unknown extent—sulphides of lead, iron, zinc, and carrying variable amounts of silver. The extent of these deposits would warrant the erection of a plant to run 100 tons daily from July 1st, 1882, although the developments have as yet been superficial, outside of work done by Mexicans. The ores, without much sorting, can be made to run in blast-furnaces without fluxes other than found in the different mine ores, and the yield can safely be placed at twenty to thirty ounces silver per ton, with twenty per cent lead. With good coking coal at less than four dollars per ton delivered, and wood at \$2.50 per cord, it requires but little argument to forecast the future of such a mining property. At present, this company is mining silver ore, coal, fire-clay, marl, limestone, and sandstone; making brick, running a saw-mill, smelting ores to base bullion, and refining the bullion, with the production of silver bars. About two hundred men are employed, mostly Mexicans, who are, as a rule, a valuable class of workmen if employed at any thing they understand. Wages in the district range from 50 cents to \$1 per day,

underground work being eight and outside labor ten hours per day. It follows from this, that food and living expenses are very small, compared with most mining districts. Several mines not working at present have exceptional records of past production, and will be opened again when they are properly introduced to Americans. Coal-beds of wide extent have lately been opened on the Sabinas River, 25 miles below in the valley, and capital only is required to develop them into "bonanzas," as railroads will soon be completed within a short distance, and "coal in Mexico" will be a rarity and a fortune to the lucky owners.

THE LAW AS AFFECTING MINING AND METALLURGICAL INTERESTS.

Mining Lease—Royalty—Amount to be Mined—Mining with Advantage.

In *Kraber's Appeal*, decided by the Supreme Court of Pennsylvania, on May 23d, 1881, L. J. & I. C. Dellone leased, in 1868, to Kraber & Nes a piece of land for mining purposes. By the articles of agreement, the lessees were to erect the necessary machinery and mine two thousand tons of ore per annum, and pay a royalty of one dollar per ton for the amount mined, and pay \$2000 per year whether two thousand tons were taken or not, "provided that quantity is to be had and can be got on the said demised premises in each year, and provided, also, that a sufficient quantity of water can be had on the said field to wash such ore as shall be necessary with the lump ore to make up the two thousand tons per annum;" and, in case of deficiency of ore or water, to pay for the ore actually mined at the rate of one dollar per ton. The lessees entered and mined. On May 10th, 1869, they transferred their lease to the Thomas Iron Company, which company entered and worked the mine until August 18th, 1869, when it quit work, alleging that the ore had so deteriorated that working the mine was unprofitable, and offered to surrender the lease and possession of the premises. The lessors brought an action at law against the original lessees, and obtained judgment for the royalty for one quarter of a year. The lessees and the Thomas Iron Company filed a bill, setting out, *inter alia*, the above facts, and averred that, owing to the unmerchantable character of the ore, they had sustained great loss in working the same, and prayed for a decree ordering the cancellation of the lease and restraining the lessors from proceeding in their action at law. After an answer, the case was referred to a master, who found that there was plenty of ore to answer the contract, although it was of a poor quality and not to be profitably worked in seasons of low prices, but that it was not so unmerchantable as to be a substance different from that contracted for. He accordingly reported a decree dismissing the bill. Exceptions being filed, after argument, the Common Pleas, *Fisher, P. J.*, delivering the opinion, affirmed the report for the following reasons: "First, because the party plaintiff can make every defense that could be made were suit brought on each payment when it becomes due, as stipulated in the lease, and because the defendants in this bill would be deprived of the privilege of showing that at certain times the ore could be mined and disposed of to advantage, although it might not be marketable at other times, depending upon the demand or want of demand for iron, should they be enjoined from proceeding at common law to enforce their claim. Our opinion is, that in any one year or years in which the ore was marketable, and could be used to advantage, the plaintiffs in the bill would be obliged to pay the defendants the amount stipulated in the lease. Second, because the evidence is too vague, uncertain, and contradictory to enable us to make a decree in favor of the bill; and because, also, there is not that preponderance of evidence on the part of the complainants in this bill as is required to enable the court to grant the relief asked for." The complainants appealed.

PER CURIAM: We think the interpretation of the agreement, given by the court below, was substantially correct. The concluding part of the agreement, properly interpreted, would read as if written as follows: "And if the parties of the second part can not get out two thousand tons gross per year, because of a deficiency of ore or of water, so that two thousand tons can not be mined with advantage, then the parties of the second part shall pay for the ore mined by them at one dollar per ton, as aforesaid." The clause evidently goes in relief of the lessees, if, by the scarcity of ore or of water, two thousand tons can not be advantageously mined; but what can be mined advantageously must be paid for. We think the conclusion of the master did not reach the point that the ore had deteriorated so far as to become entirely or substantially unfit for furnace use. Indeed, he does not positively find that there was such deterioration, while it is conceded that the top ore was good when the contract was executed. His finding went so far as the evidence would seem to justify him; and the result is this, that there is plenty of ore to answer the contract, and that, though poor in quality, and not profitable to be worked in seasons of low prices, yet it is not wholly unfit to be worked, and can not be pronounced to be so unmerchantable as to be a substance different from that contracted for. What future experiments may prove to be its real character we can not say, but must decide upon the present state of the case.

Decree affirmed at cost of appellants.

H. E.

Patents—Infringement—Supplying New Parts to Machine for Parts worn out or damaged—Combination Patent.

The purchaser of a machine composed of distinct parts can put in new parts when the wear and tear of the machine requires them, the identity of the machine being preserved, without being liable to the patentee for infringement. But if the patent is for separate and distinct elements of a combination, the use of such new parts will be an infringement of the rights of the patentee.—*Gottfried vs. Conrad Scipp Brewing Company*. United States Circuit Court, N. D. of Illinois, June, 1881.

H. E.

Contract—Negligence or Want of Skill—Damages.

Under a contract for work to be done, if the work is unskillfully done, or there is a failure to do it at all, damages can be recovered for any injury resulting from negligence, carelessness, or want of skill in the discharge of the duty imposed by the contract.—*Adams vs. Robinson*. Supreme Court of Alabama, May, 1881.

H. E.

THE MAGNETIC SEPARATING MACHINE AT PRIBRAM.*

The accompanying engravings show a magnetic separating machine, of which two are in operation at the Lill ore-dressing mill, at Pribram, for separating iron ore from zinc-blende, these being freed from other material by the ordinary concentration processes, and being then in the form of a powder, the grains less than 1 mm. (0.04 inch) in diameter. This powder is composed of spathic iron ore and zinc-blende, and is roasted in a small oven, with frequent stirring, for an hour, when the iron ore is rendered sufficiently magnetic. It is then placed in the hopper of the machine, which is shaken by a cam *A*, keyed to an iron shaft, and moved by belting and pulleys. The ore falls from the mouth of this hopper into a hollow cylinder of wood, with open ends, around the circumference of which horseshoe magnets *B* are set into the wood, so that their poles project about 10 mm. (0.39 inch) into the inside of the drum or wooden cylinder. Outside the drum, and 40 cm. (15.75 inches) apart, pieces of hard wood *C* are nailed. They are triangular in section, and, by the revolution of the drum, raise a stiff and elastic wooden spring *D* 1 meter (3.28 feet) long, 6 cm. (2.36 inches) wide, and 3 cm. (1.18 inches) thick at the base, coming to an edge at the apex.

When the triangular cam releases the wooden spring, the latter strikes the drum a sharp, quick blow, sufficient to knock off any particles of zinc-blende that may have attached themselves to the magnets, or the inside periphery of the drum, and partially jarring off the particles of iron ore that are attached to the magnets in the portion of the drum that is uppermost, and close to the elastic stick, but not the more strongly magnetic pieces of ore.

The iron ore that reaches the upper portion of the drum and is then jarred off falls on a sheet-iron shoot *N*, and the strongly magnetic particles are now swept off the magnets into the sheet-iron by means of a revolving brush *E*, aided by the jarring of the wooden spring, and run through the shoot into a receptacle *F*. The brush is provided with stiff bristles, and has two motions, one a revolution on its axis, given by a screw and pinion *G*, and the other a back and forward motion, produced by a crank *H*, operated by a pulley and belting on the other side of the drum. Within the axle of the brush, which consists of a piece of gas-pipe, is a ball and socket joint *I*, which permits this double motion. The large wooden cylinder has a narrow iron band running around its edge on both sides, which fits into four small grooved wheels *J*, on which the drum rests; two of these wheels are connected by a shaft, and the other two are disconnected from the first two and from each other. Motion is communicated to the first-mentioned grooved wheels by a belt-pulley *R* on the same shaft, while the latter two merely support the drum and turn with it. A small pulley on the same shaft as the connected grooved wheels gives motion by means of a cord belting to a horizontal pulley *L*, at the base of the upright shaft *M*, on which the screw *G* is cut, which turns the pinion keyed to the axle of the brush. On the other side of the drum is a pulley which turns the shaft on which the cam belonging to the hopper is placed, and communicates motion by means of a belt and small pulleys to another shaft, which near the middle is bent into a crank, and gives the backward and forward motion to the revolving brush. In one machine, small horseshoe magnets, to the number of 511, are used. These are the ordinary-sized magnets which are sold as toys in the philosophical instrument shops, and are 8 cm. (3.15 inches) long, 1.5 cm. (0.59 inch) wide, and made of 3 mm. (0.12 inch) plate. The other machine has 150 very large horseshoe magnets, 20 cm. (7.87 inches) long, 3 cm. (1.18 inches) wide, and made of 6 mm. (0.24 inch) plate; in addition there are 104 small ones. The feed is quite slow, and, to obtain the best work, the machines must not make more than five revolutions a minute. Each machine separates four cubic feet of iron ore from the zinc-blende in a day of twelve hours. They have been thirteen months in use, and are very well liked, the preference being given to the one working with small magnets, as the large ones make the machine very heavy, so that it does not run smoothly. The separated zinc-blende falls to the bottom of the drum, and, by the slow revolutions, gradually works toward the sides, where it falls into troughs prepared for its reception. The first operation is to separate the original powder into an iron ore containing some blende, and a blende containing some iron. These are each reworked separately, and the division is then considered complete.

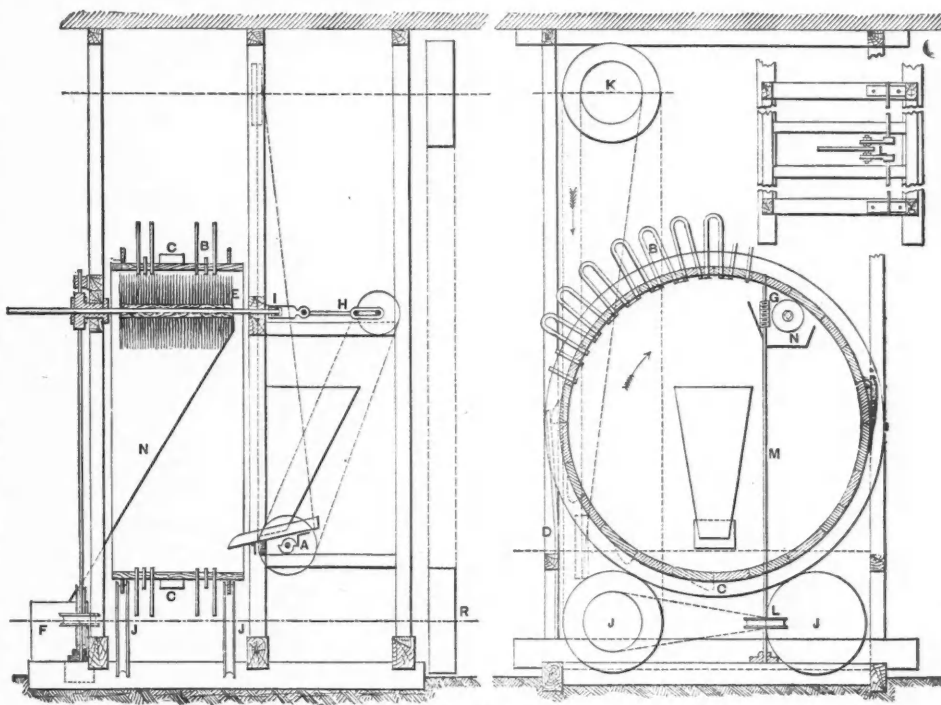


Fig. 11
MAGNETIC SEPARATING MACHINE.

*From a paper on Ore-Dressing and Smelting at Pribram, Bohemia, read by Ellis Clark, Jr., of Philadelphia, before the American Institute of Mining Engineers, at the Philadelphia Meeting, February, 1881.

ON THE UTILIZATION OF WIND AS A POWER.*

By Sir William Thomson.

When we look at the register of British shipping and see 40,000 vessels, of which about 10,000 are steamers and 30,000 sailing ships, and when we think how vast an absolute amount of horse-power is developed by the engines of those steamers, and how considerable a proportion it forms of the whole horse-power taken from coal annually in the whole world at the present time, and when we consider the sailing ships of other nations, which must be reckoned in the account, and throw in the little item of windmills, we find that, even in the present days of steam ascendancy, old-fashioned Wind still supplies a large part of the energy used by man. But however much we may regret the time when Hood's young lady, visiting the fens of Lincolnshire at Christmas, and writing to her dearest friend in London (both sixty years old now, if they are alive), describes the delight of sitting in a bower and looking over the wintry plain, not desolate, because "windmills lend revolving animation to the scene," we can not shut our eyes to the fact of a lamentable decadence of wind-power. Is this decadence permanent, or may we hope that it is only temporary? The subterranean coal-stores of the world are becoming exhausted, surely and not slowly, and the price of coal is upward bound—upward bound on the whole, though no doubt it will have its ups and downs in the future as it has had in the past, and as must be the case in respect to every marketable commodity. When the coal is all burned, or long before it is all burned, when there is so little of it left and the coal mines from which that little is to be excavated are so distant and deep and hot that its price to the consumer is greatly higher than at present, it is most probable that windmills or wind-motors in some form will again be in the ascendant, and that wind will do man's mechanical work on land, at least in proportion comparable to its present doing of work at sea.

Even now it is not utterly chimerical to think of wind superseding coal in some places for a very important part of its present duty—that of giving light. Indeed, now that we have dynamos and Faure's accumulator, the little want to let the thing be done is cheap windmills. A Faure cell containing 20 kilos of lead and minium charged and employed to excite incandescent vacuum-lamps, has a light-giving capacity of 60-candle hours (I have found considerably more in experiments made by myself; but I take 60 as

a safe estimate). The charging may be done unobtrusively, and with good dynamical economy, in any time from six hours to twelve or more. The drawing-off of the charge for use may be done safely, but somewhat wastefully, in two hours, and very economically in any time of from five hours to a week or more. Calms do not last often longer than three or four days at a time. Suppose, then, that a five-days' storage-capacity suffices (there may be a little steam-engine ready to set to work at any time after a four-days' calm, or the user of the light may have a few candles or oil-lamps in reserve, and be satisfied with them when the wind fails for more than five days). One of the 20-kilo. cells, charged when the windmill works for five or six hours at any time, and left with its 60-candle hours' capacity to be used six hours a day for five days, gives a two-candle light. Thus thirty-two such accumulator cells soured would give as much light as four burners of London 16-candle gas. The probable cost of dynamo and accumulator does not seem fatal to the plan, if the windmill could be had for something comparable with the prime cost of a steam-engine capable of working at the same horse-power as the windmill when in good action. But windmills as hitherto made are very costly machines; and it does not seem probable that, without inventions not yet made, wind can be economically used to give light in any considerable class of cases, or to put energy into store for work of other kinds.

PORTABLE ELECTRIC LIGHT.—The Faure accumulator has been used in connection with a Swan incandescent electric lamp to produce a portable lamp of two candle-power, thus showing, theoretically, at least, the possibility of providing a light that will not cause explosions in coal mines by the ignition of the gas. Mr. Swan, whose lamp, by the way, is very similar to that of Edison, stated at the meeting of the British Association that a two-cell Faure battery could keep the light going for six hours.

* From an address delivered before the British Association.

BLASTING IN FIERY MINES.

In the *Revue Universelle des Mines*, M. Oscar Bustin, of the Sarts Collieries, Belgium, proposes a method for preventing the explosions of fire-damp due to the use of powder in blasting. He calls attention to the large percentage in the accidents directly traceable to blasting, especially in small seams where hauling and ventilation roads must be made by taking away a portion of the top or bottom. Notwithstanding all the precautions observed in doing this work, during the night shifts explosions frequently occur; and M. Bustin proposes to guard against the danger in the future by the use of carbonic acid. He urges that this gas be conducted to the vicinity of the working faces under pressure, by means of pipes from portable underground reservoirs, and that it be allowed to escape just before the time when the shots are to be fired. He follows out this method in its various modifications required by the different circumstances, and bases his recommendation that carbonic acid equal in quantity to the volume of one seventh of the space of the working room would be sufficient to prevent disastrous explosions on theoretical calculations. He has figured out the quantity of carbonic acid necessary, and comes to the conclusion that the cost of his method will be small.

STATISTICS OF TIN.

By Edward P. White.

Sept. 1st, 1881. Stock in all hands, New York, Boston, and Philadelphia.		Tons.
Imported during September, Straits and Malacca, into Boston	50	
" " " " " into New York	315	
" " " " " Australian, into New York	200	
" " " " " Billiton and Banca, into New York	50	
" " " " " L. & F., into New York	15	630
		<hr/>
Consumption during September		2,290
		<hr/>
Total spot stock		800
		<hr/>
Afloat to date, Straits and Malacca, June, July, Aug., and Sept. shipments, per sail	365	
Afloat to date, Straits and Malacca, June, July, Aug., and Sept. shipments, per steamers	1,600	1,965
		<hr/>
Total in all hands, spot and afloat		3,455

Of the above floating quantities, I estimate 700 tons as due in October, 650 tons in November, and 600 tons in December.

The sad calamity which has, during the past month, placed the whole country in mourning, has had the effect of restricting the business in the metal markets to the strictest needs of our consumers; nevertheless, many of our leading articles have gradually and steadily advanced, owing to our daily increasing consumption having further reduced our greatly reduced stocks.

Throughout the whole of the past month, the demand for pig-tin has continued to absorb at steadily advancing prices all that our first-hand holders of spot stock were disposed to part with, at from 20 $\frac{1}{2}$ c. up to 21 $\frac{1}{2}$ c. for spot lots, and from 20 $\frac{3}{4}$ c. up to 21 $\frac{1}{2}$ c. for floating parcels, principally September and October steam shipments, for Straits and Malacca, the total sales and re-sales during the month having exceeded 1800 tons. Those who have so long hesitated to supply their necessities have found out that, the longer they have waited, the more difficult it has become for them to persuade their neighbors to import the tin and part with it below cost price. But, notwithstanding some heavy buying during the last few days of the month, many of our large consumers and out of town dealers are still working from hand to mouth, and they will require to make haste to secure their wants for the next three months; otherwise, they are liable to pay a still further and greater advance.

The operations in the London market during September have been of extraordinary magnitude, resulting in the heaviest advance secured in one single month throughout the last twelve months; from £90 10s. spot, the price steadily rose, without the slightest intermediate reaction, to £95 10s. and £96, and for futures, from £91 10s. to £96 10s.

The Eastern markets, too, have felt the great competition of China and India orders with those from America and Europe, prices steadily advancing at Singapore to \$29 $\frac{1}{4}$, and at Penang to \$29 $\frac{1}{2}$ per picul, the equivalent of about 22c. per pound laid down here.

In my last circular of September 1st, I took the liberty to point out that certain large operations in tin had been undertaken during August, based upon the knowledge that the present consumption of the world had by far exceeded its production. Those views have now been completely confirmed by cable advices from the other side, giving the deliveries from London warehouses for the past month at the enormous figures of 1575 tons, and from Holland as 750 tons, or a total of 2525 tons; adding to this the combined deliveries for the months of August and July, which amounted respectively to 2025 tons and 2200, we find Europe absorbing 6800 tons in the three months, or at the rate of 23,000 tons per annum.

In looking at this extraordinary development in the European consumption, we can come to no other conclusion than that the center of gravity, which during the last two years has lain in the United States, has suddenly been transferred again to the European markets, and more than ever before to the London Metal Exchange, where a few powerful houses have taken the control of the article in their hands; the great reduction in the actual stocks of nearly 2000 tons since July 1st, and the scarcity and consequent high price of Lamb and Flag—£102 per ton—have greatly facilitated their well-planned operations.

It becomes, therefore, a vital question to our importers and dealers how and where to provide in the future our necessary supplies, in competition with Great Britain, where spot prices at present are on a parity with ours, and where future shipments are dealt in at a moderate premium. At the present rate of consumption, London alone is able and willing to absorb the whole available supplies of both the Straits and Australian mines, and unless we are ready to keep our prices slightly above theirs, and be prepared to pay likewise a small premium for future shipments, we may soon be left out in the cold altogether.

Subjoined are the figures of importations and floating supplies during

the first nine months of the present year, as compared with the same period last year:

1881.	
Arrivals in New York and Boston, Jan. 1st to Oct. 1st:	
Straits and Malacca	4,247
Australian	717
L. & F. and Refined	175
Banca and Billiton	141
Total	5,280
Afloat on Oct. 1st, 1881:	
Straits and Malacca	1,965
Australian	unknown
Billiton	
	1,965
1880.	
Arrivals in New York and Boston, Jan. 1st to Oct. 1st:	
Straits and Malacca	7,100
Australian	1,090
L. & F. and Refined	725
Banca and Billiton	1,220
Total	10,135
Afloat on Oct 1st, 1880:	
Straits and Malacca	1,620
Australian	
Billiton	30
	1,650

Our closing prices to-day are buyers at 21 $\frac{1}{2}$ c. spot for Straits or Malacca; 21 $\frac{1}{2}$ c. to 21 $\frac{3}{4}$ c. to arrive; Singapore quoted \$29.75; Penang, \$29.70; Exchange on London, 3s. 9 $\frac{1}{4}$ d.; London is firm at £95 10s. spot and £96 10s. futures.

NEW YORK, Oct. 1, 1881.

MAGISTRAL IN THE PATIO AMALGAMATION PROCESS.

In the *Berg- und Huettenm.-Zeitschrift* Herr M. L. Hohagen, of Berlin, contributes an article compiled from the writings of Raimondi in a Peruvian journal. In it we find some analyses of magistral, such as used in the Patio process in Peru. Magistral is prepared by roasting copper pyrites, salt being added during the process, and its character is shown by the following figures, giving its probable constitution:

SOLUBLE IN WATER, 37 PER CENT.	
Water	14.84
Chloride of copper	4.67
Sulphate of copper	7.40
Sulphate of iron	0.50
Sulphate of soda	9.59—37.00
<hr/>	
INSOLUBLE IN WATER, 62.67 PER CENT.	
Sulphate of lead	10.00
Basic sulphate of copper	0.65
Peroxide of iron	23.20
Insoluble; silica, etc.	28.82—62.67
Total	99.67

The ore used for the manufacture of magistral was found by Raimondi to contain the following:

SOLUBLE IN WATER.	
Water	10.00
Sulphate of copper	13.62
<hr/>	
INSOLUBLE IN WATER.	
Oxide of iron	4.20
Basic sulphate of copper	7.27
Sulphides of copper, iron and lead	44.63
Quartz	19.00
Total	99.02

It will be noted that the raw ore contains almost double the quantity of sulphate of copper that the finished magistral contains. This is attributed to the addition of salt during the process of manufacture, an addition which it seems tradition in that part of Peru demands.

PETROLEUM STATISTICS.

COMPARATIVE SYNOPSIS OF REPORTS FOR JULY AND AUGUST, 1881.

42 GALLONS = 1 BARREL.	1881.			
	July, 30 days.	August, 31 days.	Increase in August.	Decrease in August.
Production for the month	2,372,678	2,331,727		40,951
Daily average	76,538	75,217		1,321
Stock at the wells	1,101,415	768,645		332,770
Iron tank stock	23,786,922	24,236,542	449,620	
Total stock	24,888,337	25,005,187	116,850	
Number of producing wells	17,000	17,250	250	
" " drilling wells	373	352		21
" " " completed	336	332		4
" " dry holes	16	34		18
Aggregate daily production of new wells	5,604	5,368		236
Average daily production of new wells	17	16 1-5		4-5
Number of rigs building	376	373		3
Total shipments out of the region, bbls	1,925,532	2,214,877	289,345	

—Stowell's Petroleum Reporter, Sept. 29.

THE LEMUT PUDDLING-FURNACE.

The *Ironmonger* prints a translation of an account given in the *Gaceta de la Industria*, by Don José Sardá, of the work done by the Lemut puddling-furnace, the chief characteristics of which are as follows: The air for combustion and a certain quantity of steam are superheated in spaces surrounding the fire-bridge and the bottom and sides of the furnace, the mixture of both being conducted under the column of fuel. The furnace has a mechanical rubbing apparatus, so that only three men are required to put 16 heats, averaging 4 $\frac{1}{2}$ cwt., through it in 24 hours. The consumption of fuel is given as 610 pounds per 1000 pounds of puddled iron produced.

SPECIFICATIONS FOR IRON AND STEEL IN GERMANY.

In all countries in which large interests are engaged in the manufacture of iron and steel, the classification of the metals and the formulation of specifications for the acceptance of materials by consumers have been the subject of much discussion and inquiry. In our own, we have had our great discussion on steel rails, which, however, passed much more amicably than that which has been going on for a number of years in Germany between the representatives of the German iron trade and the Society of German Railway Administrations over the specifications for railroad material of all kinds. We need not trace the early history of the struggles of the producers against the arbitrary and impractical laws laid down by railroad engineers, and will state only that at a meeting of the latter at Salzburg, in July, 1879, it was decided to substitute tests for tensile strength for the old bending, loading, and drop tests. They have had a large number of examinations made by Professor Bauschinger, of Munich, and others, on specimens of rails, axles, and tires, by which it was found that out of 606 submitted only 353 came up to the Salzburg specifications. A record of the results obtained with the tested material in actual service was kept in 197 cases, 119 of which were declared to show breakage or excessive wear, while in 78 cases the material was stated to be satisfactory. The material which proved to be poorly adapted for the purposes required came up to the Salzburg specifications in 60 cases, while in 59 cases it would have been rejected by their enforcement. Taking the 78 specimens of iron and steel reported good, and applying the Salzburg requirements, it was found that in 50 cases the results of the tests of the material were within the limits prescribed, while in 28 cases they were far below them. This materially discouraged the use of these specifications, and some roads sought safety by increasing their demands, while others retained the Salzburg methods and figures, at the same time going back to the discarded drop and bending tests. The manufacturers of iron and steel, after suffering severely, decided to appoint a commission to draw up a set of specifications which they thought would furnish a reasonable guarantee to the consumer without being too oppressive to the producer. This report has been recently published, and from it we take the following details. We may add that the material is classified under two general heads—as homogeneous metal, which would correspond roughly with what is generally termed steel; and welded metal, which would cover iron.

Steel Rails.—The commission advises the acceptance of allowances of an excess in weight of 3 per cent and a shortage of 2 per cent, and urges that the standard length of the rails do not exceed 30 feet, and that 5 per cent of the quantity delivered may be 3-3 feet or more shorter than that standard. The rails are to be guaranteed for 5 years, and the number of rails taken for tests is not to exceed one half of one per cent. The rails may vary 0.11 inch from the standard length, 0.03 inch in height, and 0.04 inch in width of base. The following drop tests are recommended, the weight of the drop being 1323 lbs., and the distance between supports 39.37 inches. When submitted to the number of blows given, the rail must not break. The bending tests are indicated by the last column giving the weight applied, the distance between fixed supports being 3.28 feet, and the maximum deflection permitted being 0.0197 inch:

Weight per yard.	Weight of rail.	No. of blows.	Drop.	Weight.
50.4 lbs.	5.12 inches.	2	16.4 feet.	38,582 lbs.
46.2 to 50.4 "	4.72 "	2	10.7 "	29,763 "
38.6 to 45.4 "	4.32 "	2	8.2 "	25,354 "
33.6 to 40.3 "	3.93 "	2	6.6 "	22,047 "

The tensile strength must be on specimens 7.86 inches long and 0.786 in diameter, 71,120 lbs. per square inch, accompanied by a contraction of area of 20 per cent, or an elongation of 12 per cent.

Steel Tires.—The tires must bear without fracture three blows from a drop weight of 1323 lbs. falling 16.4 feet, and the tensile strength of the material must be at least 78,232 lbs. for locomotive tires, with a contraction of area of 25 per cent, or an elongation of 12 per cent. Variations in the inside diameter of 0.1 per cent are permitted. The works undertake to guarantee tires for two years.

Steel Axles.—An axle must be able to bear six blows of a 1323-lb. weight when lying on supports 4.92 feet apart, and being turned after every blow. Two blows are delivered from a height of 13.1 feet, two from 14.76 feet, one from 16.4 feet, and one from 19.68 feet. The material must have a tensile strength of 64,008 lbs. per square inch, and a contraction of area of 28 per cent, or an elongation of 15 per cent.

Steel Plates.—For ship plates, the tensile strength must be between 56,896 to 71,120 lbs., and an elongation of 24 to 25 per cent. Annealed plates must bend cold on a radius equal to the thickness of the plate to the extent of 180 degrees. For boiler plates, the commission advises the use of metal having a tensile strength ranging between 54,051 and 66,853 lbs. per square inch, and a ductility varying from 25 to 18 per cent.

The specifications for iron are detailed, and embrace rivet rods, horse-shoe iron, merchant bar, sheets, plates, angle iron, ties, and various shapes.

THE ROZAN LEAD DESILVERIZING PROCESS AT NEWCASTLE.

At a recent meeting of the Institution of Mechanical Engineers, at Newcastle, England, Mr. Norman N. Cookson gave a description of the Rozan desilverizing process as carried out in the works of his firm. It is a modification of the old Pattinson process, which is based on the fact that when melted silver-lead cools, the crystals first forming contain less silver than the portion which remains liquid longest. As the Richmond works, at Eureka, is the only establishment this country in which this method of desilverizing base bullion is carried out, it may be of interest to give Mr. Cookson's description of the manner in which it is operated in England. The Rozan or steam desilverizing process, instead of using a row of pots, as in the old process, consists of two pots only; of which the lower is placed at such a height that the bottom of it is about 12 inches to 15 inches above the floor level, while the upper one is placed at a sufficiently high level to enable the lead to be run out of it into the lower pot. The capacity of the lower pot, which in those most recently erected is 18 tons, should be not less than double that of the upper one. Around each pot is placed a platform, on which the workmen, of which there are two only to each apparatus, stand when skimming, slicing, and charging the pots. The upper pot is open at the top, but the lower one has a cover, with

hinged doors; and from the top of the cover a funnel is carried to a set of condensers. At a convenient distance from the two pots is placed a steam or hydraulic crane, so arranged that it can plumb each pot, and also the large molds which are placed at each side of the lower pot.

The mode of working is as follows: The silver-lead is charged into the upper pot by means of the crane. When melted, the dross is removed, and the lead run into the lower or working pot among the crystals remaining from a previous operation. When the whole charge is thoroughly melted, it is again drossed; and in order to keep the lead in a thoroughly uniform condition, and prevent it from setting solid on the top and the outside, a jet of steam is introduced. To enable this steam to rise regularly in the working pot, a disk-plate is placed above the nozzle, which acts as a baffle-plate, and uniform distribution of the steam is the result. To quicken the formation of crystals, and thus hasten the operation, small jets of water are allowed to play on the surface of the lead. This, it might be thought, would make the lead set hard on the surface; but the violent action of the steam acts in the most effectual manner in causing the regular formation of crystals. Owing to the ebullition caused by this action of the steam, small quantities of lead are forced up, and set on the upper edges and cover of the pot. From time to time, the valve controlling the thin streams of water playing on the top of the charge is closed, and the workman, opening the doors of the cover in rotation, breaks off this solidified lead, which falls among the rest of the charge, and instantly becomes uniformly mixed with it. Very little practice enables an ordinary workman to judge when two thirds of the contents of the big pot are in crystals, and one third liquid; and when he sees this to be the case, instead of lading out the crystals ladleful by ladleful, as in the old Pattinson process, he taps out the liquid lead by means of two pipes, controlled by valves, the crystals being retained in the pot by means of perforated plates. The liquid lead is run into large cone-shaped molds on each side of the pot; and a wrought-iron ring being cast into the blocks thus formed, they are readily lifted, when set, by the crane. To give some idea of the rapidity of the process, it may be mentioned that, from the time the lead is melted and fit to work in the big pot, to the time that it is crystallized and ready for tapping, is, in the case of a 36-ton pot, from thirty-five to forty-five minutes; and the time required for tapping the liquid lead into the large molds is about eight minutes. Before the lead begins to crystallize, the upper pot is charged with lead of half the richness of that in the lower pot. Thus, when the liquid lead has been tapped out of the lower pot, it is replaced by a similar amount of lead of the same richness as the remaining crystals, by simply tapping the upper or melting pot, and allowing the contents to run among the crystals. The same operation is repeated from time to time, until the crystals are so poor in silver that they are fit to be melted and run into pigs for market. The large blocks of partially worked lead are placed by the crane in a semicircle around it, and pass successively through the subsequent operations.

As compared with the Parkes zinc desilverizing process, which is almost exclusively employed in this country, where it has reached considerable development, Mr. Cookson states that, while the original cost of the plant in the Parkes process is small, the amount of labor low, and it gives quick returns of lead with a small stock of lead and silver, some zinc is lost, and the results of silver and lead are not as satisfactory as might be expected. American metallurgists will differ from him as to the conclusion he reaches.

THE KRUPP GAS PRODUCER.

Le Génie Civil prints an article in which the results of the competitive working of a Krupp and an old Siemens gas producer at the Essen Steel-Works is given. A drawing is appended which, in the absence of any statement to that effect, we must suppose to be a section of the Krupp producer. From it it appears that the principal feature of that apparatus consists in the adoption of an annular iron appendage to the bottom of the charging apparatus in which the fuel is preheated before it reaches that portion where the conversion into gas actually takes place. We may add that in the same issue of *Le Génie Civil* an illustration is given of a new Siemens producer, in which provision is made for the heating of the air for the partial combustion in the producer.

The trial above referred to showed that while the old Siemens producers converted into gas in 12 hours 1220 kilograms of gas-coal from the Hannover colliery, which held from 6 to 7 per cent of cinder, the Krupp producers gasified 1500, and when pushed, even 2000 kilograms of ordinary steam-coal, holding 11.5 per cent of ash, both kinds of producers being run by Körting injectors. The gas-coal cost 10 francs per ton, while the steam-coal could be bought for 5.25 francs. The gas produced by the two styles of furnace was found to contain on an average the following:

	Siemens.	Krupp.
Carbonic oxide.....	18 per cent.	25 per cent.
Hydrogen.....	10 "	12 "
Hydrocarbons.....	2 "	2 "
Carbonic acid.....	6.8 "	2.4 "

Three workmen can attend to eight Krupp producers, and besides the reduced cost of fuel and labor, the cost of maintenance was found to be smaller.

DRILLING AIR-HOLES IN GERMAN COAL MINES.

Instead of running air-ways through coal-pillars or driving uprisers for ventilation, a practice is gaining ground in Westphalian coal mines to drill holes by means of special rotary hand-drills, one of the advantages claimed being that the danger of fire-damp explosions, which occur so easily in such workings, is avoided. The *Zeitschrift für Berg-, Huetten- und Salinen-Wesen* gives the following details of these machines, four of which are now in the market. All of them are rotary hand-drills with special bits. The Hussmann drill, which is worked by two men, has a 13-inch bit, which leaves a core. The latter is crushed by a second central auger-drill. With four men, working by turns, including time for setting up, moving, and taking away the drill, 34.6 to 45.9 feet, according to hardness of coal, were made in a shift. The Munscheid drill made 350 feet in 47

shifts, with two men. It is urged in favor of the use of these machines that, when the 12 to 15-inch hole does not suffice for ventilation or for the removal of large quantities of fire-damp, it considerably lessens the danger and much facilitates the work of driving afterward, a hand-fan being unnecessary.

ELECTROLYTIC DEPOSITION OF ZINC.

In many branches of metallurgy, the use of the electric current for obtaining metals from their solutions is attracting well-merited attention, and is carried out on a working scale in some localities. Owing to the heavy losses of metal in our present methods of distillation, there is no metal which gives better promise of financial success in this direction than zinc, and a method recently proposed in Germany by C. Luckow, of Deutz, deserves some attention, though it has not as yet, as far as we can learn, been tested on a large scale. If an electric current is made to pass through a neutral or nearly neutral solution, metallic zinc will deposit on the negative pole, the grain of the metal growing finer as the concentration of the solution and the intensity of the current increase. As a fine grain is more favorable to the deposition on a large scale, and such metal is specially adapted for various chemical purposes also, it is proposed to use solutions containing from 29 to 30 per cent of zinc. The cathodes are either sheets of metal, preferably zinc, or boxes of wire netting filled with coke, while the anodes are either mixtures of zinc ores or metallurgical products of zinc and carbon, or the latter alone. If the solutions contain sulphuric acid, special care must be taken to keep them neutral, a precaution which is less urgent in the case of solutions obtained with hydrochloric acid. The latter are inconvenient where carbon anodes are used, as free chlorine is formed, which, however, Herr Luckow utilizes.

PROGRESS IN SCIENCE AND THE ARTS.

The Lead Production of Italy is now estimated at 12,000 tons per annum. In 1877, the mines produced 36,468 tons of ore.

Production of Sulphur in Italy.—While in 1872 the sulphur mines of Italy turned out 221,000 tons of raw sulphur, they hoisted 260,325 tons in 1877.

Rail Tests in Germany.—For steel rails, the German Railway Union have agreed upon the tests to be made at the works. A rail placed on supports three feet four inches apart must bear a load of 20 tons for several hours without permanent set. It must resist a drop test of 1100 pounds falling 13 feet twice, and must bear a drop of five feet without injury. The rail must be capable of being bent cold, either way, to the extent of two inches, without showing cracks or fissures.

Dynamo-Electric Machines in Telegraphy.—About a year since, the officers of the Western Union Telegraph Company introduced the use for telegraphing of currents generated by machines instead of batteries, and thus realized a very important step in advance. Now Herr Joseph Kraemer, of Vienna, comes forward in the *Elektrotechnische Zeitschrift* with a claim that he successfully employed the currents obtained from a Gramme dynamo-electric machine for telegraphy as early as 1876.

The Volume of Air as Affected by Temperature.—Mr. Robert Briggs, C.E., in a paper on the properties of air relating to ventilation and heating, prints the following table on the change of volume of air by various temperatures. The figures are, of course, deduced from the well-known law that air in common with most gases expands or contracts the one four hundred and ninety-first part of its volume for each degree of Fahrenheit. The table, however, is convenient, and will therefore prove of value:

Temperature, Deg. Fahr.	0	10	20	32	40	50	60	70	80	100
Volume of same weight of air under same pressure	0.935	0.955	0.976	1.000	1.016	1.037	1.057	1.077	1.098	1.138
Density for constant volume	1.070	1.047	1.025	1.000	0.974	0.946	0.918	0.891	0.878	0.878
Weight per cub. foot, lbs.	0.0863	0.0847	0.0828	0.0807	0.0794	0.0779	0.0765	0.0749	0.0735	0.0709

The Fluid Density of Metals.—From a paper read on this subject, before the Section in Chemical Science of the British Association meeting, at York, the following results were deduced:

METAL.	Specific gravity, solid.	Specific gravity, liquid.	Percentage of change.
Bismuth	9.82	10.055	Decrease of volume 2.30
Copper	8.80	8.217	Increase " 7.10
Lead	11.40	10.370	" " 9.93
Tin	7.50	7.025	" " 6.76
Zinc	7.20	6.480	" " 11.10
Silver	10.57	9.510	" " 11.20
Iron	6.95	6.880	" " 1.02

The results obtained with metallic silver are, perhaps, the most interesting, mainly from the fact that the metal melts at a high temperature, which was determined with great care by the illustrious physicist and metallurgist, the late Henri St. Claire Deville, whose latest experiments led him to fix the melting-point at 940 degrees Centigrade.

Barometric Pressure and the Discharge of Springs.—The belief current among many millers on the chalk streams of England that they could foretell the advent of rain-fall from a sensible increase of the volume of water in the streams led Mr. Baldwin Latham, a well-known authority on water supply, to investigate the matter. Believing that there was some relation between the barometric pressure and the discharge of water from the springs, Mr. Latham made a series of observations, the results of which he has submitted to the scientific world in a paper read before the British Association at York. Setting up gauges on the Bourne flow in the Caterham Valley, near Croydon, he found that whenever there was a rapid fall in the barometer, there was a corresponding increase in the volume of water flowing, and that with a rise of the barom-

eter, there was a diminution of the flow, the fluctuation at one period exceeding half a million gallons per day. He attributed an increase of flow to the expansion and escape of the gases held by the water under low barometric pressure, which caused the water to escape more freely.

The Faure Battery and the Electric Light.—Mr. Keates, of the London Metropolitan Board of Works, has made some experiments recently, in which the Faure accumulator was employed in the production of the electric light. Though they do not shed much more light on the value of the Faure battery, they are of much interest in other respects, and we reproduce the following account of them, given by the *Engineer*. The lamps used were those of Maxim and Swan, one of each kind being attached at a time. M. Faure states that in these experiments 40 cells represent about half an available horse-power for three hours. The Maxim light being placed in connection with the accumulator, 30 cells were found to give the light of 16 candles. With the same number of cells, the Swan lamp gave the light of 22.4 candles; with 35 cells, the lights became respectively 45.3 and 65.6 candles; and with 40 cells, the Maxim light rose to 101 and the Swan to 141 candles. Thus far the Swan light gave the greatest amount of candle-power. But with 45 cells the Maxim light rose to 229 candles, while the Swan only displayed 204. The capacity of the latter was evidently being overtaxed, for in about a minute the carbon loop broke. A power of 50 cells was then connected with the Maxim light, which then rose to 333 candles; but in about a minute the carbon loop shared the same fate as that of the Swan. The experiments are also interesting as showing the great increase of light by a comparatively small increment of power. Thus, in the case of the Maxim lamp, taking 30 cells as the standard, an increase of one sixth nearly trebled the light, an increase of two sixths augmented the light more than six times, three sixths increased it fourteen times, and four sixths twenty-one times.

Suspension-Bridges in France.—M. Paul Delahaye, the excellent weekly correspondent of the *Revue Industrielle*, of Paris, appears to have a better idea of the durability of suspension-bridges than that conveyed to the public by the results of an inspection made from 1870 to 1879 by M. Bernardin annually on a number of bridges in the department of Lot-et-Garonne, including the Tonneins bridge, built in 1833; the Marmande, in 1835; the Mas-d'Agénais, in 1838; the Roussannes, in 1838; the Castelmoron, in 1843; and the Couthures bridge, built in 1845. The opinion seems to prevail among French engineers that accidents are very difficult to avoid because, it is held, there are no indications to point out approaching decay. Still there are such indications, and, according to M. Delahaye, reddish spots on the surface of those parts of the cable exposed to moisture prove that its interior is attacked by rust. This fact has been noted chiefly at the Roussannes, Tonneins, and Couthures bridges, the cables of which were replaced during the years 1872 to 1877, and the interior portions of which proved to be completely corroded. The wires had become extremely brittle, so that it was difficult to conceive on seeing them how they could have carried even the load of the bridge alone. Out of the 180 wires of the Couthures bridge cables, only 15 were found to be in a passable condition; all the others broke like glass. Instead of considering this a proof of their dangerous character, as the majority of French engineers do, M. Delahaye looks upon it as showing what confidence may be placed in suspension-bridges carefully watched. The Couthures bridge cables lasted 32 years, those of the Roussannes bridge 34, and those of the Tonneins bridge 39. The Castelmoron bridge fell under an ordinary weight in 1869 after 26 years of service, and that of Caumont in 1880, after 28; in both of them the cables parted at points exposed to moisture, which it is impossible to reach by inspection. M. Delahaye concludes by saying that if suspension-bridges were properly kept in repair, they would not fall, and he thinks it so difficult to contend against settled opinions that he will not further seek to defend such bridges, the advantages of which, he adds, will be understood when Americans have taught French engineers how to use them.

GENERAL MINING NEWS.

ARIZONA.

By telegraph, it is announced that there has been some fighting at Cedar Springs; and later, near the Cachise stronghold, 14 miles from Tombstone.

DOS CABEZAS DISTRICT.

The *Pioche (Nev.) Record* gives the following details of this district in a letter from a correspondent:

Dos Cabezas is about sixty miles northeast of Tombstone, with Camp Bowie fourteen miles east, and the nearest railroad station is Wilcox, on the Southern Pacific. The mining region or main belt, called Dos Cabezas District, is about 30 miles long, extending from Camp Bowie to Silver Camp, the main ledge being uninterruptedly traced along the belt, and of course has been located its entire length, but the deepest shaft is only 80 feet. The best appearing claims, as far as developed, are the Bear Cave, which is at present bonded to the Commonwealth Company, of Arizona, for \$30,000, and the bonders are erecting hoisting and pumping machinery on the same, there being a strong flow of water. This mine has a well-defined gold-bearing ledge of from eight to fifteen feet. Adjoining this claim on the east is the Greenhorn, which is bonded to the same company for \$20,000, with but little work done on it. Then follows the Jumper, a little east of the Greenhorn, the owners of which are working ore with an arrastra. Adjoining the Bear Cave on the west are the Buckeye, Silver Cave, and Sailor Boy. About six miles west of the last-named mines is a place called Silver Camp. Eight miles east is Wood Cañon Camp, where the Commonwealth Company has bought twelve claims and is doing considerable work at present.

MINERAL HILL DISTRICT.

The *Pinal Drill* prints some details on the mines of this district: The Alice mine has been bonded to William P. Miller, of California, for a large sum. The next mine east and adjoining the Alice is the Specie Paying, the property of the Specie Paying Gold and Silver Manufacturing Company of Illinois. It has two openings, one an incline shaft about 40 feet deep, showing a strong vein of lead ore, carrying a fair percentage of silver; the other, an open cut showing the same quality of ore as in the shaft. A perpendicular shaft is sinking, which at a depth of 130 feet will tap the ledge about 300 feet deep, if the dip remains the same as shown in the incline above. The next on this ledge is the Rialto, which has several openings showing lead ore. The principal one is a tunnel 66 feet long, running on the vein from the cañon below. When this tunnel is in 200 feet, it will be 250 feet below the croppings. A cross-cut at the end of this

tunnel shows the ledge to be 14 feet wide, about 8 of ore, of which 5 feet is pay ore. The next on this ledge is the Goodtruck. Only two assessment-works have been done, but these are sufficient to show a six-foot ledge of lead ore.

TOMBSTONE DISTRICT.

According to the Tombstone *Epitaph*, little that is worthy of special mention has occurred during the week ending September 25th. In the Grand Central, sinking in the main shaft has been resumed, and in the Contention the 400-foot level between the old and new shafts has been connected. Ore extraction from the Vizina is limited to 15 tons daily, pending a decision of the question of erecting a mill. Ground was broken recently for the mill of the Girard, which it is expected will be completed by the first of December. In the Flora Morrison, scarcity of timber has interfered with sinking the main shaft.

SILVER BELL QUARTZ, AND COLUMBIA.—The *Pinal Drill* prints the following on these mines, belonging to the Pinal Consolidated Mining Company: Work is progressing night and day with a force of about 30 men. The mines are 12 miles south of Pinal, and about four miles from the Gila River. The main tunnel is known as the Columbia tunnel, on the south side of the hill, running diagonally toward the Bell shaft. It is 105 feet long now, and will strike the Bell ledge on the foot-wall at a distance of 598 feet and at a depth of 248 feet in the shaft. The Silver Bell tunnel is on the other side of the hill, the north side. It is now in 65 feet, running south to strike the same incline shaft, which is sinking from the top of the ledge. This tunnel is 4½ by 6½ feet, and is intended for ventilation. It will reach the incline shaft, a distance of 132 feet, at a depth of 115 feet. The Columbia tunnel is 5½ by 7½ and is intended for the working tunnel. The short tunnel will be finished in thirty days. It is run along the hanging-wall where the ground is softer. As soon as it strikes the main shaft at 115 feet, the windlass will be placed on a level with this tunnel for temporary work, until they reach the Columbia tunnel. The main shaft is on an incline, on the foot-wall, and a depth of 125 feet has been reached. At a depth of 80 feet, there is a cross-cut showing the ledge to be 34 feet wide. It is free-milling ore at this depth. The sulphurets and carbonates are confined to streaks. The main body of ore is chloride. It is intended to run a large tunnel from the cañon below to strike the ledge at a right angle; and if the dip is there the same as above, it will strike the ledge at a depth of 700 feet, and at a length of 900 feet tunnel, cutting on its way several outcropping ledges, and then the ore can be taken out of the mine on a level with the creek below in the Martinez Cañon, on a wagon-road.

TURQUOIS DISTRICT.

Fourteen miles east of Tombstone, says the *Epitaph*, on the eastern slope of the Dragon Mountains, is the Turquoise District, which derives its name from mines of that gem that were worked by the Aztecs or Toltecs. The most prominent mine of the district is the Defiance, which is located upon the southwestern slope of the limestone mountain, whose general trend is to the east of south and west of north, and about midway from the base to the summit. The dip of the limestone strata is to the east, at an angle of about 45 degrees, and strongly marked in outlines. The development-work consists of a tunnel that, from the overhanging rock at the mouth, measures to the face or end 83 feet, which follows the ore in the mountain in almost a due north course. At a distance of 33 feet from the mouth of this tunnel, a cross-cut was made to the west for a distance of 29 feet from the hanging-wall, all the way in ore, with no visible signs of a foot-wall at a point where the work was suspended. In addition to this a winze has been sunk on the incline of the hanging-wall to a depth of 38 feet, all the way in ore. From these works there is stored upon the dump a quantity of ore estimated at from 350 to 400 tons. This ore is a ferruginous oxide and carbonate of lead, and carries silver in variable quantities.

CALIFORNIA.

THE BODIE DISTRICT.

According to the *Free Press*, steady progress has been made during the week ending September 28th, but no features of special interest. All of the mills, including the Standard, Standard-Bulwer, Noonday, Syndicate, Bodie, Silver Hill, and Miners', are employed in crushing ore. Messrs. Adam Gillespie and John Wagner are about putting up heavy machinery for working tailings below the Bodie mill. By telegraph under date of the 5th, it is announced that the Champion mine has resumed operations, and that the Boston Consolidated east cross-cut, 400 level, is cutting stringers of rich gold ore.

STANDARD CONSOLIDATED.—There were extracted and shipped to the mills during the past week 1347 tons of ore from the 300, 385, 500, and 550-foot levels. The average pulp-assay for the week was \$30.76. The amount of bullion shipped from the mill was \$38,746.72. Owing to the pump gear wheel having given out, they were unable to work on the 100-foot level during the week; but as the new gear is on the road, they will soon be able to resume operations at that point. Considerable work has been done during the week in running a cross-cut for waste to fill in worked-out ground in the stopes. The stopes are all looking well and yielding as usual. The ledge on the 385 and 550-foot levels is from 15 to 25 feet wide in the stopes.

CALAVERAS WATER AND MINING COMPANY.—Work on the great dam is pushed rapidly by the contractors, Messrs. P. Nye & Co., of Sacramento. At the present rate, it will be finished several weeks before the rains set in.

CHEROKEE.—The superintendent reports: The new ledge has opened out strong to a width of five feet, a good solid vein. The richest ore is on the hanging-wall, about three feet of which is very rich, and prospects equal to the best ever found in the district; the foot-wall portion of the vein is harder and more compact, every foot of which yields handsome prospects in the horn. This, taken in connection with the richness of the hanging-wall portion, gives us a development of unexpected value. The value of this ore-chimney is increased by the fact that it is made 160 feet below the deepest workings in the old mine, giving a certainty of reserves to that extent.

HITE.—Mr. John R. Bothwell telegraphs from Hite: New double shaft going down in 12-foot ledge, furnishing ore for 20 stamps; air-compressor, pumping and hoisting machinery in place, and air-pipe laid from the river; dam thoroughly repaired, and all improvements ordered by President Clark in progress or completed; every thing running smoothly and economically.

INYO CONSOLIDATED.—The superintendent states that there are now on hand and ready for treatment at the mill and on the dumps of the company's mines 400 tons of ore, the assay value of which is \$136 per ton. The *Independent* of September 17th contradicts a report that the Panamint mill had been mining on waste rock.

COLORADO.

CLEAR CREEK COUNTY.

SHIVELY.—This mine, located near Georgetown, is now employing fourteen lessees and four contractors. The 225-foot level is driven easterly. A sump is sinking preparatory to putting in a pump. The sump contains two to four inches of excellent ore, and some is taken out of the drifts, but no stopping is in progress at the present time. The last run of ore milled 890 ounces of silver per ton. A large run will be brought down the first of the month. The contractors are cross-cutting for the lode at the west side of the big porphyry dike.

GILPIN COUNTY—RUSSELL DISTRICT.

OAKLAND.—The company is, according to the *Register-Call*, drifting west from the Paola working-shaft at the depth of 200 feet, and cross-cutting north from that level. The ore contains galena, with quantities of copper pyrites scat-

tered throughout it. The mill-dirt treated at the Russell stamp-mill of the Miners' Smelting-Works, yielded as well as was anticipated from that class of material. A quantity of concentrates is on hand, which will be sent to the concentration-works.

WYANDOTTE.—This company is driving a drift north from the 140-foot cross-cut north from the 350-foot east level of the Wyandotte vein on the Leavenworth lode. This cross-cut intersected the Leavenworth lode 160 feet from the Wyandotte. This drift, when connection shall have been made with the workings of Mackay & Co., on the property of the Ayers Company west, will afford a splendid air circuit for ventilation. At a point 88 feet north of the Wyandotte in this cross-cut, a vein was cut, and a drift 240 feet in length, west, has been driven through almost a continuous body of ore. The vein of ore in the Leavenworth drift is very promising, and contains a large percentage of gray copper. The entire force of miners is now concentrated in the workings of the main working-shaft on the Wyandotte lode. The last mill-dirt treated under stamps from the Crawford County or whim vein yielded 6 ounces gold per cord.

HISDALE COUNTY.

PALMETTO.—"Moss Agate," in his correspondence with the Lake City, Colo., *Mining Register* of September 30th, says: The working shaft is 230 feet deep. The first level extends north 100 feet; the second level extends north 140 feet and south 18 feet; the third level, west 175 feet and south 175 feet; the winze, from first to third level 130 feet. Ten tons of ore are lifted to the dump daily, and a force of 50 men constantly employed, seven of whom are assorting the same. A new 35-horse power engine and cage will soon be added to the plant.

LAKE COUNTY.

There is considerable activity in the Leadville mines, and the stocks at the smelting-works are accumulating. They are reported to be now nearly 40,000 tons, and it is stated in a general way that the ores are as a whole richer in lead and poorer in silver than last year. A correspondent of the *Denver Republican* estimates the probable production of lead during the year at 40,000 tons, while the silver will probably range from twelve to fourteen millions of dollars. In detail we give the following gathered from our Leadville exchanges:

ÆTNA.—This mine, located on Carbonate Hill, is taking out about ore enough to pay expenses. The owners are devoting the time chiefly to prospecting south of the Chadburne shaft, which was connected with the new shaft recently, 400 feet south of the Chadburne, which is 250 feet deep. The south shaft is 95 feet deep.

BIG PITTSBURG.—This mine is sinking a new shaft and although only down to the depth of 199 feet, has met with great success, striking a vein of mineral some two feet in thickness, with six feet of iron under it.

BIG CHIEF.—This mine is raising about forty tons per day. The ore-house is nearly full of ore. The shaft is down 441 feet to the ore-level, and is 468 feet deep, including the sump. There are now from thirty to forty men employed on the mine, which is not shipping, owing to the fact that their contract expired. A level is driving to connect with the Castlevision shaft; and when that is accomplished, heavy machinery will be put on. The Castlevision shaft is down over 300 feet, and it is thought the ore-vein will soon be reached.

THE BRIAN BORU.—On this mine, situate on Printer Boy Hill, is only work for the development. Some 260 tons of ore were shipped last month, the ore assaying 20 ounces of silver, 40 to 55 of lead, and one and five tenths ounces to one and eight tenths ounces of gold to the ton. The mine is worked chiefly through a tunnel, which extends into the hill some 360 feet. The formation is a sandy rock, the vein of mineral running between porphyry and iron. At a distance of some 250 feet from the mouth of the tunnel, a drift has been made to the west, following a vein of mineral from eighteen inches to two feet in thickness, in which drift a pocket of gold-bearing quartz was discovered shortly since, showing a test of ten ounces of gold to the ton. At a distance of 125 feet, a drift has been run to the east, which uncovers a vein of mineral some two feet in thickness.

CARBONATE.—The main incline and the combination incline of the Leadville Consolidation is being driven.

DENVER CITY.—The Wright shaft of this mine is down some 260 feet, the water has all been pumped out, a new gallows-frame has been erected, which is of the most substantial kind, the setting up of the machinery nearly completed, and the putting out of the ore is expected to begin in about two weeks. The quadrilateral shaft of this same mine is already producing ore.

LEADVILLE CONSOLIDATED.—The superintendent reports that below the ninth level, south of the main incline, the ore continues good. No stopping is done in this section. A few feet still remain to be driven to connect the workings below the ninth level and the uprise in the tenth level, north. The ore here is a gray sand carbonate, assaying from 100 to 150 ounces per ton. All the exploration in this part of the mine indicates a large ore-body. From the fourth, fifth, and sixth levels, north, a large quantity of ore is being taken, from below the Van Wagenen workings. This ground has been worked for a year, and there is still as much ore in sight as ever. In the third level, north, as much ore is being developed as below the ninth level, south. The vein averages from six to fifteen inches of good mineral. There are considerable reserves of ore at all of these points.

MINER BOY.—There are three shafts to this mine, all of which are worked, but the principal interest and work center on shaft No. 3, which has been sunk some 200 feet below the level of the tunnel. Here the old vein of mineral has been struck—but with increased richness. A drift of more than 15 to 20 feet has been made along this mineral vein, showing a large body of ore, some three and a half feet to four feet in thickness. Sufficient space in the tunnel in the immediate vicinity of the shaft is clearing for the putting in of a 50 horse-power boiler and engine, which have already been ordered; and as soon as the machinery is in position, a large force of men will be put immediately to work.

OURAY COUNTY.

BOOMERANG.—The *San Miguel Journal* says that the strike made last week continues good, and the pay-streak of 36 inches gradually increases in quality and quantity as the work progresses. The boys, who are now working the 50-foot tunnel on the vein, tell us that as depth is gained the vein begins to get more compact and the walls gradually grow more perpendicular, that less of the limestone spar and porphyry are seen, confirming the belief that at no great depth rich pay-mineral will be found uninterrupted and compact. The ore which is now extracting will mill-run about 100 ounces per ton.

PARK COUNTY.

WHEELER.—The latest advices by telegraph from the superintendent at Alma report taking out large quantities of free-milling ore from level No. 3, averaging \$110 per ton. He is within a few feet of a chimney, the top of which was discovered in level No. 4.

SUMMIT COUNTY.

ROBINSON CONSOLIDATED.—The *Tribune* publishes the following as the result of an interview with Manager Ewing: The mine is in excellent condition. When I went there, not quite six months ago, there were only about 11,500 tons of ore in sight. I have mined and reduced 12,500 tons, and there are to-day 75,000 tons in sight. A contract has been made with the Boston & Colorado Smelting Company, at Argo, for the reduction of 2500 tons per month for one year, at the rate of \$19.50 per ton. The cost of reduction heretofore has been from \$22.50 to \$26 per ton. Another contract has been made with the La Plata Smelting Company for twenty-five tons a day for what ever length of time I please. I expect to run it through the

year. These twenty-five tons will pay all the expenses of the mine, and the entire contract with the Argo works will be profit. Mr. Wolcott, of the Argo works, who examined the mine, expressed the opinion that I could contract for 70,000 tons or more. While it has been intimated that, although a contract could be made for so large a quantity of ore, the mine could not fill it, I have only to say that I will give my personal guarantee that we will fill this contract, and I will also guarantee that no ore shall yield less than 50 ounces per ton. As regards the ore-bodies between levels Nos. 4 and 5, the ore is 23 feet thick for a distance of nearly 100 feet in length. At No. 6 it is 29 feet thick for the same distance, and at No. 7 it is 30 feet thick. I can not tell its length at No. 7 because we are just cutting into it. The ore continues the same high grade and runs from 70 to 150 ounces per ton. The ore is entirely clear, and is shipped just as it comes from the mine. The last ore settled for averaged 110½ ounces per ton. The lowest settlement we have ever had was about 73 ounces. The average can safely be placed at 100 ounces. The new works are all of the most satisfactory character, and the machinery will have to last for many years, as the mine will be permanent. A depth of 800 feet has been reached in the mine, and the next level, No. 8, will be begun about the 10th of October. The mine is a deep mine, a true fissure, and there is not another mine in the West that can show a similar body of equally rich ore. In September, the mine produced about 3050 tons of ore, which will net \$200,000. It will take ninety days to connect the new incline and the new east shaft with the present drifts and levels, when the mine can produce 200 tons a day. I gave these gentlemen this morning \$125,000 in cash, and yet there are 1400 tons of ore unsampled, which will yield one hundred and odd thousand dollars more. The pay-roll for the month amounts to about \$11,000, and the total expenses, including new machinery, will be less than \$20,000. The regular force consists of 80 men, although during the past month I have had 120 men employed, owing to putting up machinery, grading, etc. There are 70 miners in the mine, 30 of whom are engaged entirely upon dead-work, on the incline, sinking the shaft and running the north drift to develop the new ore-body, leaving 40 men actually engaged in mining, who produce 100 tons of ore per day. The entire plant, the surface works, and machinery, cost \$200,000. I have wood, timbers, and every thing necessary for a year, piled up now in the mine, and the mine does not owe a dollar in the West. The cost of mining will not be more than \$4.20 per ton for September. By the 15th or 20th of this month, when the power drills will be in operation throughout the mine, the expense will be further reduced at least 50 cents per ton.

SILVER KING.—Mr. Bartlett, owner of the Silver King mine at Montezuma, made a new strike on the west slope of Glacier Mountain on the 5th of this month. At a depth of 10 feet, the vein disclosed 15 inches of ore that, it is stated, will mill 600 ounces of silver per ton. The load has been named the Silver Princess, and has created considerable excitement in Montezuma.

DAKOTA.

Our exchanges report increased activity in the carbonate locations in the vicinity of West Virginia and Black Buttes, 80 miles from Deadwood. The *Custer Chronicle* gives a description of the new 40-stamp mill of the Grand Junction Company, which is fast approaching completion. The mine is developing rapidly.

GEORGIA.

The *Ellijay Courier* reports a gold excitement over some discoveries in that vicinity. The *Mountain Signal* has a mining directory for Lumpkin County, according to which there are the following stamp-mills near Dahlonega: Findley, 30-stamp water-power mill and 20-stamp steam-power mill; Barlow & Hand, Pigeon Roost mill, 40 stamps; Bast mill, 20 stamps; Ivey mill, 20 stamps; Singleton mills, one 10 and one 5 built, and one 10 building; White's Pigeon Roost mill, 10 stamps; Fish Trap mill, 10 stamps, and a 20-stamp mill building by parties owning ground south of the Findley property. At Auraria, there are the 10-stamp mill of the Chicago Gold Mining Company, the 20-stamp mill of the Auraria Mining Company, the 20-stamp Bell mill, the 20-stamp Cleveland mill, and the 10-stamp Wells mill. In addition, a 20-stamp mill is building on the Smith property.

MICHIGAN.

A flood caused by heavy rains has done damage to the iron mines of the Marquette District, which collectively is very large, though most of the mines will experience only a few days' delay, and will have to do some extra pumping.

The *Marquette Mining Journal* publishes the following table, which gives, in gross tons, the total lake shipments of iron ore the present season, up to and including September 28th, together with the amount shipped during the corresponding period of last year:

WHERE FROM.	1880.	1881.
Escanaba.....	911,593	1,085,055
Marquette.....	530,614	553,772
L'Anse.....	44,488	40,587
Total.....	1,486,695	1,679,414

An increase of 192,719 gross tons.

**MONTANA.
BUTTE DISTRICT.**

According to the reports of the local journals, there is nothing new in the Alice, Lexington, Stevens, or Gagnon, in which the work of development and extraction is vigorously pushed. It is reported that the Clear Grit mine, owned by Philadelphia parties, is to be opened and worked at an early date, preparations being made with that end in view.

MORNING STAR.—In sinking the main shaft, the volume of water is heavy. In the shaft, a small feeder has been struck, according to the *Miner*. The vein is only three inches wide, but the ore is filled with native silver. The east shaft of the Morning Star is down about 80 feet. The new steam hoist for it has arrived from Chicago, and is on the ground.

MOULTON.—The *Miner* says: Sinking the main shaft has been temporarily stopped at a depth of 520 feet. The cross-cut to the south will be started to-day from the 500-foot level. At the 400-foot level, the cross-cut to the south has been advanced 107 feet, and is going forward at the rate of five feet per day. It is thought the cross-cut will strike the middle vein in four days. The south cross-cut at the 300-foot level has struck the hanging-wall of the south vein, or, properly speaking, the main vein of the Moulton mine, but the cut has not penetrated the vein yet. An extraordinary head of water has been encountered, and the vein will not be opened until the Cornish pump is put in place to handle the water. The stopes in the 300-foot level are looking well, and are yielding about twenty tons of rich ore daily, which is carried out and dumped into the new mill. The west shaft of the Moulton, 600 feet from the main shaft, is down 100 feet. A cross-cut to the south has cut the center vein. This vein is thirteen feet thick, four feet of which is high-grade ore. Every thing is in readiness to start up the new 40-stamp Moulton mill on short notice. The delay in starting the mill is occasioned by the water-ditch not being finished, for want of lumber to put the boxes in the ditch.

It is reported that the Colorado & Montana Smelting Company intends to erect concentrating-works on Silver Bow Creek.

NEVADA.

THE COMSTOCK LODE.

The *Gold Hill News* prints the following summary for the week ending September 28th:

Affairs at the north end are still shrouded in mystery, Senator Fair continuing to decline giving any information concerning operations there, save the number of feet the drifts and cross-cuts have been driven. There is nothing said of the joint winze, around which so much interest is centered at present. Last week, it was reported to have been sunk 16 feet, and a statement of the progress made since, or the announcement that work had been discontinued at that point, was reasonably looked for. The desired information is not to be had. One can in a measure solace himself, however, with Fair's published declaration that there will be no favoritism shown when the condition of things in those mines is made public; that all will be allowed an equal chance of ascertaining for themselves by personally inspecting the lower regions. Prior to throwing the winze open to visitors, the Senator purposes to publish a letter containing his views on the situation. The north cross-cut on the 2500 level is expected to reach the ore-vein to-morrow. The east drift joint with Sierra Nevada and Union Consolidated, on the 2700 level, is nearing the ledge, and the increase of water in it raises hopes of finding more than barren rock when it is reached. Work was yesterday resumed in the bonanza mines. It is understood that miners will be put to work wherever operations can be carried on advantageously. There is not much else of interest along the lode. Belcher continues to extract its daily quota of ore, and Crown Point is increasing its force of workmen as repairs are completed. Sinking of the Forman shaft has been resumed, and the Alta drift for the ledge progresses as rapidly as the nature of the ground will admit.

SIERRA NEVADA.—The *Tribune* prints the following under date of October 1st: A private dispatch received here yesterday from Virginia City says that the Sierra Nevada north cross-cut went through four feet of low-grade ore on Thursday night and came into porphyry. Senator Fair says the assays of the ore were not as high as he expected. This ore, however, being from the edge of the vein, he hopes to find better further on.

ORIENTAL.—The superintendent reports, under date of September 23d, that the cross-cut in the Ellis mine was continued through about two feet of mixed clay and ledge matter which was supposed to be the hanging-wall, and another ledge was found. This back ledge has been cut into two feet, and shows no signs of disappearing. The ore assays from \$56 to \$81 per ton. A whim will have to be put up before sinking much deeper.

STARR-GROVE.—A Battle Mountain, Nev., special to the *Mining Associated Press* says: Drifts Nos. 1 and 2, south, have been advanced 17 and 20½ feet respectively during the past week, and a large quantity of fine milling ore has been taken out which will average about \$95 to the ton. Drift No. 1, north, has been run 22 feet, and has opened out the ore-body immensely. Ore is now taken from the latter drift and is sent to mill. The incline shaft is down 95 feet, and is opening out a fine deposit of black ore. A very rich strike has been made in this part of the mine, which promises to develop into a perfect mountain of ore. In fact, all parts of the mine are looking splendidly, and it is expected that the payment of dividends will be resumed as soon as the new mill is in a condition to crush ore. Every thing has been put in shape to stoop out at least 100 tons of ore daily.

TUSCARORA DISTRICT.

CATSKILL.—The *Daily Times-Review* prints the following under date of September 23d: A contract has been let and the work on air-shaft has commenced. It will connect with the east drift, 170-foot level. The Prospect shaft, east of the main incline, was sunk 20 feet, in bird's-eye porphyry. The work of placing the machinery and the necessary work on the shaft for receiving a cage will be in progress Monday.

PROPOSALS AND SALES.

For the benefit of many of our readers, we compile weekly such proposals and solicitations for contracts, etc., as may be of interest. The table indicates the character of proposals wanted, the full name and address of parties soliciting, and the latest date at which they will be received:

Graduation, Masonry, Bridging, Cross-Ties, and Track-Laying of 33 miles of the Baltimore & Drum Point Railroad, from the City of Baltimore to Mount Zion, in Anne Arundel County; Baltimore & Drum Point Railroad Office, 158 West Fayette Street, Baltimore, Md.....	Oct. 10, 1881.
Construction of the Toronto & Ottawa Railroad, from Madoc to Sharbot Lake (on the Kingston & Pembroke Railroad), about 47 miles in length; Toronto & Ottawa Railroad Company, 42 Front Street, West Toronto, Canada.....	" 10, "
The Mines, Minerals, and Mining Rights of the Laurentian Phosphate Mining Company (Limited) will be sold at the Rooms of John J. Arnton, 91 St. James Street, Montreal, Canada, at 11 o'clock.....	" 11, "
Pumping Engine, capable of raising five million gallons of water 130 feet high in 2½ hours; Joseph McAllister, Chairman of Special Committee, Water Department, Camden, N. J.....	" 11, "
Manufacture and delivery (not including erection), of about One Thousand Tons of Steel, required for the completion of the East River Bridge; Trustees of the New York and Brooklyn Bridge, 21 Water Street, Brooklyn, N. Y.....	" 15, "
Dredging in Passaic River, between Newark Bay and Pennsylvania Railroad Bridge, and Dredging in Rahway River, N. J.; G. L. Gillespie, Major of Engineers, Room 59, Army Building, corner Houston and Greene Streets, New York City.....	" 18, "
Furnishing Materials and Labor of all kinds necessary for the completion and delivery of the Metal-Work of the Savannah River Lights, Georgia; Peter C. Hains, Major Engineers, Light-House Engineer, 6th District, Charleston, S. C.....	" 20, "
Bids for the Sale of Obsolete and Unserviceable Fire-Arms of Foreign Molds and Manufacture which are stored at the various Arsenals in the United States; U. S. Ordnance Agency, 146 Greene Street, P. O. Box 1811, New York City.....	" 26, "
Construction of a Bridge across the Potomac River at Three Sisters about 3100 feet above the present Aqueduct Bridge at Georgetown, D. C.; and also for the Construction of a Bridge on a Section of the River about 500 feet above the said Aqueduct Bridge; U. S. Engineer's Office, 1907 Pennsylvania Avenue, Washington, D. C.....	" 29, "
Construction of the necessary Foundations, Masonry, Superstructure, and Approaches of a Highway Bridge to be built across Cumberland River at Nashville, Tenn.; Bridge Committee, Nashville, Tenn.....	Nov. 1, "

ASSAY DEPARTMENT OF THE ENGINEERING AND MINING JOURNAL.

This department is opened for the benefit of miners, prospectors, and others interested in minerals.

Replies will be made in these columns, and *without charge*, to questions asked regarding the nature and commercial value of minerals, and of samples sent.

Assays, determining the actual composition and value of ores, will be made at the following rates. All assays are made with the utmost care by the most experienced and competent assayers:

Assay for gold.....	\$3.50	Assay for copper.....	\$3.00	Assay for iron.....	\$4.00
" silver.....	3.00	" lead (wet).....	3.00	" nickel and	
" gold and silver.....	5.00	" zinc.....	5.00	" cobalt.....	10.00

The amount should invariably accompany the order, and expressage or postage must always be prepaid.

Communications, samples, etc., to be addressed to
ENGINEERING AND MINING JOURNAL, 27 Park Place, New York
(P. O. Box 4404).

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Feet on Vein.	Capital Stock.	SHARES.		ASSESSMENTS.		DIVIDENDS.		HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.							SALES.												
			No.	Par Val.	Total levied to date.	Date and amount per share of last.	Total paid to date.	Date and amt. per share.	Oct. 1.		Oct. 2.		Oct. 3.		Oct. 4.		Oct. 5.		Oct. 6.		Oct. 7.							
									H.	L.	H.	L.	H.	L.	H.		L.	H.	L.	H.	L.	H.	L.					
Alice, s. c.	3,000	10,000,000	400,000	25	*			320,000	Oct. 1881	10	6.50																	
Amie Con. s. L.	5,000,000	500,000	100	10				305,000	May 1880	10	.30	.20	.30	.20	.30	.20	.30	.20	.30	.20	.30	.20	.30	.20	4,800			
Argenta, s.	1,500	10,000,000	100,000	100	140,000	Sept. 1881	10	40,000	Feb. 1880	20															24,850			
Barbee & Walker, s.	1,000,000	100,000	10					60,000	Nov. 1880	10																		
Bassett, g. s.	10,000,000	100,000	100					25,000	Feb. 1880	25																		
Belle Isle, s.	1,500	10,000,000	100,000	100	55,000	Sept. 1881	10	300,000	Dec. 1879	25			.12	.10	.10		.07		.21	.10						945		
Black Bear, g.	3,000	3,000,000	30,000	100	15,000	Sept. 1879	50	832,147	Sept. 1881																			
Belcher, g. s.	1,040	10,400,000	104,000	100	2,380,000	Sept. 1881	50	15,397,200	Apr. 1876	75							8.75	8.50								920		
Bodie Cons. g.	10,000,000	100,000	100		75,000	May 1879	1 00	1,200,000	Mar. 1880	25	7.00	6.63	6.75													490		
Breese, s.	5,000,000	200,000	25					2,000	Feb. 1880	31																		
California, g. s.	600	54,000,000	540,000	100	162,000	June 1881	30	31,320,000	Dec. 1879	50	1.05	1.00	1.00	.88	1.00	.80	1.00	.68	.99	.95	1.00	.95				12,575		
Calumet & Hecla, c.	2,500,000	100,000	25					19,850,000	Aug. 1881	5 00																		
Caribou Con., s.	1,400	1,400,000	100,000	10				50,000	Mar. 1880	10																		
Catalpa, s. L.	3,000,000	300,000	10					130,000	May 1881	20																		
Chrysolite, s. L.	10,000,000	200,000	50					1,400,000	Oct. 1881	50	7.63	7.38	7.25	7.00	6.88	6.88	7.33	6.75	7.38	7.13	7.25	6.50				12,000		
Climax, s. L.	2,000,000	200,000	10					180,000	Aug. 1880	30																		
Cons. Virginia, g. s.	710	54,000,000	540,000	100	573,200	Aug. 1881	30	42,930,000	Aug. 1880	50	2.45	2.40	2.65	2.45	2.20	2.55	2.45	2.80	2.45	2.50	2.35	2.85				4,400		
Copper Knob, c.	1,000,000	1,000,000	100					15,000	Nov. 1880	02	.08	.06	.07	.06	.07		.07		.08	.07	.07					82,900		
Copper Queen, s.	2,500,000	250,000	10					100,000	Jan. 1881	10																		
Crown Point, g. s.	600	10,000,000	100,000	100	2,573,370	Sept. 1881	0 75	11,888,000	Jan. 1876	2 00																		
Deadwood Terra g.	5,000,000	200,000	25					1480,000	Sept. 1881	20																		
Dunkin, s. L.	200,000	200,000	25					200,212	June 1881	7 1/2			.50		.50												150	
Eureka Cons., g. s. L.	5,000,000	50,000	100					4,730,000	Sept. 1881	50	25.00						24.50										1,550	
Excelsior W. & M. Co.	325 acres	10,000,000	100,000	100	100,000	June 1881	1 00	950,000	Sept. 1880	25							24.50									290		
Exchange, s.	1,000,000	100,000	10					350,000	Apr. 1881	25																		
Evening Star, s. L.	500,000	50,000	10					400,000	Sept. 1881	50																		
Father de Smet, g.	10,000,000	100,000	100					340,000	July 1881	50																		
Findley, g.	1,200,000	200,000	25					8,000	May 1879	1c																		
Freeland, s. L.	5,000,000	50,000	100					50,000	May 1880	25																		
Glass Pendery, s. L.	5,000,000	250,000	20					50,000	May 1881	25																		
Gold Strips, g.	1,500,000	150,000	10					90,000	July 1881	15																		
Gould & Curry, g. s.	10,800,000	108,000	100					3,828,800	Oct. 1870	10 00																		
Grand Frize, s.	1,500	10,000,000	100,000	100	315,000	July 1881	25	450,000	Sept. 1880	0 25				.35														
Great Eastern, g. s.	1,000,000	300,000	10					200,000	Jan. 1881	10																		
Green Mountain, g.	4,350	1,250,000	125,000	10				192,550	Sept. 1881	7 1/2	5.25	5.13			.16	.14	.15	.15	.14	.15							520	
Hale & Norcross, g. s.	400	11,200,000	112,000	100	3,098,000	July 1881	50	1,698,000	Apr. 1871	5 00																		
Hibernia, s. L.	7,500,000	300,000	25					180,000	July 1881	10	.36	.32	.35	.33	.36	.34	.37	.33	.44	.35	.45	.37					1,500	
Hornstake, g.	10,000,000	100,000	100					1,110,000	Sept. 1881	30																		
Horn Silver, s. L.	1,000,000	100,000	10					200,000	Apr. 1878	1 00																		
Hukill, g. s.	3,288	1,000,000	200,000	5				210,000	Dec. 1873	2 00	14.50				14.75		14.88	14.50										335
Independence, s.	1,500	10,000,000	100,000	100	170,000	Aug. 1881	0 15	225,000	Sept. 1879	25																		
Indian Queen, s.	250,000	125,000	2					275,500	Sept. 1881	05																		
Inyo, s.	500,000	100,000	5					15,000	Sept. 1881	05																		
Iron Silver, s. L.	10,000,000	500,000	20					390,000	Sept. 1881	20	2.50	2.40	2.45		2.50	2.45	2.45	2.10	2.30	2.15	2.30	2.25					17,050	
La Plata, s. L.	2,000,000	200,000	10					150,000	Jan. 1880	15	1.60	1.55	1.60	1.45	1.50		1.50		1.50	1.35	1.45	1.10					7,940	
Leadville Cons., s. L.	4,000,000	400,000	10					78,000	Oct. 1878	15																		
Leeds, s.	3,000	6,000,000	60,000	100	51,000	June 1881	25	700,000	Aug. 1880	50				1.35	1.30	1.35	1.30	1.30		1.25	1.15	1.30					6,610	
Little Chief, s. L.	10,000,000	200,000	50					1,350,000	Jan. 1880	50	3.00	2.88	3.00		2.70		2.75											1,010
Little Pittsburg, g.	30 acres	200,000	200,000	100				90,000	July 1879	50																		
Martin White, s.	22,900	10,000,000	100,000	100	875,000	June 1881	25	550,000	Mar. 1878	25	.80	.77	.95	.78	.62	.84	1.05	.91	1.20	1.05	1.25	1.05					104,500	
Moose, s.	39,000	2,000,000	200,000	10				25,000	Mar. 1881	25																		
Navajo, s.	500	10,000,000	100,000	100	200,000	Aug. 1881	0 25	25,000	July 1879	10																		
N. Y. & Colorado, g.	1,000,000	50,000	10					25,000	July 1879	10																		
Northern Belle, s.	1,000	5,000,000	50,000	100				1,000,000	Oct. 1881	7 1/2	12.50	11.63	12.75	12.00	12.75	12.25	12.00	11.75	12.25									1,320
North Belle Isle, s.	1,500	10,000,000	100,000	100	25,000	Feb. 1880	15	15,000	Sept. 1880	15																		

NON-DIVIDEND PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, NUMBER OF SHARES, ASSESSMENTS, HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE (Oct. 1-7), SALES. Lists various mining companies like Albion, Allouez, Alta Montana, etc.

Total shares of Non-Dividend Paying Stocks sold during the week, 511,643. Total shares sold at all the Exchanges during the week, 917,588.

Boston. Quotations and Sales of Mining Stocks for week ending Oct. 5th.

Table with columns: NAME OF COMPANY, Opening Sept. 29, Highest during the week, Lowest during the week, Closing Oct. 5, Total shares sold. Lists companies like Allouez, Atlantic, Aztec, Blue Hill, etc.

Philadelphia. Quotations and Sales of Mining Stocks for week ending Oct. 5th.

Table with columns: NAME OF COMPANY, Opening Sept. 29, Highest during the week, Lowest during the week, Closing Oct. 5, Total shares sold. Lists companies like Etina, Am. Cons., Argent, etc.

payable on October 15th. Transfer-books close on the 5th inst.

The regular monthly dividend of the Silver King Mining Company, of 25 cents per share, is announced.

REVIEW OF THE SAN FRANCISCO MARKET.

The boom in the north end stocks has been short-lived, and the prices are gradually dropping back to the old standard. Nevada closed last night at \$12 1/2, the lowest price of the week.

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

The stringency in the money market has had a depressing tendency on the market for copper stocks during the past week, and prices have continued to decline.

marked than any other, from the fact that nearly all the dealings are for cash, as the banks or bankers do not, as a general thing, loan on this class of securities.

At the Boston Mining Exchange, the condition of the money market has not affected the business of the Board, and the week has been an exceedingly active one.

ally changed, and the market for coppers has rather a more healthy tone, and an advance in prices is not improbable.

Coal Stocks.

NEW YORK, Friday Evening, Oct. 7.

These stocks have been very active but very weak. Delaware, Lackawanna & Western and Reading have monopolized the greater part of the business.

3 P.M.—At the afternoon Boards, prices were not materi-

SAN FRANCISCO MINING STOCK QUOTATIONS. Daily Range of Prices for the Week.

Table with columns: NAME OF COMPANY, CLOSING QUOTATIONS (Sept. 30, Oct. 1, Oct. 3, Oct. 4, Oct. 5, Oct. 6, Oct. 7), Opening Oct. 6, Opening Oct. 7.

BULLION MARKET.

NEW YORK, Friday Evening, Oct. 7.

The silver market abroad has been somewhat firmer the past week, but the advancing rate for money in London is likely to affect silver there as it has lowered it here, through lower rates for sterling exchange.

DAILY RANGE OF SILVER IN LONDON AND NEW YORK, PER OZ.

Table with columns: DATE, London Pence, N. Y. Cents, DATE, London Pence, N. Y. Cents.

MISCELLANEOUS.

Exports of Gold and Silver from New York.

Table with columns: Description, Amount.

Coinage of Precious Metals in Mexico.—The following table gives the average annual coinage of precious metals in the various mints of Mexico during the period of five years from 1874 to 1879:

Table with columns: City of Mexico, Guanajuato, Guadaluajara, San Luis Potosi, Zacatecas, Durango, Chihuahua.

Statement U. S. Mint for September.—The following statement shows the coinage executed at the United States mints during the month of September, 1881:

Table with columns: Denomination, Value.

Total gold \$5,415,000 Standard silver dollars 2,400,000 Cents 32,300

Total coinage \$7,847,300

Bullion Receipts at New York.—The bullion received from the mines at the various offices in this city during the week ending October 6th, as compiled from various sources, amounted to \$196,934.33, as against \$465,195.12 reported for the previous week, and \$12,905,010.09 from January 1st, 1881, to date.

BULLION PRODUCTION FOR 1881.

We give below a statement showing the latest bullion shipments. These are officially obtained from the companies, where that is possible; and where official statements can not be procured, we take the latest shipments published in those papers nearest to the mines reported.

The shipments of silver bullion are valued at \$1.29-29 per ounce, Troy; gold at the standard \$20.67 per ounce, Troy. The actual value of the silver in the following table is therefore subject to a discount, depending on the market price of silver.

COAL STOCKS.

Table with columns: NAME OF COMPANY, Capital Stock, SHARES (No., Par Val., Last Dividend, Rate per Ann.), Quotations of New York stocks (Oct. 1-7), Sales from Oct. 1st to Oct. 7th inclusive.

Of the sales of this stock 64,611 shares were in Philadelphia and 110,550 in New York.

bullion, should be diminished by about 13 1/2 per cent to arrive at actual value.

Table with columns: MINES, States, For the week, Month of September, Year from Jan 1st, 1881.

at over 18 1/2 c. There is a very large consumption going on, and no indications of an abatement. There is no pressure on the part of holders to sell.

Our London advices by mail include September 23d, from which we take the following:

Sept. 19th. The sales on the 17th and to-day amount to about 1000 tons, mostly for cash parcels at £61@£61 1/2 for g. o. bs., £61 1/2@£61 1/2 for favorite marks, and £62 for best brands. G. o. bs. three months prompt sold at £62@£62 1/2.

Sept. 20th. Sales about 425 tons, mostly with three months prompt at £62@£62 1/2@£62. Cash metal sold at £61 1/2@£61 1/2, and one month's prompt at £61 1/2.

Sept. 21st. Sales about 350 tons at £61 1/2@£61 1/2 cash, and £61 11-16@£62 sundry forward.

Sept. 22d. Sales about 500 tons g. o. bs., one month, at £61 1/2, and distant deliveries £62 1/2@£62 1/2. Favorite brands £61 1/2 cash, and best marks £62 1/2.

Sept. 23d. Small quantity offered at current rates reduced the business to about 300 tons, g. o. bs. at £61 9-16@£61 1/2 net and sharp cash, up to £62 usual cash terms, and £62 1/2 net for distant arrival. Wallaroo is quoted at £67 1/2@£68 1/2; Burra, £66 1/2@£67; English Tough Cake, £65@£66; Select, £67@£69.

Tin.—The sales of the week amount to about 300 tons at 2 1/2@2 1/2 c. on spot and to arrive. At the close, 2 1/2 c. is asked for ordinary brands, and 2 3/4 c. for L. & F. During the week, tin declined in London to £94 5s., while to-day it recovered to £95 5s. on spot, and £96 futures, with large purchases by consumers. The decline is attributed to the advance of the Bank of England rate, and the recovery to a movement in tin plates. Singapore quotes \$29 3/4, and Penang \$29 1/2, with exchange at 3s. 9 1/2 d.

Our London advices include September 23d, from which we extract the following:

Sept. 19th. Sales, including the 17th, amount to about 300 tons at 93 1/2@93 1/2 s.; 14 days, 93 1/2@93 1/2 s.; one to two months, 93 1/2@94 1/2 s.; three months, 94@94 1/2 s.

Sept. 20th. Sales about 150 tons at 93 1/2 s. for cash and prompt payment; 93 1/2@93 1/2 s. fourteen days; 93 1/2 s. one month, and 94 1/2 s. three months.

Sept. 21st. Sales about 150 tons at 93 1/2@93 1/2 s. sharp and early cash, 93 1/2 s. fourteen days, and 94 1/2 s. three months.

Sept. 22d. Business small and prices stronger.

Sept. 23d. Sales about 200 tons at 94 1/2@94 1/2 s. cash and prompt payment; two months, 94 1/2 s.; and three months, 95 1/2@94 1/2 s.

Tin Plates.—The English market has advanced about 35c. per box on cokes, with large buying by operators there based on the advance of iron and pig-tin. Excepting in coke tins, which show an advance, and purchases of several thousands of boxes at \$5, there is no change yet in this market. We quote per box as follows: Charcoal tins, Melyn grade, 1/2 cross, \$6 1/2. Allaway grade, \$5.70@5 1/2. Charcoal Roofing, Dean grade, \$5.35 for 14 x 20, and \$11 1/2@11 1/2 for 20 x 28; Allaway grade, \$5.15@5.20 for 14 x 20, and \$10 1/2 for 20 x 28. Coke Roofing, B. V. grade, \$5 1/2 for 14 x 20, and \$10 1/2 for 20 x 28. Coke tins, B. V. grade, IC, \$5@5.05, and ICW, \$4.55.

Lead.—There has been but a retail demand,

* Official. † Net. G. Gold. S. Silver. L. Lead.

METALS.

NEW YORK, Friday Evening, Oct. 7.

The high rate asked for money this week has had a tendency to curtail business, without weakening prices. The consumption of metals still continues to be large, and strong if not higher prices are predicted.

Copper.—But little can be said of this article at present. The sales have been 300,000 to 400,000 lbs. at 18 1/2@18 1/2 c. At the close, under a light demand, the quotation is a little weaker, and can not be placed

amounting to perhaps 200 tons at 5¼@5.35c. At the close, we quote at 5¼c.; refined is nominal at 5.40c. The English market is higher, with an upward tendency.

The shipments of lead over the St. Louis & San Francisco Railroad for the week ended September 30th amounted to 248 tons.

Spelter and Zinc are quiet. Spelter is quoted at 5½@5½c., and Sheet Zinc at 7¼c.

Antimony.—Cookson's is quoted at 14¼ and Hallett's 14c.

Quicksilver.—The San Francisco Commercial Herald of Sept. 22d says:

The nominal price is 37c., but sales have been made for export at a shade less.

The exports for the week, by sea, were as follows:

To Corinto per Colima, hence 19th inst.:		
Eugene de Sabla.....	2	\$57
To Mazatlan per same:		
Thomas Bell & Co.....	25	750
To Callao per same:		
J. W. Grace & Co.....	20	600
To Hongkong per Gaelic, hence 20th inst.:		
Wing Chong Wo & Co.....	200	5,750
To Victoria per Dakota, hence 20th inst.:		
Albert Mau & Co.....	1	25

Totals.....	248	\$7,182
Previously since January 1st, 1881.....	26,275	761,581

Totals.....	26,523	\$768,763
Totals same period, 1880.....	24,506	740,943

Increase in 1881.....	2,017	\$27,820
-----------------------	-------	----------

Receipts since January 1st, 1881, 38,986 flasks.

The exports by rail for the first eight months aggregate 7993 flasks.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Oct. 7.

The business recorded in iron this week has been very small, and the quotations do not indicate that an improvement has taken place. The fact is, that there is but very little of anything in the way of iron being forced for sale or in large supply, while consumers, displeased with the advance that has taken place, are buying but for the most pressing necessities, which demands, in conjunction with those from contractors, are absorbing all that is produced. Orders for large quantities, which must come later, are likely to advance prices considerably.

American Pig.—We learn of no business worthy of notice. Some has been done at even higher prices than our quotations. An order for 1000 tons of some brands would advance prices several dollars per ton, owing to the scarcity of good iron. The outlook favors higher prices, although, excluding the contracts made earlier in the year, there are not many important inquiries at the present time. The consumption does not abate a particle, every available establishment being fully employed. We quote No. 1 Foundry at \$25@26; No. 2, \$23; and Forge, \$21@22.

Scotch Pig.—The higher prices are restricting business, but holders are as little unwilling to sell at current prices as consumers are to purchase. Glasgow prices are higher, while freights are strong at 15s., with all vessel room engaged for three months ahead, mostly for Bessemer pig-iron and steel blooms. We quote Eglinton at \$23½@24; Glengarnock, \$24¼@25; Coltness, \$26@26½; Gartsherrie, \$25@25½; and Summerlee, \$25½. Bessemer on spot is quoted at \$24@25, while the cost of importing is about \$26. No. 1 English is held at \$21½@22.

Messrs. John E. Swan & Brothers, of Glasgow, under date of September 23d, report 121 furnaces in blast, as against 82 at the same time last year. The quantity of iron in Connal & Co.'s stores was 586,802 tons, an increase of 2348 tons for the week. The shipments show a decrease since Christmas of 107,193 tons, as compared with the shipments to the same date in 1880. The imports of Middlesbrough pig-iron for the same period show an increase of 36,306 tons. The following were the quotations of the leading brands of No. 1 pig-iron: Gartsherrie, 60s.; Coltness, 62s.; Langloan, 62s.; Summerlee, 59s.; Carnbroe, 55s.; Glengarnock, 55s.; Eglinton, 52s. Middlesbrough pig-iron was quoted as follows, f. o. b.: No. 1 Foundry, 46s.; No. 2, 44s.; No. 3, 42s. 6d.; No. 4, 42s.; No. 4 Forge, 41s. 6d.

Rails.—The domestic steel mills, having but little to offer, are doing no business, and quoting at \$60 for delivery one year hence. Foreign steel is quiet, and quoted at about \$61@61½ for winter and spring delivery. In iron rails, we learn of no transactions, and quote English here at \$48, and American at mills at \$48@50.

Old Rails.—We note sales of 300 tons of D. Hs. at \$29.75; 1000 tons of Ts. at \$27; and 1000 tons of

American Ts. at \$30. We quote Ts. at \$27½ and D. Hs. at \$30, with few offered at these prices.

Wrought Scrap.—This article is quiet and in small supply. We quote at \$28@30.

We publish the following letters from our regular correspondents:

Baltimore. Oct. 3.

[Specially reported by R. C. HOFFMAN & Co.]

We have no special change to report in the iron market; the demand is fair, and prices about the same as last report. We quote:

Balt. Char. ...	\$36.00@38.00	Anth. No. 3...	\$21.00@22.00
Va. " " " "	36.00@ 38.00	Mot. and Wh.	19.00@ 20.00
Anth. No. 1.	25.00@ 26.00	Cl. C. B. Bl'om	65.00@ 70.00
" " 2.	23.00@ 24.00	Refined Bl'm	55.00@ 60.00

Louisville. Oct. 4.

[Specially reported by GEORGE H. HULL & Co.]

The market is quiet but firm. Southern Coke, No. 1 mill, is worth from \$21@21.50 cash, delivered here No. 1 Coke Foundry, \$23.50@24.

Nearly all sales made in this market are for cash, and we quote on that basis:

FOUNDRY IRONS.

	No. 1.	No. 2.
Hanging Rock Charcoal...	\$27.50@28.00	\$25.00@27.00
Southern Charcoal.....	24.00@ 25.00	22.50@ 23.00
H'n g Rock, Stc'l & Coke...	24.00@ 24.50	23.00@ 23.50
Southern Stonecoal & Coke	24.00@ 24.50	22.50@ 23.00
Amer. Scotch....	\$21 @ \$23	Silver Gray...\$20.00@21.00
Scotch Iron.....	24 @ 26	

MILL IRONS.

No. 1 Charcoal, cold-short and neutral.	\$21.50@22.50
No. 1 Stc'l & Coke, cold-short and neutral..	21.00@ 21.50
No. 2 Stc'l & Coke, cold-short and neutral...	20.00@ 20.50
No. 1 Missouri and Indiana, red-short.....	25.00@ 27.00
White & Mottled, cold-short and neutral....	18.00@ 19.00

CAR-WHEEL AND MALLEABLE IRONS.

Hanging Rock, cold blast.....	\$35.00@41.00
Alabama and Georgia, cold blast.....	35.00@ 38.00
Kentucky, cold blast.....	35.00@ 40.00
Hanging Rock W. B.....	29.00@ 33.00

Pittsburg. Oct. 3.

[Specially reported by A. H. CHILDS.]

The general features of the market are about the same as last report. Prices are unchanged, but metal is rather more firmly held and indications favor a stronger market. Many holders are refusing to sell for future delivery.

No. 1 F'dry... 4 mos.	\$24.00@26.00	M. & White... 4 mos.	\$20.00@22.00
No. 2 " " " "	23.00@ 24.00	Hot Blast Ch.	24.00@ 28.00
Gray Forge... 22.00@	24.00	Cold Blast W.	33.00@ 38.00

Richmond. Oct. 3.

[Specially reported by ASA SNYDER.]

Market active and firm at about the quotations below:

Scotch Pig-Iron.....	\$25.00@28.00
Anthracite Pig-Iron No. 1.....	25.00@ 27.00
" " " " No. 2.....	23.00@ 25.50
" " " " No. 3.....	22.00@ 23.00
Virginia Coike Pig-Iron, No. 1.....	23.00@ 24.00
" " " " No. 2.....	22.00@ 23.00
" " " " No. 3.....	20.00@ 22.00
Va. Charcoal C. B. Wheel Iron.....	32.00@ 34.00
Old Rails.....	27.00@ 29.00
Wrought Scrap No. 1.....	22.50@ 24.00
Cast Machinery Scrap.....	20.00@ 21.00
Richmond Refined Bar-Iron.....	@ 03
Horse-Shoes (Tredegar).....	@ 4.25
Mule.....	@ 5.25

St. Louis. Oct. 3.

[Specially reported by HOFFER, PLUMB & Co.]

The demand is good, and prices are firm at the following figures:

HOT BLAST CHARCOAL.	
Missouri.....	\$27.00@28.00
Southern.....	26.00@ 27.00
Ohio.....	29.00@ 30.00
COKE AND COAL.	
Missouri.....	\$27.00@28.00
Southern.....	25.50@ 26.50
Ohio.....	26.00@ 27.00
MILL IRONS.	
Cold short.....	\$22.00@23.00
Red short.....	25.00@ 27.00
CAR-WHEEL AND MALLEABLE IRONS.	
Missouri.....	\$28.00@33.00
Southern.....	35.00@ 38.00
Ohio.....	33.00@ 42.00

Philadelphia. Oct. 7.

Quotations in iron and steel are as follows: No. 1 Foundry, \$24.50@25.50; No. 2, \$23; Gray Forge, \$20@21; English, \$19@21; Scotch, \$22@25; Bessemer Pig, \$25@25.50. The tone of the market is strong. The total volume of business to date is light. Inquiries are quite numerous, but buyers and sellers are not able to agree. The larger companies decline to sell any further forward, and will watch the course of the foreign market until December. Several new furnaces are heard of going into blast in November. It is not probable that there will be any great increase in production, not enough to affect prices. The foreign fluctuations in raw iron are believed to be due partly to speculative influences. The foreign demand for Bessemer keeps American buyers out of the market. The market for manufactured iron is steadily growing stronger, and greater difficulty

exists in meeting requirements. The stores are doing all the business done in the city at 2½c. Mills are far back on deliveries. Skelp iron is in very active demand at 3¼@3½c. Wrought pipe orders are abundant, and buyers are urgent to get supplies. Sheet-iron is firm, and orders are hard to place. Structural shapes are 3@4c. Plate and Tank, 3¼@6c. Large orders can not be placed under three to four months. Steel rails are quiet at \$56@62. The mills are so far oversold that they do not care to concede points to secure contracts, unless in special cases. Iron rails are dull at \$47. Steel ingots are the subject of negotiation: sales this week, 6000 tons; last week, 11,000. Old rails are quiet; a few small lots sold at \$27.75. Machinery scrap is active at \$20; finer grades of choice, heavy lots, \$28@32. The supply is fair, and consumption heavy.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Oct. 7.

Anthracite.

There is an improved demand for anthracite coal, which has made prices firm, if not higher. The cooler weather has given the retail dealers a very much better business, and this must be felt in the wholesale trade soon. It is stated that the retail dealers in this city have not a sufficient number of carts and horses to meet the demand that is at present made upon them. There is a better supply of vessels, and freights are lower. Owing to a scarcity of cars for moving coal West, some inquiries have come for shipment by the Erie Canal. It is reported that some important sales have been made. Excepting on special coals, there were no advances made in prices on the 1st. Most of the companies were in favor of a slight curtailment of production about 60 days ago, and then advancing prices. This the Delaware, Lackawanna & Western Railroad Company opposed. Now this company finds a demand for all of its coal, and thinks an advance should be made. Some of the other companies, remembering the previous action of the Delaware, Lackawanna & Western, now refuse to join in its desires, and say that present prices are high enough.

There are no signs of the companies uniting upon any point during this year. They will probably run full time and secure prices approximating what is now received. The question of what will be done in 1882 is an important one, and is engaging the attention of the managers. If the Reading Company is to be again headed by Mr. Gowen with strong financial backing, as now looks to be certain, the position will be considerably changed. The prospects of 1882 will receive our early attention.

We condense the following from Messrs. C. A. Miltenberger & Co.'s monthly circular:
Coal on hand in New Orleans October 1st: Pittsburg coal, 86 boats. Consumption during September, Pittsburg coal, 24 boats, 3 barges and 3 French Creeks. Arrivals during September: Pittsburg coal, 11 boats, and 3 barges from Baton Rouge.

Wholesale Prices of Anthracite Coal Delivery f. o. b. at Tide-Water Shipping Ports, per ton of 2240 lbs.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
WYOMING COAL.						
* Pittston at Newburg.....	3 95	3 95	3 85	3 90	4 05	3 90
Scranton at Hoboken.....	3 90	3 90	3 90	4 05	4 20	3 90
Lackawanna at Weehawk'n	3 90	3 90	3 90	4 05	4 20	3 90
Wilkes-Barre at P. Johnston	3 90	3 90	3 90	4 05	4 20	3 90
Plymouth R. A. at P. John.	3 90	3 90	3 90	4 15	4 50	4 00
LEHIGH COAL.						
Honey Brook at Port John.	5 00	4 25	4 25	4 25	4 25	3 90
Cross Creek at Port John.	4 40	4 40	4 35	4 35	4 25	4 00
U. L. & Coun. R'ge at Eliz'pt						
SCHUYLKILL COAL.						
At Elizabethport.						
Hard White Ash.....	4 85	4 85	4 25	4 25	4 25	3 90
Free-Burning White Ash...	3 90	4 05	4 20	3 90	3 90	3 90
Schuyllkill Red Ash.....			4 05	4 30	3 90	
Shamokin.....			4 25	4 45	3 90	
Lorberry.....			4 75	4 75	4 00	
Lykens Valley (Brookside).		5 50	5 50	5 50	5 50	4 60
At Port Richmond, Philadelphia, for shipment to points beyond Capes of the Delaware.						
Hard White Ash.....	4 50	4 50	3 90	3 90	3 90	3 55
Free-Burning White Ash...	3 55	3 70	3 85	3 85	3 85	3 55
Schuyllkill Red Ash.....			3 70	3 95	3 55	
Shamokin.....			3 90	4 10	3 55	
Lorberry.....			4 35	4 35	3 65	
Lykens Valley (Brookside).		5 00	5 00	5 00	4 25	

* Fifty cents per ton additional for delivery at New York.

Bituminous.
There is an improved inquiry and some inclination to advance prices. The Clearfield region is very short of cars, which accounts for the falling off of ship-

ments, as there are plenty of pressing orders to fill. The production, according to the last report, shows but 33,194 tons for the week. From January 1st, as compared with the like period of 1880, the production shows an increase of 552,036 tons, or an increase of over 45 per cent. The Cumberland region shows a falling off of 61,690 tons for the year. Cars are scarce in this district, and the lowness of the water in the canal checks business.

STATISTICS OF COAL PRODUCTION

Comparative statement of the production of anthracite coal for the week ending Oct. 1st, and years from January 1st:

Tons of 2240 Lbs.	1881.		1880.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co.	70,239	2,639,764	53,466	2,180,422
D. L. & W. RR. Co.	81,952	3,118,805	66,515	2,527,424
Penn. Coal Co.	31,908	1,010,975	26,211	803,123
L. V. RR. Co.	15,679	836,350	10,339	727,776
P. & N. Y. RR. Co.	1,361	71,627	869	27,584
C. RR. of N. J.	44,607	1,715,461	44,151	1,181,828
Penna. Canal Co.	20,929	326,646	13,854	343,314
	266,675	9,719,688	215,407	7,796,471
Lehigh Region.				
L. V. RR. Co.	68,083	3,240,691	79,460	2,455,077
C. RR. of N. J.	38,655	1,581,419	61,033	1,539,171
S. H. & W. B. RR.		9,386		8,031
	106,738	4,831,496	140,493	4,002,279
Schuylkill Region.				
P. & R. RR. Co.	133,946	5,049,642	139,205	4,290,048
Shamokin & Lykens Val.	21,439	774,966	26,898	693,345
	155,385	5,824,633	166,103	4,923,393
Sullivan Region.				
St. Louis & Sul. RR. Co.	1,113	46,532	830	33,393
Total	529,911	20,422,349	522,833	16,756,073
Increase	7,078	3,666,276		

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Total same time in 1876	12,365,653 tons.
" " " 1877	14,275,663 "
" " " 1878	12,147,543 "
" " " 1879	19,262,150 "

Belvidere-Delaware Railroad Report for the week ending Oct. 1st:

	Week.	Year. 1881.	Year. 1880.
Coal for shipment at Coal Port (Trenton)	1,926	51,768	35,961
Coal for shipment at South Amboy	10,580	496,384	349,470
Coal for distribution	13,349	516,727	367,932
Coal for company's use	2,272	82,633	79,442

The decrease in shipments of Cumberland Coal, over the Cumberland Branch and Cumberland & Pennsylvania railroads, amounts to 186,024 tons, as compared with the corresponding period in 1880.

The shipments of Cumberland Coal, over the George's Creek & Cumberland RR. by the Maryland and the American Coal companies, for the week ending Oct. 1st, amounted to 8093 tons, making a total of 113,424 tons since the beginning of transportation.

The Production of Coke for the week ending Oct. 1st, and year from Jan. 1st:

Tons of 2000 lbs.	Week.	Year.
Penn. RR. (Alleghany Region)	2,048	73,341
West Penn. RR.	2,452	89,874
Southwest Penn. RR.	21,844	1,043,906
Penn. & Westmoreland Region, Pa. RR.	5,271	144,474
Pittsburg, Penn. RR.	7,708	437,606
Show Shoe (Clearfield Region)	348	8,167
Total	39,671	1,797,368

The Production of Bituminous Coal for the week ending Oct. 1st was as follows:

Tons of 2000 lbs., unless otherwise designated.	Week.	Year.
Cumberland Region, Md.	49,617	1,543,545
Barclay Region, Pa.	6,224	309,820
Barclay RR., tons of 2240 lbs.	3,740	157,164
Broad Top Region, Pa.	2,045	61,348
Huntingdon & Broad Top RR.	1,295	88,037
East Broad Top	33,194	1,761,573
Clearfield Region, Pa.	6,734	205,483
Snow Shoe	6,211	216,815
Tyrone and Clearfield	477	20,594
Alleghany Region, Pa.	14,288	668,096
Pennsylvania RR.	17,748	483,960
Fitzburg Region Pa.		
West Penn. RR.		
Southwest Penn. RR.		
Penn. & Westmoreland gas-coal, Pa. RR.		
Pennsylvania RR.		

FREIGHTS.

Rates of Transportation on Coal for Northern and Western Shipment.

SOUTHERN CENTRAL RR., IN CONNECTION WITH THE LEHIGH VALLEY, PENNSYLVANIA & NEW YORK, UTICA, ITHACA & ELMIRA, NEW YORK CENTRAL & HUDSON RIVER, AND ROME, WATERTOWN & OGDENSBURG RAILROADS.

On a consignment of not less than 25 tons, from Lackawanna Junction, subject to regulations printed below, will be as follows:

To Auburn (local)	\$2.35
" " for shipment N. Y. C. & H. R. RR.	1.97
" " points east of and including Syracuse	1.97
" " Weedsport (local)	2.35
" " for shipment	2.18
" " Rochester	1.92
" " points between Rochester and Buffalo	2.18
" " for Charlotte and Genesee Docks	1.75
" " Buffalo, International Bridge, and Suspension Bridge	1.72
" " Erie Canal, except Buffalo	1.97
" " Sterling (local)	2.55
" " for shipment R. W. & O. RR.	2.38
" " Oswego	2.38
" " Fair Haven for shipment	2.40
" " from Penn. Haven	2.65

Rate, L. & B. Junction, to Buffalo, Black Rock, Suspension Bridge (via Weedsport), \$3 per gross ton.

Rate, L. & B. Junction, to Rochester (via Weedsport), \$2.59 per gross ton.

Rate, L. & B. Junction, to Buffalo, in return line cars (via Weedsport), \$2.70 per gross ton.

Regulations.

A charge of 15 cents per ton will be collected of each consignor, on all coal not unloaded within 24 hours after its arrival, and an additional charge of 10 cents per ton for every 24 hours thereafter, Sundays and legal holidays excepted.

No allowance will be made for coal lost from cars on account of broken doors or other defects existing when the coal is loaded.

Claims for lost coal will be settled with shippers only. Charges for freight or tolls will follow the coal from State line to destination, when consigned to points on and beyond the New York Central Railroad.

Ten cents per ton will be charged, at Weedsport docks, for shipping coal directly from cars to boats, and 12 cents per ton additional from stock, making a total charge on what is shipped from stock of 22 cents per ton.

Freight charges to destination, via Weedsport and canal, will, at all times, be made as low as the rates via Ithaca and canal, to same destination.

CHARLES A. WARDEN,
General Freight Agent, S. C. R.
AUBURN, N. Y., Sept. 30, 1881.

Horsford's Acid Phosphate

Makes a much more delicious acid drink than lemons or limes, at the same time giving to the system the invigorating phosphates.

OFFICE OF THE ONTARIO SILVER MINING COMPANY, 18 Wall Street,

New York, Oct. 5, 1881.

DIVIDEND NO. 72.

The regular monthly dividend of FIFTY CENTS PER SHARE has been declared for September, payable at the office of the transfer-agents, Wells, Fargo & Co., 65 Broadway, on the 15th inst. Transfer-books close on the 10th inst.

H. B. PARSONS, Assistant Secretary.

MAPS.

ARIZONA AND NEW MEXICO.—This Map shows all the Township Surveys, Private Land Claims, Post-Offices, and Settlements. It also exhibits the Explorations of other Government and Private Expeditions, including the facts developed by the Surveys for the Routes of Projected Railroads, etc. 1881. Scale, one inch to thirty-three miles. Colored, 24x17 inches. Pocket form, \$1.

COLORADO.—Topographical and Township Map of the State. Compiled from U. S. Government Surveys and other authentic sources, by Louis Nell, Civil Engineer. By means of symbols, the following mass of facts is graphically shown: Railroads in operation; Railroads chartered or in progress; Wagon-roads; Wagon-roads proposed; Trails; Drainage dry during the greater part of the season; County-seats; Post-offices (July 1st, 1880); Villages; Townships subdivided; Townships surveyed in outlines; Contour-lines, with vertical intervals of 100 feet; Altitudes in feet above sea-level, by barometer observations, and by spirit-levels; Private grants; Military reservations; Indian reservations ceded to the U. S. Government; Arable land, with irrigation. Tables of Areas of Counties; Astronomical Positions; Arable Land. Scale, 1 inch: 10.5 miles. Size, 31 x 40 inches. Pocket form, \$1.50, on thick paper, varnished, on rollers, \$1.75.

THE SAME, AS A WALL-MAP, GREATLY ENLARGED, 1881. Scale, 1 inch: 6 miles. Size, 46x64 inches. Backed on linen, mounted on rollers, and varnished. Price, \$6.

COLORADO.—Topographical and Township Map of Part of the State, exhibiting the San Juan, Gunnison, and California Mining Regions. By Louis Nell. Substantially same as above. Post-offices, March 1st, 1880. Scale, 1 inch: 9 miles, 1-570,240. Plain sheets for wall, 90 cents.

COLORADO.—Thayer's New Map of the State. Compiled from Official Surveys and Explorations, 1880. Scale, 14 inches to one mile. 25 x 32 inches. Pocket form, .75.

SAN JUAN MINING DISTRICT (COLO.).—Kibbe's Map of the San Juan Mining District locates towns, camps, post-offices, reduction-works, mining districts, etc. It gives the new local names of towns, mountains, and gulches in all the mining camps, including Durango, Rico, and the new county of Dolores, the new railroad and railroad towns, and the proposed railroads, stage routes, wagon-roads, and trails; the elevation of mountains and towns above sea-level. It is colored by counties, 25x37 inches, linen paper, folded in cloth cover for pocket form, or printed on heavy paper for office use. Also, a complete GEOLOGICAL MAP of the same size. Either map, \$1.50.

SAN JUAN MINING REGION (COLO.).—Stockder's Map of San Juan Mining Region, compiled from U. S. Surveys and other Authentic Sources, 1881. Shows county boundaries, district boundaries, wagon-roads, trails over mountain passes from river basin to river basin, continental divide, timber-line (11,000 to 11,500 feet above sea-level), etc. Scale, 1 inch to the mile, or 1-63360. 28x38 inches. Pocket form, stiff paper cover, \$1.50; or as a wall-map, \$1.50.

LEADVILLE MINES.—Thayer's Map of the Leadville Mines. Compiled from the United States Surveys and County Records, 1880. Scale, 800 feet to one inch. 27 x 18 inches. Pocket form, \$1; mounted on muslin, with rollers, \$2.

MAP OF MINING CLAIMS ADJOINING LEADVILLE, California, Mining District, Lake County, Colo. By Edward Rollandet. 1879. Mounted on muslin, \$2.50. In cloth-bound covers, \$2.

MEXICO.—Map of Mexico. Showing Railroads, Broad Gauge and Narrow-Gauge, Constructed; and Railroads, Broad-Gauge and Narrow-Gauge, Proposed. This very large and finely-engraved Map, constructed originally by the government for official purposes, contains all the information obtainable by it, and shows minutely the towns and villages of the entire country. Scale: 26.6 Mexican Leagues to the degree, and 69.16 English Miles to the degree; also, Kilometrical Scale, 1881. Size, 53x41 inches. Printed in colors. Pocket form, \$5.

MINING MAP OF UTAH.—Showing the location of the Mining Districts, over an extent of territory 150 miles from North to South. Compiled from U. S. Government Surveys and other authentic sources, exhibiting the Sections, Fractional Sections, Counties, Cities, Towns, Settlements, MINING DISTRICTS, Railroads, and other internal improvements. Scale, one inch to eight miles. Colored, 1878. \$3.50.

POCKET MINING ATLAS OF THE MINES OF THE UNITED STATES.—Showing the Mines of NEVADA: the Comstock Lode, the Eureka, Treasure Hill, and Tuscarora Districts; CALIFORNIA, including Map of the Bodie District; COLORADO, including the Leadville, Silver Cliff, San Juan, Caribou, and Central City Districts; DAKOTA, including Map of Deadwood; MONTANA, IDAHO, UTAH, ARIZONA, NEW MEXICO, LAKE SUPERIOR REGION, the SOUTHERN STATES. Printed in colors, and bound in flexible leather covers. Price, \$1.

Address
The Scientific Publishing Co.,
P. O. Box 4404. 27 Park Place, New York.

COLORADO: ITS GOLD AND SILVER
Mines, Farms, and Stock Ranges, and Health and Pleasure Resorts in and near the Rocky Mountains. By Frank Fossett. Second Edition, 1880, \$2. First Edition, 1879, \$1.50. Address THE SCIENTIFIC PUBLISHING COMPANY, 27 Park Place, P. O. Box 4404, New York.

JENNINGS' PATENT WATER CLOSERS



AMERICAN PHOTO-LITHOGRAPHIC CO.
(OSBORN'S PROCESS)
Photo-Relief Plates
Copies of Line
"Engravings,"
Arch. & Mech.
"Drawings,"
Wood Cuts,
Maps, Plans,
Mus. Music,
&c. &c.
ESTABLISHED 1866
206 & 208 Broadway
Estimates and Specimens furnished on Application.

USEFUL BOOKS.

- ASSAYING.**
 A Treatise on the Assaying of Lead, Silver, Copper, Gold, and Mercury. From the German of Th. Bodemann and Bruno Kerl. Translated by W. A. Goodyear, Ph.B. Plates. \$2.50.
 Notes on Assaying and Assay Schemes. By P. DePeyster Ricketts, E.M., Ph.D. Revised and Enlarged. New York, 1879. \$3.
 A Manual of Practical Assaying. By John Mitchell, F.C.S. Fourth Edition. Edited by William Crookes, F.R.S. 1873. 8vo, pages xxxvi + 819 + iv; 199 Illustrations. \$10.
- BELTING.**
 A Treatise on the Use of Belting for the Transmission of Power. With numerous illustrations. By John H. Cooper, M.E. 1 vol. demy 8vo, cloth. \$1.50.
- CASTING AND FOUNDRY.**
 A Treatise on Molding and Founding in Green Sand, Dry Sand, Loam, and Cement. By F. Overman. To which is added a supplement on Statuary and Ornamental Moulding, Ordinance, Malleable Iron Castings, etc. New Edition, 1880. \$2. By A. A. Fesquet.
 The Practical Brass and Iron Founder's Guide. By James Larkin. New edition. Crown 8vo, cloth. \$2.25.
 The Brass-Founder's Manual. A Practical Treatise on every Branch of the Art. By Walter Graham. \$1.
- CHEMISTRY.**
 Analysis Note-Book. Prepared for the Use of the Students of Washington University, St. Louis. By Prof. W. B. Potter. 12mo, leather cover, 208 pages. \$2.
 A Treatise on Chemistry. By H. E. Roscoe, F.R.S., and C. Schorlemmer, F.R.S. Vol. I. The Non-Metallic Elements. 8vo, 769 pages, 357 illustrations, and portrait of Dalton. New York, 1879. \$5.
 — Volume II. Part I.—Metals. 8vo, 504 pages, 129 illustrations. New York, 1879. \$3.
 — Volume II. Part II.—Metals. New York, 1880. 8vo, 552 pages, 69 illustrations. \$3.
 The Chemistry of Sulphuric Acid Manufacture. By Henry A. Smith. Cuts. \$1.50.
- ELECTRIC AND GAS LIGHTING.**
 The Practical Application of the Electrical Light. By Paget Higgs, M.A., D.Sc., Assoc. Inst. C.E. With wood engravings. 8vo, cloth. \$3.50.
 A Practical Treatise on the Manufacture and Distribution of Coal-Gas. By Wm. Richards. Demy 4to, with numerous wood engravings and large plates. Cloth. \$1.2
- ENGINEERING.**
 Engineer and Machinist's Pocket-Book. By Charles H. Haswell. 12mo. roan tuck, new edition. \$3.
 Practical Hydraulics; a series of Rules and Tables for the use of Engineers. By Thomas Box. Plates. \$2.
 Leffel's Construction of Mill-Dams, and Bookwalter's Millwright and Mechanic. Illustrated by numerous full-page plates. 12mo, limp cloth. 50 cents.
 Engineering Specifications: A Manual of Engineering Specifications and Contracts. By Lewis M. Haupt. 8vo, cloth. \$3.
 Practical Treatise on Limes, Hydraulic Cements, and Mortars. By Major-Gen. Q. A. Gillmore. Cuts, royal 8vo, cloth. \$4.
 The Civil Engineers' Pocket-Book, by J. C. Trautwine. 12mo, mor. tuck. \$5.
 The Mechanic's, Machinist's, and Engineer's Practical Book of Reference. By C. Hazlett and C. W. Hackley. 12mo, roan tuck. \$2.50.
 The Pocket-Book of Pocket-Books; being Molesworth & Hurst's Pocket-Books bound together. Royal 32mo, russia, gilt edges. \$5.
- GEOLOGY.**
 Geological Sketches. By L. Agassiz. 2 vols. 12mo, cloth. \$3.
 Lyell's Principles of Geology. Illustrated. New Edition. 2 vols. royal 8vo. \$8.
 Geologist's Traveling Hand-Book. By James MacFarlane. Giving the Geological Formation of every Railway Station in the United States. 1879. \$1.50.
 Magnetic Variation in America, from 1640 to the present time. By J. B. Stone, Ph.D., C.E. \$1.50.
 Elements of Chemical and Physical Geology. By Gustav Bischof, Ph.D. Translated by B. H. Paul, F.C.S., and I. Drummond. 3 vols. 8vo. \$20.
 Chips and Chapters. A Book for Amateur and Young Geologists. By David Page, F.G.I. \$2.50.
 Advanced Text-Book of Geology. By David Page. \$3.75.
 Geology for General Readers. A Series of Popular Sketches in Geology and Paleontology. By David Page. \$3.
 Economic Geology; or Geology in its Relation to Arts and Manufactures. By David Page. \$3.75.
 Manual of Geology. By Prof. J. D. Dana. 8vo. \$5
 Text-Book of Geology. Designed for Schools and Academies. By Prof. J. D. Dana. \$2.
 Corals and Coral Islands. By Prof. J. D. Dana. Illustrated. \$4.
 Geology of Pennsylvania. By Henry D. Rogers. \$30.
 Elements of Geology. By Sir Charles Lyell. \$3.50.
 Geological Science. By Prof. D. T. Ansted. 1 vol. 8vo, limp cloth. London, 1854. \$1.25.
 Chemical and Geological Essays. By T. Sterry Hunt. \$2.50.
- GUIDE BOOKS.**
 Colorado: Its Gold and Silver Mines. Tourist's Guide to the Roc-y Mountains. By Frank Fossett. Second Edition, 1880. \$2. First Edition, 1879. \$1.50.
 The Yosemite Guide-Book. By J. D. Whitney, State Geologist. \$5.
 Montana as It Is. By G. Stuart. 1865. \$2.
 New Mexico. Mills's Hand-Book of United States Mining Laws, and Guide to New Mexico. Pamphlet, 37 pages, and Map. 50 cents.
- IRON AND COAL TRADES.**
 History of the Rise and Progress of the Iron Trade in the United States from 1621 to 1857. By B. F. French. \$2.
 Iron Manufacture. On the Present State of the Iron Manufacture of Sweden. By R. Akerman. \$1.50.
- LEGISLATION.**
 United States Mineral Lands, Laws, Forms, Instructions, and Decisions. By Henry M. Copp. Part I., Laws; Part II., Land Office Regulations; Part III., Land Office Rulings; Part IV., Judicial Decisions; Part V., Miscellaneous, namely, 35 Forms, Glossary by Dr. R. W. Raymond. New Rules of Practice, Full Instructions how to Examine a Title, the Public Land Commission's Codification relating to Mineral Lands. 1881. 8vo, 570 pages, with 35 pages of Index. Full law binding, extra paper, \$4.50. Half law binding, medium paper, \$3.
- New York Mining Laws. The Act authorizing the Formation of Corporations for Manufacturing, Mining, Mechanical, Chemical, Agricultural, Horticultural, Medical or Curative, Mercantile or Commercial Purposes. Passed February 7th, 1848. With the Amendments [from February 7th, 1851, to May 5th, 1875]. To which are added Notes, Forms, and an Index. 1880. 12mo, paper, 66 pages. 50 cents.
 Copp's Public Land Laws; Decisions, Opinions, and Instructions. 8vo, sheep, 553 pages. \$8.
 Copp's Hand-Book of Mining Law. Seventh edition, with appendix. Square 8vo, cloth, pp. 163. \$1.
 Copp's Decisions.—Decisions of the Commissioner of the General Land Office and the Secretary of the Interior, under the United States Mining Statutes of July 26, 1866, July 9, 1870, and May 10, 1872. With Appendix of Circulars and Forms; By Henry M. Copp, General Land Office, Washington, D. C. Washington, 1874. 8vo, law sheep, 351 pages. \$4.50.
 Carpenter's Mining Code. A Compilation of all the existing Mining, Water, Pre-emption, and Homestead Laws of the United States and the State of Colorado, Mining Decisions in the Courts and Department of the Interior, Articles of Incorporation and By-Laws for Mining Companies, Comments, Forms, etc., etc., by M. B. Carpenter. Third Edition. 1880. 8vo, paper, 113 pages. \$1.25.
- MECHANICS.**
 A Manual of the Mechanics of Engineering and of the Construction of Machines. Vol. II. Part II. Hydraulics and Hydraulic Motors. Translated by A. J. Du Bois, Ph.D. Illustrated. 1878. \$6.—Vol. II. Part III. Heat, Steam, and Steam-Engine. Translated by A. J. Du Bois, Ph.D., with Additions showing American Practice. By R. H. Buel, C.E. \$6.—Vol. II., Parts II. and III., bound together, \$10.
- MINERALOGY AND MINERAL VEINS.**
 Manual of Mineralogy. By Prof. J. D. Dana. \$2.
 Descriptive Mineralogy. Wood Engravings. By Prof. J. D. Dana, aided by Prof. George J. Brush. \$10. Appendices to above, separate, \$1.
 A Text-Book of Mineralogy. By Edward S. Dana. 800 wood-cuts. \$3.50.
 Mineralogy Simplified. A Short Method of Determining and Classifying Minerals. Translated from the German of Von Kobell by H. Erin. \$2.50.
- MINING, MILLING, AND METALLURGY.**
 Copper Smelting: its History and Processes. By Henry Hussey Vivian, M.P. A Lecture delivered at Swansea, December 20th, 1880. A History of the Baltimore Copper-Works at Canton, Maryland; Sketches of the Forest Copper-Works, and the Hafod Copper-Works, Swansea, South Wales. With Illustrations. 8vo, iv + 140 pages. Paper covers, 75 cents.
 Mine Draining. A Complete and Practical Treatise on Direct-Acting Underground Steam Pumping Machinery. With a Description of a Large Number of the best known Engines, their General Utility, and the Special Sphere of their Action, the Mode of their Application, and their Merits compared with other Pumping Machinery. By Stephen Michell. Illustrated by 137 Engravings. 8vo, 277 pages. \$6.
 Digging Gold among the Rockies; or, Exciting Adventures of Wild Camp Life in Leadville, Black Hills, and the Gunnison Country. By G. T. Ingham. 1880. 12mo, cloth; 308 pages. \$2.
 Industrial Progress in Gold Mining. A Review of the Gold Mining Industry in the United States. [Gold-Finding; the Accumulation of Precious Metals; Areas of Gold Distribution; Distribution in the U. S.; Geological Occurrence; Auriferous Veins, Fissures, or Lodes; Gold-Washing; Working Yield of Auriferous Ores; the Stamp-Mill; Methods of Working Sulphides; Loss of Gold by Stamp-Mills]. 1880. 8vo, limp cloth, 107 pages. \$1.
 The Mines and Mineral Lands of Nova Scotia. By Edwin Gilpin, Jr., A.M., F.G.S., Inspector of Mines for the Province of Nova Scotia. 1880. Thin 8vo. \$1.
 Tin Mining in Larut. By Patrick Doyle, C.E. With Maps, Plates, and Notes. New York, 1879. Thin 12mo. \$1.50.
 A Treatise on Metalliferous Minerals and Mining. By D. C. Davies, F.G.S. London, 1880. Cr. 8vo, pages xx + 432 and 148 Illustrations. (Very full Glossary and Index.) \$5.
 Comstock Lode, The. Its Formation and History. By John A. Church, E.M., Ph.D. Illustrated by Six Plates and Thirteen Figures. New York, 1879. 4to, 226 pages. \$7.50.
 A Practical Treatise on Coal Mining. By George G. André, F.G.S., Assoc. Inst. C.E. 82 lithographic plates, 2 vols. royal 4to, cloth. \$28.
 A Practical Treatise on the Gases met with in Coal Mines. By J. J. Atkinson. 50c.
 The Student's Guide to the Principles of Coal and Metal Mining. By W. Eales. Illustrated by 61 plates. 8vo. Vol. I. (only), half morocco. London, 1879. \$2.
 Notes of a Visit to Coal and Iron Mines and Iron Works in the United States. By I. Lowthian Bell, F.R.S. 8vo, paper. London, 1875. \$1.
 Principles of Coal Mining. By J. H. Collins, F.G.S. With 139 illustrations. 12mo. London, 1876. 50c.
 Principles of Metal Mining. By J. H. Collins, F.G.S. With 76 illustrations. 12mo. London, 1875. 50c.
 Colliery Management. By Jonathan Hyslop, C. and M. E. Second Ed. With atlas of 17 plates. London, 1876. \$9.
 The Coal Regions of America; their Topography, Geology, and Development, with a Colored Geographical Map of Pennsylvania, a Railroad Map of all the Coal Regions, and numerous other Maps and Illustrations. By James MacFarlane, Ph.D. New York, 1877. \$3.
 Friction of Air in Mines. By J. J. Atkinson. 50 cents.
 Record of Mining and Metallurgy. By J. Arthur Phillips, M.E., and John Darlington. Illustrated by numerous engravings. In one volume. 12mo. \$1.50.
 A Treatise on Metallurgy; comprising Mining and General and Particular Metallurgical Operations. By Overman. 372 engravings. \$5.
 Quartz Operator's Hand-Book. By P. M. Randall. New edition. Illustrated. \$2.
 Manual of Mining Tools. For the use of Mine Managers, Agents, Students, etc. By William Morgans. 12mo. With quarto atlas of plates, containing 235 illustrations. \$3.
 Special Report on Coal, showing its Distribution, Classification, and Cost. By S. H. Sweet. With Geological Maps. \$3.
 The Coal Mines: Their Dangers and Means of Safety. By James Mather. \$10.
- Coal, Iron, and Oil. Engravings. By S. H. Daddow and Benj. Bannan. \$7.50.
 Hand-Book for Charcoal Burners. By G. Svedelius; translated from the Swedish, by R. B. Anderson, M.A.; edited by Professor Nicodemus, M.A. Crown 8vo, cloth. \$1.50.
 Metallurgy of Copper. By R. H. Lamborn. \$1.
 Report upon Precious Metals, or Statistical Notices of the Principal Gold and Silver Producing Regions of the World. By William P. Blake. \$3.
 The Useful Metals and their Alloys, including Mining Ventilation, Mining Jurisprudence, and Metallurgical Chemistry. By John Scoffern and others. 8vo. \$3.
 The Metallurgy of Lead, including Desilverization and Cupellation. By John Percy, M.D. Illustrated. London, 1870. \$12.
 Metallurgy. The Art of Extracting Metals from their Ores. By John Percy, M.D., F.R.S., F.G.S. Silver and Gold.—Part I. With numerous illustrations, mostly from Original Drawings. 1880. 8vo, 698 pages (including Index). \$12.
 The Metallurgy of Fuel, Wood, Peat, Coal, Charcoal, Fire-Clays, etc. By John Percy, M.D., etc. Revised Edition, with Illustrations. 8vo. \$12.
 STATISTICS OF MINES AND MINING IN THE STATES AND TERRITORIES WEST OF THE ROCKY MOUNTAINS. 1867. By J. Ross Browne and James W. Taylor [the latter, Gold Mines East of the Rocky Mountains]. 1868. By J. Ross Browne. 1869-76. By Rosster W. Raymond, United States Commissioner of Mining Statistics. 10 vols. 8vo. \$28. Singly, \$3 a volume, except 1870, which is \$4.50.
 Mining Laws of the United States, Colorado, New Mexico, and Arizona, containing Statutes Complete, with the Latest Amendments, Decisions of the Courts and Land Office, Notes, Forms, Diagrams, Suggestions to Prospectors, etc. etc. By Charles S. Wilson. 1881. 12mo, boards, 120 pages (with Index). \$1.
 The Manufacture of Steel. By M. L. Gruner. Translated from the French by Lenox Smith. Illustrated. \$3.50.
 A First Book on Mining and Quarrying. By J. H. Collins, F.G.S. 12mo, 50c.
 Fuel. By C. William Siemens. 50c.
 A Treatise on Fuel, Scientific and Practical. By Robert Galloway, M.R.I.A., F.C.S. With Illustrations. London, 1880. 8vo. \$3.
 Practical Treatise on Metallurgy. By Prof. Kerl. Translated by Crookes and Rohrig. Three volumes, \$30. Separately, Vol. I. Lead, Silver, Zinc, Cadmium, Tin, Mercury, Bismuth, Antimony, Nickel, Arsenic, Gold, Platinum, and Sulphur, \$10. Vol. II. Copper and Iron, \$10. Vol. III. Steel, Fuel, and Supplement, \$10.
 Metallic Wealth of the United States. By J. Whitney. \$3.50.
 Metallurgy of Silver and Lead. By R. H. Lamborn. \$1.
 Treatise on the Metallurgy of Iron. By H. Bauerman. \$1.80.
 Lectures on Mining, delivered at the School of Mines, Paris. Translated. 3 vols. Vol. I. now ready, with atlas of plates. London, 1876. \$13.
 Conversation on Mines, between a Father and Son. By Wm. Hopton. \$1.50.
 Mining, its Theory and Practice, by J. M. Stuart, M.E. Illustrated. \$1.
 Mining Machinery. By G. André, F.G.S. 2 vols. Plates. \$28
 A Practical Guide for the Manufacture of Metallic Alloys. Translated from the French of A. Guettier. By A. A. Fesquet. \$3.
 A Practical Treatise on the Means Employed in Blasting Rocks. By G. G. André. Plates. \$4.25.
 Steel, its History, Manufacture, and Uses. By J. S. Jeans, Secretary of the Iron and Steel Institute. London, 1880. 8vo, 860 pages, 183 engravings. \$14.50.
 Underground Treasures: How and Where to Find them. A Key for the Ready Determination of all the Useful Minerals within the United States. By James Orton, A.M. 1872. Small square 8vo, 137 pages. Illustrated. \$1.50.
 Manual of Hydraulic Mining. For the Use of the Practical Miner. By T. F. Van Wageningen, E.M. 12mo., 93 pages. \$1.
 The Explorers' and Assayers' Companion: Rocks, Veins, Testing and Assaying. Vol. I. (Complete in itself.) By J. S. Phillips, M.E. 1879. 8vo, cloth, illustrated; pages xiv + 468 (including 46 pages of Glossary) This is Vol. I. of the third Edition of Explorers', Miners', and Metallurgists' Companion.) Library size and pocket size; either size, \$6.
 The Explorers', Miners', and Metallurgists' Companion. A Practical Exposition of Geology, Exploration, Mining, Engineering, Assaying, and Metallurgy. By J. S. Phillips, M.E. Second Edition. 1873. 8vo, cloth, illustrated; pages xv + 671. \$10.50.
- ROADS.**
 The Principles and Practice of Road-Making. By W. M. Gillespie. Ninth edition. Cuts. \$2.50.
 A Practical Treatise on Roads, Streets, and Pavements. By Q. A. Gillmore. Illustrated. \$2.
- TRANSACTIONS.**
 TRANSACTIONS OF THE AMERICAN INSTITUTE OF MINING ENGINEERS. Vol. I., May, 1871, to February, 1873. Vol. II., May, 1873, to February, 1874. Vol. III., May, 1874, to February, 1875. Vol. IV., May, 1875, to February, 1876. Vol. V., May, 1876, to February, 1877, with a General Index to Vols. I. to V. Vol. VI., May, 1877, to February, 1878. Vol. VII., May, 1878, to February, 1879. Vol. VIII., May, 1879, to February, 1880. Strongly and neatly bound in half morocco. Price, \$5.75 a volume; \$5 unbound.
- WEIGHTS AND MEASURES.**
 Tables of Weights, Measures, Coins, etc., of the United States and England, with their Equivalents in the French Decimal System. Arranged by T. Eggleston, Prof. of Mineralogy and Metallurgy, School of Mines, Columbia College. 1880. Thin 18mo, \$1.
 Useful Rules and Tables relating to Mensuration, Engineering, Structures, and Machines. By William John Macquorn Rankine. London. Sm. 8vo, \$3.50.
- MISCELLANEOUS.**
 The Delaware & Hudson Canal Company's Report Reviewed by THE ENGINEERING AND MINING JOURNAL. 50c.
 Play-Book of Metals. Illustrated. \$2.25.
 Workshop Receipts, for the use of Manufacturers, Mechanics, and Scientific Amateurs. By Ernest Spon. \$2.
 Report from the Royal Commissioners on International Coinage. \$2.50.
 Fragments of Science for Unscientific People. By John Tyndall, LL.D. \$2.

Rare Books and Books on Mining, Metallurgy, and Engineering are made a special feature, but books of all kinds will be furnished, postage paid, at publishers' prices.

Remittances to be made to the SCIENTIFIC PUBLISHING COMPANY, 27 Park Place (P.O. Box 4404), New York.