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CONTENTS.

	PAGE.		PAGE.
Metallurgy of Steel.....	395	Phenomenal Wires.....	400
Anarchist Bomb Manufacture.....	395	Development of Costa Rica.....	400
Recovery of Silver and Gold from Sea water.....	395	Cables for Alternating Currents.....	400
Material for High Power Ordnance.....	395	New Chlorination of Zinc Ores.....	400
The Mineral Census of 1890.....	395	Important Mining Decision.....	400
Silver in Basalt.....	396	Coal Mining in Japan.....	401
Chlorination of Gold Ores.—Newberry-Vauria Process.....	396	The Furnat Safety Lamp.....	401
Carlisle Gold Mine and Mill, N. M.....	397	Silver Excitement in Australia.....	401
Electrical Plant at Valencia, Spain.....	397	An Unpolishable Diamond.....	401
Mica Mining in North Carolina.....	398	waste in the Basic Open-Hearth Process.....	401
Glazes for Porcelain Ware.....	398	Books Received.....	401
Coal Mining Machinery.....	398	Monthly Dividend Table.....	401
A N-w Zealand Sulphur Island.....	399	Mining and Metallurgical Patents.....	401
Locomotive Motive Power for Canals.....	400	Personals.....	402
Prize for Electrical Essay.....	400	Furnace, Mill, and Factory.....	402
		Contracting Notes.....	402
MINING NEWS:			
Alabama..... 403	Montana..... 404	Pittsburg..... 406	Birmingham..... 409
Alaska..... 403	Nevada..... 404		London..... 409
Arizona..... 403	New Mexico..... 405	METALS..... 406	Boston..... 412
California..... 403	New York..... 405	CHEMICALS..... 407	St. Louis..... 412
Canada..... 403	Ohio..... 405		Pittsburgh..... 412
Cent. America..... 403	Pennsylvania..... 405	IRON: New York..... 407	
Colorado..... 403	Utah..... 405	Louisville..... 407	FREIGHTS..... 406
Cuba..... 404	Washington T..... 405	Philadelphia..... 407	MEETINGS..... 408
Dakota..... 404	West Virginia..... 405	Pittsburg..... 408	FINANCIAL..... 408
Idaho..... 404	Wisconsin..... 405		DIVIDENDS..... 412
Iowa..... 404		MINING STOCKS:	ASSESSMENTS..... 412
Kansas..... 404	MARKETS:	New York..... 408	PIPE LINE CERT..... 412
Mexico..... 404	COAL: New York..... 405	Baltimore..... 400	
Michigan..... 404	Boston..... 405		
	Buffalo..... 406	Advertisers' Index.....xvii	

OWING to unavoidable delays in engraving, the usual installment of Howe's Metallurgy of Steel has been held over this week.

THE announcement that an anarchist bomb factory has been unearthed in Connecticut leads us to suggest that the anarchists, if they really mean business, would do well to consult our advertising columns and avoid the waste of time and money in the amateur manufacture of explosives that don't explode, or go off when they are not expected to, and of fuse that refuses to burn, etc. They would do well also, to engage the services of practical miners in future operations.

SO MANY references are made to the presence of silver in sea-water that it would be interesting to test the matter practically. The wet analysis of concentrated bitterns is a most delicate manipulation and easily subject to error. The stories of silver and gold recovered from ship's sheathing metal we believe to be without foundation, or, at least, if in any case the precious metals have been extracted in working over old sheathing, that they were not entirely parted from the copper in its original treatment. But let a series of carefully assayed amalgamated copper plates be exposed under fair conditions of a moderate tide-way and clear water, and removed for examination at periodic intervals. The volume of water passing over the plates could be calculated, and the

amount of precious metal recovered, if any, would be known. Silver would probably exist as chloride or iodide in brine, and gold as terchloride. If present, even in excessively minute quantities, some indication should be given by the method proposed. The ocean does not hold out much encouragement as a silver mine, but the experiment would be interesting. Its conditions would, of course, be less favorable than, and different from, the recorded cases of float amalgam, being caught at a distance below mills, as on the Carson River. In this connection we may also remark that it is probable that there are some localities in which plates arranged for catching float gold and amalgam, or waste leach-water material, would effect small savings. Such plates would require almost no attention, and their small cost might often be more than covered by the small amounts of metal recovered. But we commend the sea-water experiment to the notice of any one who has plenty of curiosity, time, and patience.

MATERIAL FOR HIGH-POWER ORDNANCE.

To predict in advance of actual trial is always an unsafe and thankless task. On verification the prophet gets little credit; while in case of a failure in his predictions he comes in for a good deal of hard usage. But still we venture to predict that the heavy-gun controversy will not be settled by any ingenious makeshift such as the wire-wound gun, the multiple-charge arm, the water-distributing device for equalizing shock, the converted cast-iron rifle, the built-up steel gun, or any of the orthodox patterns or novel inventions of the day. The heavy gun of the future will be a homogeneous casting. Its material will probably be mild steel, whether open-hearth or not, forged or unforge; or steel alloyed in such manner as to give sound castings, or some of the remarkable aluminum alloys which have shown such extraordinary strength in recent tests.

What the Rodman system has done for cast-iron ordnance, and what the Mitis process has accomplished for wrought-iron castings and the Cowles furnace has done for aluminum alloys, will be in time, we think, equaled by practice in large steel castings, in which blowholes and flaws will be eliminated or reduced.

There are two directions in which progress can be made; one in the way of mechanical improvement, in which the Whitworth fluid compression process offers some prospect of success, though it is not yet economically or technically what was claimed for it; the other is in a modification of the metal, by alloying or by different and improved metallurgical treatment. The solution may be found in either mechanical or chemical manipulation, and the outlook for a decisive result, as between either starting point, now seems to be about even. But the present system of built-up guns, with expensive material, large cost in forging, and enormous waste of material, is one which can not last, any more than the attempt to revivify obsolete types by inner tubing and outside hooping of the old cast-iron ordnance. We do not think that the high-power steel rifle of the future will cost a dollar or more a pound. Such an assumption would reflect badly upon the skill of our steel-makers and ordnance experts, who have often overcome greater difficulties than are involved in making a sound steel casting of say fifty to one hundred tons.

If the problem is to be simply a mechanical one, there is no reason why we should not have 150-ton hammers and other heavy appliances, the matter being merely a question of demand and supply. But if a better arm than the built-up gun can be produced, a stronger powder will at once come into use, and there will be a renewal of the polygonal controversy between gun material and powder, shells, and armor-piercing projectiles, and armor, etc. The whole question of armor versus guns will in all probability be settled in favor of the latter, and we shall in a few years see the middle age rejection of armor defense as against gun-powder repeated on a large scale, the offensive side taking the lead as against the defensive. For the present we look anxiously to our steel manufacturers to evolve a sound material for heavy ordnance. This is the main issue; if they succeed we need not worry about armor protection.

THE MINERAL CENSUS OF 1890.

There is some prospect that the eleventh census will be taken under considerable advantages in point of time allowed for organization and preparatory work, as compared with previous ones. The great difficulty connected with these spasmodic attempts to gather statistics at intervals of ten years is the want of a well-drilled and experienced force. If a small organization were constantly maintained, which would serve as a cadre to be extended when needed, the country would undoubtedly save money and obtain more satisfactory results. In the absence of such a system an early start is of the highest importance. Besides allowing time for planning the work, it is essential that the force should be selected deliberately.

The tenth census, that of 1880, was organized and conducted on a larger scale, and its aims were higher than have ever before been at-

tempted in this country or elsewhere. The results, while perhaps not coming up to the standard proposed by its able organizer, General WALKER, were certainly in advance of any thing before achieved. That they were open to criticism in many details was only to be expected. Figures do lie, and the best statistics have always a margin of error.

The utter failure of the ninth census in 1870 to gather adequate returns from the mining industry was probably the cause of the special effort made in this direction in 1880, when the mineral census was planned on a most elaborate scale. The supervision of the examination of the various mining industries and metallurgical works was entrusted to special agents of good professional standing, but for the most part without experience in statistical work. They naturally made the mistake, common to all amateurs, of attempting altogether too much, with the inevitable result of failing to grasp the main points. The reporting experts were mainly young men, who, though fairly educated so far as book and lecture-room information was concerned, were unfamiliar with actual practice and with the districts they were appointed to report upon. The data collected were of varying degrees of utility and in great measure unserviceable, inasmuch as the scattering details could not be harmonized and digested into a systematic whole. What they failed to accomplish was what, we suppose, Congress and the country had primarily in view—the collection of accurate statistics of production, costs, supplies consumed, labor employed, accidents, etc.

The precise cost of the mineral census is not known, as it was complicated by the expenditures of the geological survey and in other ways. If it amounted, directly and indirectly, to \$300,000, as has been asserted, the results did not justify the outlay.

In the coming census of 1890 the difficulties will be repeated, but the experience gained in the tenth census will be of service, though it is not likely that many of those engaged in 1880 will be available for the eleventh census. The remuneration is so small, and the time of employment so brief that census work does not hold out very enticing inducements. We shall, therefore, probably see the direction of the investigation intrusted to agents who have other occupations demanding their time; who will have to rely upon subordinates for office-work and compilation; and who will employ as examining experts a fresh crop of untried men, the most efficient of whom will be those who embrace the opportunity of travel and observation through the mining regions, and do not enlist for the sake of the meager pay.

In the light of past experience some suggestions may be offered:

I. The principal object of a census is the collection and recording of statistics which will be of use to the various industries studied, and to the legislator and political economist. Attention should not be diverted from the main questions by side issues, however tempting.

II. The results should be compiled and published within some reasonable time after the collection of data. Most of the publications of the last census read like ancient history when they appeared. They would be valuable to the historian of the next century, but exhibited a state of affairs long out of date before the description was published. There need be no reason for a similar tardiness in the coming census. Neither compilers nor the Government Printing Office should have valid excuses with the work under efficient supervision. That accurate mineral statistics can be published promptly has been demonstrated by the work of the ENGINEERING AND MINING JOURNAL.

III. It has been proved that a segregation of work by subjects is preferable to a geographical division. Each agent in charge of a special branch will naturally subdivide the work of his subordinates territorially; but to harmonize the whole there should be a single head for each subject. The awkward gaps in the returns of the last census show that independent organizations, treating the same subject in different localities, do not work well together. Sometimes they overlap.

IV. The reports should consist of preliminary bulletins, subject to revision, and the final volumes. The latter should give the principal statistics in an intelligible, summarized shape, and not be loaded down with details. The work of compilation and editing implies a thorough digestion of the mass of figures accumulated, so that in published form the results will be available for ready reference, and the rehandling of original data on the part of the student avoided.

V. As a provisional division of the investigation and reports, we may suggest the following: (1) Coal, coke, gas, petroleum, and the lesser hydrocarbons; (2) iron and manganese; (3) gold, silver and quicksilver; (4) copper, lead and zinc; (5) fertilizers and minerals used in chemical manufactures; (6) building materials; (7) the minor metals and minerals; (8) a brief summary of the whole field. The points sought to be obtained in each of these fields should be chosen, worked out and published with a view to correlation. Thus, if the accidents in coal mining are reported, those in the different ore-mining branches should be given; if the proportionate cost of labor is stated for silver mining, it should also be given for copper, and so on.

VI. The function of a census investigation is hardly a study of technical methods. But if this is to be attempted let us have the best and

most recent practice, something to mark the progress made and not a rehash of time-worn information. Careful study in detail of selected and typical works, one or two only of a class, will give more satisfactory results than an endeavor to describe every thing, good, bad and indifferent. The field of mining and metallurgical technology is such a wide and rapidly growing one that it is hopeless to attempt to cover it all in a series of census reports, and it would be better not to enter the field at all.

VII. There are many short cuts open in collecting statistics, especially of production, which give more reliable totals than details from individual producers, and which should be taken advantage of to a greater extent than was done in 1880. And where absolute figures can not be had, as is generally the case in statistics, let us have round numbers honestly stated, with the compiler's estimate of the limits of probable error, rather than a misleading assumption of accuracy.

CORRESPONDENCE.

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

Silver in Basalt.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In to day's issue of the JOURNAL you publish a note from the Panama Star and Herald, which mentions the occurrence of silver in volcanic ash collected on the coast of Ecuador, and which concludes as follows: "This is believed to be the first instance that silver has been identified in material ejected from a volcano." In the summer of 1881 I had occasion to examine some of the (then) recently discovered silver-lead mines in the Wood River district, Idaho. On our way out by stage, from Bellevue to Blackfoot, on the Utah & Northern Railroad, we passed over several streams of lava-basalt which, in many places, retained the folds and wrinkles produced when it was in a molten condition. The road was so rough in places our progress was slow, and walking was preferable to riding, and I took advantage of an opportunity to examine the lava, thinking it would possibly contain some traces of mineral, as it was not very far from a district rich in silver. I was rewarded by finding copper stains in several places, and in one instance was able to obtain a few small pieces slightly colored by the copper. When I reached Salt Lake City I assayed the pieces, and found they contained silver at the rate of about three ounces per ton, or one part in 10,000 of lava. This is about eight times as much as was contained in the Ecuador ash, but mine were "selected" specimens. Respectfully,

New York, May 26, 1888.

W. DE L. BENEDICT.

The Chlorination of Gold Ores—Newbery-Vautin Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your journal of October 29th, I notice an article on Messrs. Newbery and Vautin's gold extraction process, and as I am working this process in this district, I was much interested in it.

I was of course well aware that this process was only an adaptation from American patents; but I thought we might flatter ourselves in being the first to practically make use of it.

I should like to make a few remarks on your article.

1. The injection of compressed ore is all a fad, as it is evidently not necessary, nor am I certain that it has ever been done.

2. If you in America were so successful with this process, why has it not become of more general use, as it is undoubtedly the best method of treating really refractory ores.

3. I disagree with you about the charcoal, as in no case have I found it a precipitant for any of the metals in solution except the gold, and I think the difficulties you found were only mechanical, namely, permitting the slime to run through with the liquor. Good secondary filters are very necessary after the liquor has been precipitated through the leaching vats, but I quite agree with you that the charcoal is a cumbersome method; but it has two recommendations, namely, that the liquor passes straight through, and does not require to be allowed time to settle, and this is a virtue that can hardly be overrated; and also that in its action it is automatic and requires no supervision.

Still it would be adding very considerably to the value of the process if by an added precipitant the gold could be collected by itself; and I should be extremely obliged if you could give any mechanical plan of working the sulphureted hydrogen by which the liquor could be allowed to run off as fast as it came in. I think I might be able to do this, but expect, if practicable, you have already done it, and I should be most grateful for a plan of any vat in actual use by which the liquor can be immediately filtered off, leaving the gold behind.

Having copper in our ore, besides the same difficulties you mention with sulphate of iron, we are debarred from using either of these precipitants, but find heavy carburated hydrogen successful, and this gas can no doubt be injected in the same manner in which you use hydrogen sulphide. Faithfully yours,

THOMAS W. CONRAN.

Norron, Gladstone, Queensland.

[The chlorination in revolving barrels with or without pressure has been in use in this country steadily for seven or eight years. The chief reasons for its not being more generally adopted are, doubtless, its greater complication and expense as compared with the old Plattner method, though it certainly works closer than this. The objections to charcoal precipitation have been mentioned in the ENGINEERING AND MINING JOURNAL, and are confirmed by all those in this country who have tried it. Its advantages, as stated by our correspondent, are recognized. It is possible, by the use of well-arranged settling and precipitation tanks, and by the use of the very simple little filter (illustrated in the ENGINEERING AND MINING JOURNAL, March 28, 1885) employed to catch the suspended

precipitate, to have practically a continuous process in precipitating with hydrogen sulphide or ferrous sulphate. In our own practice we have precipitated and filtered with a single filter a tank of 1500 gallons in less than two hours. The hydrogen sulphide gives a precipitate easier to collect than that by ferrous sulphate, but as an offset it requires roasting before smelting.

The use of carburated hydrogen as a precipitant has not, so far as we know, been tried here.—EDITOR ENGINEERING AND MINING JOURNAL.]

The Carlisle Gold Mine and Mill, New Mexico.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Several items have appeared in the JOURNAL, through the London correspondence, concerning this prominent growing gold mining camp of the Southwest, and it seems awkward that the news should have to travel so far to be published. It is a fact that Grant County, New Mexico, papers do not seem to be aware that the large gold camp of the Territory is in this corner of the county. Hitherto, however, the camp has been operated chiefly from Tombstone instead of Silver City; the boundary line between the Territories apparently moved eastward three miles, placing Carlisle, as it is in spirit, in Arizona, so far as Silver City interests are concerned. The camp is flourishing, with sixty stamps dropping and a smelting plant working up the sulphuret concentrates.

So many changes have taken place since the present management acquired control, that perhaps a description of the camp may be advisable.

The mine is operated with the hoisting-works which have been in use since the camp has been a producer, and which, together with the large engine of the original 20-stamp mill, were placed there through the foresight of a former superintendent, Wm. Farish, whose confidence in the mine has been amply justified.

The stamps are 850 pounds, drop 10½ inches, with 90 drops per minute; screens, No. 9 long slots. It is proposed to change the screens for No. 8 short slotted. One hundred and sixty-five to 175 tons per day are crushed. The ore now comes chiefly from the second (300) level, where the ore-body is of immense size—an average of fully 40 feet when stoped. The foreman, Mr. Tembey, says that he can keep the mill supplied with only fourteen men breaking ore. This speaks volumes for the working conditions of the mine, and, together with the 30,000 tons of ore broken but held as a reserve, enables the mine to produce ore at a remarkably low rate per ton. The mine cars dump directly to the mill rock-breakers, three in number (two of the largest standard size of the Farrell Foundry Company's Blake style, 20 × 10 inches, and third 15 × 9), the ore passing first over "grizzlies." The ore thence falls to the bins of each set of twenty stamps, and is fed by automatic feeders to the batteries. The item of ore handling is reduced to a minimum.

The rock-breakers of the two later (or additional) sets of twenty stamps, however, stand higher above their respective bins and are a decided improvement in this respect over the original mill. It might prove still better if the ore passed over "grizzlies" in the stopes, so that the fine and coarse ores could be brought up separately. At present the storage capacity of the mill is not over 48 hours' run in the new and 24 in the old.

Within the mill the machinery is arranged in sets of 20 stamps, showing the original 20 and two additions, it is the finest looking gold mill in the two territories. On account of the many vanners, etc., it has much more space under cover than the Vulture (Arizona) 80 stamp. The amalgamation is fully 86 per cent of the assay value. Considering the fact that no free gold is visible this seems remarkable. It is somewhat creditable to the new management that they obtain more amalgam per ton than the old. Whether this is due to the greater care of the mine foreman, Mr. Tembey, or the superior amalgamation of the mill foreman, Mr. Comiskey, is not said—a division of the honors is probably the solution—but the fact remains.

The mill averages 170 tons per day for the 60 stamps. The ore must be crushed fine, but it crushes readily, despite the frequent reuse of the water, nearly 3 tons per head being a high result for a gold mill working on hard quartz. The percentage of finely disseminated sulphurets assists the crushing.

From the copper plates the pulp passes directly to Frue vanning machines, thirty-six in number, arranged in sets of three to each battery and in three rows. The original and second 20 stamps had but two vanners to the battery, *i. e.*, 16 vanners for 40 stamps. These were so manifestly insufficient—vanners do their best at about 5 tons each per 24 hours, while those in use were required to handle 15 tons to the pair—that another row was added with excellent results. This state of affairs is probably peculiar to this mill and is due solely to the high tonnage of the mill.

The old management shipped the best of their concentrates, all over \$40 per ton, and for awhile the new company did the same. In July, 1887, alterations were made in the mill, engine moved back 12 feet, and the old system of belting back and forth abandoned (the batteries now belt, with tighteners, directly to the engine shaft, which is extended along the base of the batteries), and since the mill was started in August all concentrates have been allowed to accumulate until space was hard to find. Several thousand tons of concentrates were thus accumulated when the smelter blew in March 28th. The output with the 40 stamps was over 300 tons per month, and since the 60 started three months ago an average of 15 tons per day. The company tore out the conglomeration of strange machinery, called the "Freiberg," built in years past to work the concentrates by any one of a variety of processes from chlorination and leaching to pan amalgamation with subsequent roasting. They have used the building for a smelting plant of four revolving roasters and a water-jacket stack.

The building is connected with the mill by a car track upon which the concentrates are run out. The concentrates are thence dumped to the foot of a little chain elevator which lifts them to a bin, whence they are trammed to the hoppers of the roasters.

The roasters, four (two with cylinders 6 feet internal diameter, 13 feet long, and two 7 diameter, 16 feet long), are connected with a long flue chamber built up the side of the hill, and ending in stone stack, a legacy, by the way of the "Freiberg," and the only feature of that mistake useful at present. Each furnace receives eight (8) tons of concentrates as a charge, and is run 36 hours, requiring about 6 cords of

wood. The charge is then dropped to the feed floor, whence it is wheeled to the furnace. The furnace is a square brick stack (round inside), 12 feet between tuyeres and feed door, with round water jacket breast, 10 sections, 5 tuyeres, and a small independent jacket about the slag tap. The water jackets are short, about 4 feet high, and narrow, and the internal diameter is 3 feet, while at the feed floor the furnace is 5 feet across.

Flue-dust is caught in the stack itself, and there is no connection with dust chambers. This seems singular when the character of the material smelted, a fine powder, is considered. The smelting is proving difficult. The concentrates are sulphurets, chiefly iron pyrites, said to contain 14 per cent lead, 20 per cent zinc, the remainder iron, quartz and sulphur. To make a smelting material, the roasting must be very complete. How well this is done is hard to say, but from the quantity of matte now being roasted in heaps, as the result of a short run, it would seem as if the difficulties encountered in smelting the roasted product were due as much to insufficient roasting as to the zinc to which the trouble is assigned. Fluxes are scarce, too. An energetic prospecting, stimulated by a reward of several hundred dollars, resulted in finding limestone about a mile from camp. Complete roasting should furnish iron enough, but some is added. Still, the work is new and the difficulties by no means insurmountable. There are good smelter men in charge, and they are undaunted.

The nominal capacity of the furnace is 30 tons per 24 hours, but actually, so far, it has not exceeded 15 of concentrates. The blower is small, and it has been deemed advisable to place an air receiver (or tank) between it and the furnace to regulate the blast. The extremely fine charcoal packs, too. The hot water from the jackets is sent to the mill tanks by a steam pump. Steam is furnished from the mill boilers, but there is also a boiler at the smelter. The engine running the smelter is small, 12 inches cylinder, 16 inches stroke, 225 strokes.

One thing that strikes the observer unfavorably about the smelter is the lack of bin room, especially for the coke, and the frequent re-handling, together with the cramped space. The coke is dumped from the wagons which bring it from the railroad at Duncan (16 miles) upon the ground far enough away and below the smelter to necessitate a team to haul it.

The wood question, next to the water, is most important. Wood is scarce and a large amount is needed. When the four roasters are running, nearly 25 cords a day are required; hoist boilers, 3 cords; mill boilers, 11; roasters, etc., 10, at \$6.50 a cord.

The water is the key to the success or failure of the camp. It has been obtained by sinking the shaft and drifting on the vein. While the water lasted on a level, no further concern was entertained. From February, 1887, to January, 1888, the third (or 400 foot) level furnished the water; then there was a scarcity—the level was drained. The shaft reached the 500 and soon the drift encountered more water than was obtained from the third. At present there is an abundance, and the question is practically settled for a year. At each level about one third more is obtained than in the preceding. There is now enough and to spare.

The water is raised from the mine by steam pumps, the lowest amount upon which the mill could work at all being 5000 gallons fresh water per day. It is received in a circular tank of about 30 000 gallons capacity. Fresh water is used, when possible, on the vanners. The mill water carrying the tailings is flumed ¼ mile to 10 large double tanks, each front (or sand) tank receiving an equal portion of the total water. From the "sand tank" the water flows to the "slum tank" of the pair. Six tanks are discharged each day. From the slum tanks the water flows into a sluice which carries it to the pump tank and thence it is forced to a square tank above the mill. By allowing a little water to run to each "sand tank," instead of permitting the entire volume to flow in a rapid, heavy stream through the series of tanks, all current is avoided. The settling is very thorough.

The pump is a Knowles, four cylinders, 10 inches diameter, 19 inches stroke, two pistons each; 25 strokes per minute; run by wire cable from mill. No water is wasted, and all lost goes out in discharging tailings. In the cañon below the tanks a dam was built and pumped operated by a "wind engine" placed to pump back such water as filtered through the tailings. It was not a success, and the "wind engine" was replaced by a steam pump. But this is not now needed.

The mine water is unfit for drinking, etc., the camp being supplied chiefly from neighboring wells by water haulers. The company's store, boarding-house, residences, etc., are supplied by condensed steam from the mill and hoist engine.

One annoyance (and expense) occasioned by this "hardness" of the water is the effect on the boilers. It is necessary to change boilers after ten days' use. The scale is very thick and hard to remove. For this reason the hoist has two boilers and the mill four, the latter being run in pairs.

A large air compressor stands in the mill engine room and when running is under charge of the mill engineer. It is idle now, although the air drills are regarded here as economical. The large amount of ore broken is said to be the reason the drills are not working.

Under the management of Mr. J. Longmaid and his son, J. H. Longmaid, the Carlisle G. M. Co. is achieving an unqualified success. The senior Mr. Longmaid has been prominent in Montana mining matters, is a recognized authority hereabouts. No doubt is entertained that he will be successful ultimately with the smelting of the concentrates, although the peculiarities of the proposition are now causing him and his assistants considerably anxiety.

Two suggestions may prove valuable to him: To rework his concentrates, separating the galena, blend and pyrites, and handle each to much better advantage independently. This can be done quite cheaply. Next, as one source of trouble is the small amount of lead, to build a hearth and cupel his bullion for the lead.

CARLISLE, New Mex., May, 1888.

V.

A company has been formed in Valencia, Spain, to establish an electrical plant, which is to furnish all the power required in the various manufacturing industries in and about the city. It is to be capable of producing 3000 to 4000 horse-power, and to transmit it to distances within the limit of 35 miles. The plant is to be run by the water-power of the Turia River.

MICA MINING IN NORTH CAROLINA.—V.

By Wm. E. Phillips.

The minerals found in mica veins are both numerous and interesting. Some time before his death in 1885 the lamented W. C. Kerr, for twenty years State Geologist of North Carolina, prepared a list of the minerals found in mica veins, and this has been corrected by F. A. Genth and one or two added by W. E. Hidden.

The list is as follows, according to Kerr:

Albite,	Biotite,	Limonite,	Thulite,
Allanite,	Columbite,	Magnetite,	Torbernite,
Amazon stone,	Euxenite,	Menaccanite,	Tourmaline,
Apatite,	Glassy feldspar,	Muscovite,	Uraninite,
Arethunite,	Garnet,	Phosphuranylite,	Uranocher,
Autunite,	Gummite,	Rogersite,	Uranotil,
Beryl,	Hatchettolite,	Samarskite,	Ytrogummite.

F. A. Genth* corrects this list, and his criticisms are as follows:

- "Amazonstone, perhaps, doubtful.
- "Autunite (torbernite?), all autunite.
- "Biotite, probably, but I have not seen it from mica veins, as far as I remember.
- "Euxenite, does not contain TiO_2 , and hence is not true euxenite.
- "Glassy feldspar (sanidin), very doubtful.
- "Pyrochlore, in very minute octahedra at the Ray mine, with black tourmaline.
- "Ytrogummite—I do not know of any analysis having been made: very doubtful.
- "Fluorite, in pseudo morphous granular patches after apatite.
- "Apatite, seems to be fluorapatite.
- "Orthoclase, often completely altered to kaolinite.
- "Quartz, of course."

Neither Dr. Genth nor myself are able to identify Kerr's arethunite; it is most likely a *lapsus pennæ*. To this list Hidden has added fergusonite, which now sells for \$5 a pound, manazite and æschynite (?). Large masses of samarskite are found in some of the mines, a piece weighing 94 pounds being taken from the Mart Wiseman mine, in Mitchell County.† This formerly sold, I believe, for \$1.50 per pound, but is now offered at 75 cents per pound. The largest pieces ever found have been obtained from Mitchell County.

A rather curious bit of history and of etymology is associated with the feldspar altered to kaolinite. W. C. Kerr, in the paper previously referred to, says that the Indian name for the Smoky Mountains, *Unaka* mountains, is derived from the Indian word for white, *Unakeh*, and that they applied this name to them because they were accustomed to obtain white kaolin there, and to "pack" it to the coast for exportation 150 years ago. He does not give his authority for this statement, and I have not been able to find it. He may have ascertained it himself, but if so, he makes no mention of it.

The farmers near the mines are accustomed to apply the disintegrated feldspar to their crops, and it has given good results, containing as it does from 10 to 15 per cent potash. Some attempts have been made to utilize the feldspar as a source of potash, but the experiments have not been successful on a commercial scale. With kainit of 13 per cent potash, selling at \$11 per ton, it is doubtful whether the potash can be economically extracted from feldspar. I am informed that interest in the problem has somewhat revived of late. The material can be had in any quantities at an almost nominal cost, as it is obtained in great abundance, and constitutes at least one third of the dumps.

From the list of minerals found in mica veins it will be seen that many of them are rare, and some quite so. Whatever agencies were at work during the formation of these veins they seem to have conditioned the occurrence of some of the rarer minerals in considerable quantities. It is not without interest that fluorine was present at the time, occurring as it does in fluorite and fluorapatites. The well-known decomposing power of this element, when present as hydrofluoric acid, or combined with lime, may have a bearing upon the constitution of the mica vein itself and of the minerals found in it. I have examined numerous specimens of apatite from Mitchell County, and so far have not observed any chlorapatite. Dr. Genth's experience, stretching over a much longer time than my own, and based on many more examinations, would seem to be in the same direction. The apatite is generally of the greenish variety, is well crystallized, and is usually imbedded in the feldspar. It does not occur in sufficient quantity to be of much value, although the fine crystals can of course be sold to mineral dealers, and occasionally an extra fine crystal may be used as a gem stone. Some large, and a few really handsome beryls have been found, notably at the Ray mine, in Yancy County. An hexagonal crystal, now in the possession of the writer, but unfortunately broken, is $8\frac{1}{2}$ inches long, and was originally $3\frac{1}{2}$ inches in diameter. It is, however, quite opaque.

At the Grassy Creek mine, Mitchell County, crystals 2 feet long and 7 inches in diameter have been found.‡

The recent discovery of germanium in euxenite** lends some interest to the reported discovery of this mineral in mica veins. Dr. Genth, however, says that the mineral reported as euxenite does not contain TiO_2 , and is hence not a true euxenite, and as germanium, besides occurring in argyrodite, is supposed to accompany titanium, it is hardly likely to be present in this so-called euxenite. Allanite is found in slender, black crystals, 6-12 inches long, at the Balsam Gap mine, Buncombe County, and at the Clarissa (Buchanan) mine, Mitchell County.‡

Albite occurs at the Presly mine, Haywood County, as an alteration product of the decomposition of corundum.‡ Columbite occurs imbedded in samarskite at the Wiseman mine, Mitchell County, and rogersite at the same mine "in white mamillary crusts and little pearly beads upon samarskite."‡

Monazite occurs in feldspar at the Ray mine, autunite and phosphuranylite on quartz and feldspar at the Flat Rock and Clarissa mines, Mitchell County.‡

A piece of gummite weighing 6 pounds 8 ounces, but partly altered to uraninite, has been found in Mitchell County according to W. E. Hidden.‡

*Priv. com., October 3d, 1887. †D. A. Bowman, priv. com., November 5th, 1887

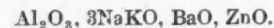
**Minerals and Mineral Localities of North Carolina, 1881. F. A. Genth and W. C. Kerr.

‡See abstract of Gerhard Krüss's paper before Munich Chem. Soc. Dec. 16, 1887, in ENGINEERING AND MINING JOURNAL, Vol. XLV., No. 7, p. 125.

GLAZES FOR PORCELAIN WARE.

MM. Lauth and Dutailly have recently communicated to the French Chemical Society the results of their investigations on the red glazes which are produced on porcelain by means of copper and its salts. The color produced in this manner is of a much more permanent nature and of a far superior tint than that which is obtained when oxide of iron is used for the same purpose. This red color, when used for decorative work on ancient porcelain, is often accompanied with a blue coloring matter beneath the surface of the glaze. It appears that the secret attached to the production of these colors was known only to the Chinese until recently, and that the red, known as *Tsi-houng*, or *sang de bœuf*, could not be imitated by the French at the porcelain manufactory at Sévres. In 1852, MM. Ebelmen and Salvétat endeavored to reproduce these copper colors in France by making careful analyses of fragments of Chinese porcelain colored in this manner, and then imitating, in the composition of the glaze and clay employed, the Chinese specimens. The results of these earlier experiments are now in the ceramic museum at Sévres, and are the first examples of the kind produced in Europe. Other French chemists have since then attempted to improve on the first trials, and the problem has also been attacked by H. Seger, of the Berlin Porzellan Fabrik, and by H. Bünzli, at Krummnus, in Austria. MM. Lauth and Dutailly have established by their experiments that the maximum temperature which the Chinese red glazes can stand without losing their color approaches to that used for baking the new Sévres porcelain. By successively associating all the compounds capable of entering into the formation of a colorless glaze with oxide of copper, they have come to the following conclusions: That in the same series of glazes, those which produce the finest red color with copper compounds have the greatest amount of silica present, and that in a series of glazes of approximately the same degree of acidity, the best results are obtained when there is a large proportion of alkalis and a small percentage of alumina. They have further noticed that if the alkaline metals be increased in relation to the alkaline earths present, a finer red is produced, but at the same time the liability to break is increased. By employing boracic acid or borates this inconvenience may, in some measure, be prevented. Lime, magnesia, various fluorides, and lead and iron oxides have also been tried; but the results obtained by their use have not proved satisfactory. A very good red glaze can be produced when zinc oxide and baryta are the bases present in the glaze. The copper can be introduced into the glaze in different ways. Oxalate of copper, simply mixed and not fused with the melt, gives good results; but if previously fused with the glaze, very satisfactory colors are produced. The quantity of copper salt employed depends on the time required for baking the porcelain, and also on the temperature of the furnace. Five per cent is the quantity which is recommended as the most suitable to use, and the addition of a small quantity of tin oxide is advantageous. The glaze which has given the best results has the following composition:

Pegmatite, 31.17; sand, 36.37; fused borax, 12.98; dry carbonate of soda, 4.76; barium carbonate, 10.39; zinc oxide, 4.83. Corresponding to silica, 61.02; alumina, 5.85; alkaline oxides, 10.72; baryta, 8.42; zinc oxide, 4.51; boric acid, 9.48. This glaze has a degree of acidity represented by the number 5.39, that of the French glaze, No. 1, being 5.14. The bases are in the proportion which corresponds to the formula:



By using this glaze with a similar one containing lime, MM. Lauth and Dutailly have succeeded in obtaining a great variety of colors on the same material, and in producing some effects on porcelain which have not hitherto been achieved.

COAL MINING MACHINERY.

The adoption of coal cutting machines and machine drills in coal mining is becoming each year more general, as their advantages over hand labor are better appreciated. For many years the imperfections in coal cutting machines which made them expensive to keep in repair and heavy and hard to handle in the mines, made their introduction slow, while in some cases the miners unions objected to them and either prevented their adoption or fixed such a rate of wages for the men working them that there was little economy in their use. A few unsuccessful strikes have greatly changed this last drawback, while the improvements which are embodied in the Legg coal cutter have rendered the machine so simple and efficient that there is every prospect that in a few years more the mines which cut bituminous coal in this country by hand will be the exception.

In coal seams of say 5 feet in thickness, 125 bushels or five net tons per day per man is an excellent average for good miners to cut and load. When we compare this with the work done in some collieries with the Legg machine, which makes from 500 to 600 square feet of under-cut in a shift of ten hours, and, it is said, has made over 1000 square feet in that time, the progress made can be appreciated.

The following record was reported to and published in the ENGINEERING AND MINING JOURNAL some months ago: Mr. Richard Sneddon, superintendent in charge of mine No. 4, Rock Springs, Wyoming, Union Pacific Railroad, on October 10th last, with the assistance of one man, with one Legg coal mining machine, carrying a three-foot cutter bar, between the hours of 7 A. M. and 5:30 P. M., undercut in rooms averaging from 24 to 30 feet wide, 195 lineal feet face, 5 feet under, producing in this 10-foot seam 325 tons of coal.

With this as the highest record we have knowledge of, the economy of these machines in skillful hands can be understood; but excellent work is also done with them when handled by a very inferior class of labor, such, for example, as the negro convicts of Alabama.

The relative economy of machine and hand work in coal will depend on the thickness and inclination of the beds, the presence or absence of "sulphur balls," and a variety of other considerations, but most of our bituminous coal beds lie at low angles and are well adapted to machine work, so that there are few places where the coal cutter would not effect an important economy over hand labor.

In personal letters received by us from one of the largest collieries in Ohio, our correspondent says: "We consider the Legg machine by far

the best which is now in use, and do most of the cutting at our machine mine with it, although we use a small number of — machines to cut in places where the conditions are not entirely favorable to the use of the Legg. All our machine work is done on contract, the price being 8 cents per ton of lump coal that goes over a 1½-inch screen, for cutting with the Legg machine, and 12½ cents per ton for cutting with the other machine. These figures will give you a very fair idea of the efficiency of the two machines in our coal. Our drilling is done by the Jeffrey company's small rotary drill, run by compressed air, and is paid 1½ cents per ton of coal." The coal bed here runs from 6 to 10 feet in thickness.

The following description of the Legg coal cutter is given by the manufacturers, the Jeffrey Manufacturing Company, of Columbus, Ohio: The machine consists of a bed frame occupying a space two feet wide by seven feet six inches long, composed of two steel channel bars firmly braced, the 'top plates' on each forming racks with their teeth downward, into which the feed wheels of the sliding frame engage.

Mounted upon and engaging with his bed frame is a sliding frame, similarly braced, consisting mainly of two steel T bars, upon which are mounted, at the rear end, two small 4 × 5 or 5 × 5½ engines, from which power is transmitted through straight gear wheels to the rack, by means of which the sliding frame is fed forward. Upon the front end of this

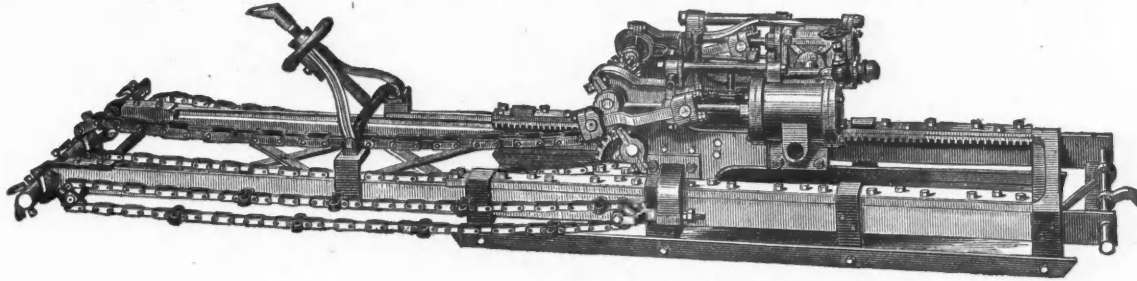
weighs only from 1000 to 1400 pounds; it requires no track; is easily and quickly handled by two men; drives all entries and turns the rooms; and it cuts away but four inches of coal or fire-clay.

The Legg rotary power coal drill is also one of the modern improvements in coal mining which reduces considerably the cost of drilling and effects economy. It is driven by compressed air. Its operation is easily understood from an inspection of the engraving.

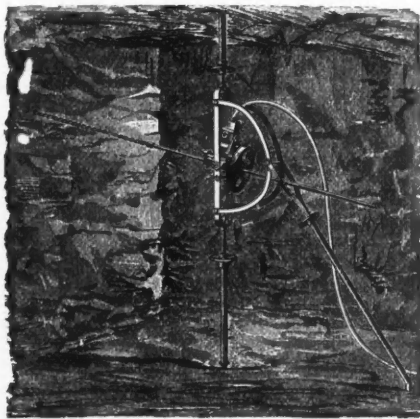
A NEW ZEALAND SULPHUR ISLAND.*

By R. W. Emerson Macivor.

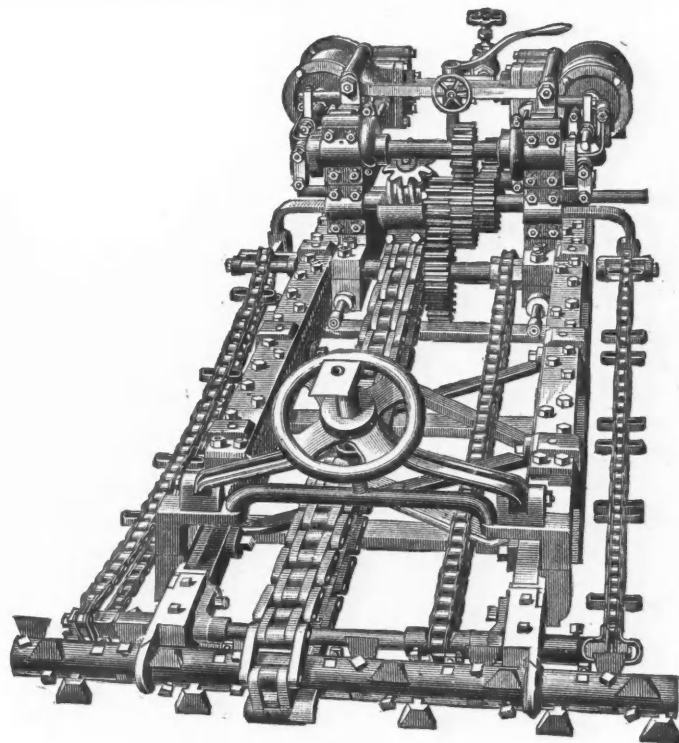
The wonderful little island known as White Island, in the Bay of Plenty, is part of the crater of a huge conical mountain which has long since been submerged. It lies about 50 miles east of Tauranga, and 20 miles out of the usual track of vessels crossing the bay between Cape Colville and East Cape. Sir J. Hector, F.R.S., the eminent Director of the Geological Survey of New Zealand, who visited the island in 1870, described it as a horseshoe-shaped range of mountains, having an altitude of from 800 to 900 feet. It had much the same shape and height when I explored it some thirteen years later, but at least half of it disap-



Legg Coal Mining Machine—Cutter Bar Partly Extended.



Rotary Power Coal Drill.



Legg Coal Mining Machine.

sliding frame is mounted the cutter bar, held firmly by two solid steel shoes, with suitable brass boxes. The cutter bar contains steel bits, made of tool steel, held in place by set screws. When the cutter bar is revolved these cutters or bits cover its entire face. The cutter bar is revolved by one endless steel chain from the driving shaft, and as it is revolved, is advanced by the above mechanism into the coal or other material to be undercut to the desired depth. The feed is thrown on and off by means of a lever. The cut under the coal, five to six feet by three feet six inches is made and the cutter bar withdrawn in from four to six minutes.

Some of the advantages claimed for the use of these mechanical coal cutters:

The machine is easily handled by two men.

The construction of the machine is very simple. Any body of ordinary intelligence can understand and handle it with a few days' instruction. The parts are all durable, and with ordinary care will last a long time.

The work is concentrated in the mines, requiring a much less number of rooms to produce a given number of tons of lump coal as compared with hand labor.

Reduction of dead-work, having less track to lay to the several rooms, because of concentration, requiring a less number of boys and horses for gathering purposes.

The great saving and better condition of the coal. This machine

peared into the sea during the violent and disastrous volcanic disturbances in the northern part of the colony a year or two ago.

I can not describe the island as it is now, and so must confine myself to a statement of what it was like in 1883. Its sides were steep, deeply furrowed, and even precipitous in places, and carried a good deal of scrubby vegetation besides some small but useful varieties of timber. At one place on the southwest side I observed a considerable deposit of guano, which, however, on analysis proved to be of very inferior quality. The island received its present name from the immortal Cook, probably on account of its emitting from its summit more or less dense clouds of white vapor. These clouds contained much free hydrochloric acid, and the atmosphere in the vicinity of the island was in consequence often any thing but pleasant to the respiratory organs of those on board of passing vessels. When the barometer was high little or no vapor rose above the encircling crater wall so as to be visible from seaward; but when it was low the clouds often went right up into the air, and could then be seen from a long distance off, even before the island appeared above the horizon.

I landed at Crater Bay, on the southwest side of the island, which was the only place where there was a beach, and where there was a gap in the crater wall by which I could find easy access to the amphitheatre and

* In Chemical News.

hot lake which occupied the interior. The beach consisted of large stones, and indeed boulders of trachytic lava, and extended a few chains from the sea. Beyond this point and within the crater the ground consisted of tuffaceous ciner, superficially covered with gypsum. The inside of the crater had a most desolate appearance, as it was utterly destitute of vegetation. The wall was almost perpendicular all round, and of uneven height, being highest on its southern side. The early morning sun, shining through the feathery clouds of vapor which escaped from innumerable fissures all round the top of one side of the wall, produced a very pretty effect, giving the dull rocks the appearance of having an edging of bright silver. The flooring upon which I stood occupied about two thirds of the space within the amphitheatre, being about 40 acres in extent, and the lake, which stretched from side to side of the crater, covered an area of, I should think, 15 acres. On the opposite shore, and also at one end of the lake, active geysers could be seen throwing out steam and hydrochloric acid in great volumes. On our side of the amphitheatre there were no geysers, though the ground was in many places treacherous and perforated with holes, in the bottom of each of which there was a peculiar black acid mud in a violent state of ebullition. Here and there I noticed small fissures from which sulphureted hydrogen and steam escaped very freely. At the base of the wall, and close to the margin of the lake, there were extensive accumulations of a mixture of gypsum and sulphur. Samples taken from different parts of these deposits were found to contain from 30 to 85 per cent of sulphur. While exploring this part of the amphitheatre I came upon numerous large balls of what at first sight appeared to be solid gypsum, but on breaking them with the aid of a stick they proved to be hollow shells, internally lined with projecting lemon-yellow prismatic crystals of sulphur, which quickly lost their transparency on exposure to the air! Some of these balls, or rather hollow spheres, were as large as old-fashioned bombshells. One or two which I measured had a diameter of 25 cm. These mineralogical curiosities could not have been thrown from a distance, nor could they have been carried by water, but how they could have been formed *in situ* puzzles me to this day. The only facts I can offer concerning them are—1. The shell-wall consisted of gypsum and a little sulphur. 2. The atmosphere within the sphere was much warmer than the outer air. 3. The shells did not occur near the lake or in proximity to active fumeroles. And 4. The sulphur found on them was invariably prismatic and transparent. Reason as I may, I can offer no theory to explain their formation.

It may be mentioned that the floor on this side of the lake reaches an elevation of nearly 60 feet above sea-level towards the interior between the lake and the sea, and then falls away to about 20 feet at the margin of the lake.

Before proceeding further it will perhaps be well to say a few words about Lake Hope—a name given to this remarkable sheet of water by a previous explorer. It was first described by Dr. Roston and Lieutenant Edwin, R.N., of H.M.S. *Brisk*, in 1868. These gentlemen state that it had a temperature of 43.3 degrees C., and a uniform depth of 2 fathoms, at about 50 yards from the southern shore. It was then some 15 feet above sea-level. Hector, during his visit, also found the water to have a temperature of 43.3 degrees C., but estimated the height above sea-level at 25 or 30 feet. I found the lake to register 63 degrees C., and to be fairly uniform in depth, as stated by Roston and Edwin, but it was unfathomable near the center. There could be no question, however, but that the appearance, temperature, and depth of the water were greatly influenced by meteorological and subterranean influences. I was informed by Judge J. A. Wilson, of Teuranga, an owner of the island and a man of service, that whenever there were unusual disturbances in the distant Hot Lake Country there were sure to be more or less remarkable changes in Lake Hope. Now, when we consider that there are at least 90 miles of land and sea between the places, this observation appears most interesting, and it is in some measure supported by the fact that a great part of the island disappeared during the terrible eruptions in the Lake Country. However, without further reference to this point, I shall return to my own experiences.

The lake, when I saw it, had a muddy appearance over its deepest part, but was blue-green and transparent elsewhere. The atmosphere over it was very irritating, owing to the hydrochloric acid, which came off from the water in abundance, and from the fumeroles near the margin. Two liters of the water were taken for analysis, and when the sample reached my laboratory in Melbourne it was perfectly clear, but had deposited small crystals of sulphate of calcium on the sides and bottoms of the bottles in which it had been put while warm. The crystals were re-dissolved in the water, and the following is the statement of the analysis in 1000 parts:

Ferrous sulphate.....	15.254	Aluminium chloride.....	25.557
Aluminium ".....	1.350	Sodium ".....	11.950
Calcium ".....	3.605	Silica ".....	0.670
Magnesium ".....	0.331	Hydrochloric acid.....	149.876
Potassium ".....	4.715	Water, etc.....	776.059
Sodium ".....	10.033		

This water has also been examined by Skey (*Trans. and Proc. N. Z. Inst.*, Vol. III., p. 278). It will be seen that free hydrochloric acid, chlorine of aluminium, chloride of sodium, sulphate of calcium, and potash and soda alums are the principal constituents. The bottom of the lake, wherever visible, was thickly covered with oblique prisms of selenite. It may be mentioned that occasional bathing in Lake Hope had a very beneficial effect in some exceedingly bad cases of rheumatism.

The actual production of sulphur and hydrochloric acid in the fumeroles at one end and on the other side of the lake was one of the most beautiful sights I am ever likely to meet with in the whole laboratory of Nature. The fumerole at one extremity of the lake was rather small, but none the less deposited round its orifice bright yellow sulphur at the rate of about one hundredweight per week, and sent forth limitless volumes of not hydrochloric acid and steam, which, as they ascended, often assumed the form of perfect vortex rings of great size. The hissing, rumbling and grunting noises were almost deafening, and at irregular intervals there could be heard—"from far in the bowels of the earth"—peculiarly loud reports, as of explosions, which were immediately followed by the projection of large pieces of dark amber-colored or red sul-

phur high into the air. The violence with which these projectiles were sent above the surface may be judged from the circumstance that I have seen pieces of sulphur weighing several pounds dashed against the rocks a hundred feet away from the fumerole.

On the side of the lake opposite to that on which I landed a new fumerole had sprung into existence within a few weeks of the time of my visit, and it had in the short time developed into the most extensive on the island. It was shaped like an inverted cone, had steep sides, consisting of a loose mixture of ciner, gypsum, and sulphur, made moist with acid laden steam, and was about 40 feet deep. Its mouth had been raised about 6 or 7 feet above the surface of the ground, and had a diameter of perhaps 20 feet. The orifice of the fumerole from which the sulphur, steam, and hydrochloric acid came was circular, and did not occur exactly in the bottom of the cone, but rather to one side—a peculiarity, by the way, of all the fumeroles on the island. Pieces of sulphur were shot to a height of 30 yards in the air.

One peculiarity of the sulphur ejected from the various fumeroles was its variation in color. The material deposited at the orifices was for the most part pale yellow and opaque, but that which came out in lumps was quite transparent and ranged from orange to reddish brown in color. The tint generally became somewhat lighter as the lumps cooled. This darkness of color I found to be due to selenium, which occurred in some specimens to the extent of 1.75 and 2.1 per cent. About 10 tons of White Island sulphur were sent to Melbourne and used in vitriol making, but it was found that the acid obtained from it had a very dirty appearance and deposited a large quantity of selenious matter on standing for a time. From that day the local manufacturers have refused to use the sulphur, preferring to import the Sicilian article.

Close to the fumeroles there were many large holes full of thin, black, boiling mud, which on examination I found to consist of clay, siliceous matter, gypsum and iron pyrites, suspended in a strongly acid water containing even more mineral matter than the water of Lake Hope. The latter was fed by boiling-hot streams, which rushed down the courses and deep furrows worn in the steep floor of the crater.

The probability is that the sulphur and hydrochloric acid on the island result from the action of sea-water on hot beds of pyrites within the center of the submerged mountain.

In concluding these notes I may say that the only indications of life on the island were a few rats, which certainly had shown a terrible want of wisdom in selecting such a home. I expected to hear, sooner or later, that the remains of this "earthly hell" have sunk for ever into the fathomless sea.

The Emperor Frederick has granted an annuity of \$250 to the widow of Reis, the originator of the telephone.

Locomotive Motive Power for Canals.—The experiments in substituting locomotives for horses along the Shropshire Canal, England, have been a fair success. The rails were laid 18 inches apart. The engine drew eight laden boats at the rate of four miles an hour.

Prize for Electrical Essay.—The Belgian Society of Electricians offers a prize of 250 francs for the best essay on the elementary principles of electricity. The competition is open to all electrical workmen, but more especially to those who have not received a technical education. The essays need contain neither mathematical formulæ, nor the demonstration of fundamental laws.

Phenomenal Wires.—William Riddell & Co., Glasgow, have finished for the Glasgow Exhibition two pieces of wire, one of brass, 65 miles long and 48 w. g. in diameter. The other is of copper, 111 miles long, 48 w. g. in diameter, and was reduced at one process from 22 w. g. to 48, taking forty hours' continuous running to run it off. Except in the precious metals, this length has probably never been exceeded, and certainly never without annealing.

Development of Costa Rica.—The British Consul at San José states that a concession of 7000 acres of land has been granted to Marco Soto, ex-President of Honduras, in order that he may form syndicates in the United States and Europe to develop the mines of the country, and establish agricultural and other industries. Special privileges will be granted for a term of ten years, and all machinery and agricultural implements destined for the purposes of these industries will be admitted duty free.

Cables for Alternating Currents.—The Grosvenor Gallery Company have recently been testing an anti-induction electric light cable, in an underground conduit, in which were also several telephone wires. The results were most satisfactory. The cable contains a 19-strand wire, well insulated; around this is a copper sheath, which is also highly insulated; the strands and the sheath form the lead and return wires. When the copper sheath was not used as the return there was great induction, but the telephone remained absolutely silent when the copper sheath was utilized.

Chlorination of Zinc Ores.—The Iron Silver Mining Company, of Leadville, Colo., has entered into a contract with the Omaha & Grant Smelting Company for the erection of a plant in connection with the latter company's works, to extract the zinc from the ores mined by the Iron Silver Company. The process is an experiment, the success of which will be of immense importance to Leadville. It will consist of a partial roasting of the ore for desulphurizing, and then an application of electricity to a chlorination process, which will precipitate the metallic zinc and leave the residue a free smelting ore. It is the application of Platner chlorination to zinc instead of gold ores.

Decision in a Mining Case.—The Mineral Estate Owes a Servitude of Support to the Upper Estate.—A decision of interest in this, as in all other mining regions, is that of the Pennsylvania Supreme Court in the case of Thomas Williams against J. M. Hay, from Somerset County. It is held that where one person owns the surface, and another person owns the coal or other minerals lying underneath, the under or mineral estate owes a servitude of sufficient support to the upper or superincumbent estate. In this case it was contended that where the deed "provided, however, that the said W. J. Barr, his heirs and assigns, in mining and removing the coals, iron ore and minerals aforesaid, shall do as little damage to the surface as pos-

sible," the right to surface support was waived; but the Supreme Court holds that an absolute right to surface support is not to be taken away by a mere implication from language which does not necessarily import such a result.

Coal Mining in Japan.—The German consular reports contain some interesting information concerning the prospects of coal mining in Japan. Rich coal-fields are found in the islands of Kiusiu and Yesso. In the former there are four basins now being worked upon, having a superficial area of 400, 155, 90 and 40 square kilometers respectively. The Karatin coal is a seam some 5 feet thick, in a sandstone formation, and having an extent of about 100 square kilometers. In the island of Amakusa, to the west of Kiusiu, there is anthracite. An extensive coal field exists also in the neighborhood of Tokio. There are besides, in other localities, brown coal and lignite in abundance. The Japanese have begun to work some of these seams. The output amounted to 700,000 tons in 1881, but every year has seen a great increase. The German consul remarks that the Japanese use the best European machinery and follow the most approved methods of mining adopted on the Continent. It might be worth while to bring machinery of American manufacture to the notice of the Japanese, who have lately bought largely in Germany.

The Fumat Safety Lamp.—This new safety lamp, which has been devised by M. Fumat, the chief engineer in the French mines of the Grand Combe, gives a good light, and is not extinguished when it is violently shaken or held in an inclined position, and does not cause an explosion when placed in a strong current of air charged with fire damp. When lowered into an explosive mixture of air and fire damp, an explosion takes place within the lamp as soon as the flame comes in contact with the explosive mixture; but by the ingenious construction of the protecting network, the heat generated is prevented from raising the temperature of the outer metallic portions of the lamp. Oil is used in this lamp, and it has been used for some time in the mines at the Grand Combe and by the firemen of Paris, with very satisfactory results. MM. Mallard and Le Châtelier have also put the lamp to many severe tests in their laboratory, and have found that it fulfills all the conditions of safety which the inventor claims for it. Its cheapness, coupled with these properties, will, it is hoped, cause it to be used in other mines, where lamps of more expensive construction have hitherto been employed.

The Silver Excitement in Australia.—A Melbourne paper says: The "silver boom" has passed out of all control. Several hundred silver mining companies are now in existence, two or three of which have paid dividends. A new company has only to be whispered and all its shares are subscribed before the prospectus is fairly issued. Brokers formerly doing a gross business to the extent of a few thousand a month, are now often lodging at their banks as many thousands per day. A seat on the Stock Exchange, worth £300 a few months ago, is now worth £1500. Will all this excitement last, or will it be followed by a prostrating reaction? Every thing goes on merrily while Stock Exchange values rise by leaps and bounds, but when the realization of profits commences in earnest; when calls are being freely levied, and when the public are carrying more high priced investment stocks than they can well finance, the utmost caution and prudence will have to be practiced to avoid a serious crisis. There is fortunately always the great recuperative power possessed by a new country with large resources to fall back upon. But this is not in itself any justification for gigantic speculations.

An Unpolishable Diamond.—A remarkable diamond was exhibited at a recent meeting of the New York Academy of Sciences by Mr. George F. Kuntz. It is of the class termed "extreme durate" by the French. It had been cut into the general shape of a brilliant, and its main face or table was then placed on the polishing wheel. It was kept there for 100 days, the wheel revolving at the rate of 2,800 revolutions per minute. The diamond was held upon the rotating surface at a distance of about 15 inches from the center. Based on these figures, a calculation showed that the surface passed over by the diamond amounted to 75,000 miles, or nearly three times the circumference of the earth. Yet it was all futile, as the stone would not acquire a polish. The ordinary weight placed on a diamond while on the wheel is from 2½ to 2¾ pounds. This was increased by 4 and 8 pounds without effect, and finally 40 pounds were used. The wheel was badly damaged, the diamond plowing into it and throwing scintillations in all directions. The diamond, even under these conditions, could not be given a commercial polish. The wheel had to be replaced. The work was done in the establishment of Tiffany & Co., of this city.—*Scientific American.*

Waste in the Basic Open-Hearth Process.—M. E. de Gachter and M. L. Camberdon have contributed to the *Génie Civil* a paper on the waste of metal in the basic or neutral open hearth as influenced by the re-carburizing, which brings out some points worthy of notice. They discuss at length the theoretical considerations involved, and quote the following analyses of steel and cinder:

	Analyses of steel		Analyses of cinder					
	Carbon Per cent.	Silicon Per cent.	Manganese Per cent.	Prot. oxide of Iron Per cent.	Peroxide of Iron Per cent.	Total Iron Per cent.	Manganese Per cent.	Silica Per cent.
A { Before final addition	0.078	0.037	0.075	17.44	3.95	16.33	3.96	15.3
{ During casting	0.09	0.037	0.305	15.12	1.3	12.72	9.15	14
B { Before final addition	0.12	0.014	0.4	12.39	1.88	11	6.05	21.7
{ During casting	0.15	0.014	0.371	9.21	1.88	8.36	10.62	20.7
C { Before final addition	0.1	0.004	0.1	17.45	5.09	17.2	3.31	15.6
{ During casting	0.133	0.013	0.325	14.08	3.14	13.2	10.6	15.4

The final additions for A were 145 kilograms of 60 per cent ferro and 30 kilograms of ferro-silicon, with 9 per cent silicon; for B, 140 kilograms of 60 per cent ferro, and for C, 182 kilograms of ferro and 40 kilograms of ferro-silicon. The figures in the analyses show that there was a notable reduction of iron from the cinder, as the result of re-carburization, thus lessening the waste. By theoretical considerations they reach the conclusion that this is due principally to manganese, and that the aim must be to avoid, as much as possible, excessive oxidation of the bath and produce as little cinder as possible.

BOOKS RECEIVED.

- [In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another part of the Journal.]
- Algonia West; Its Mines, Scenery and Industrial Resources.* By Walpole Roland, C. E. Published by Warwick & Sons, Front street, West Toronto, Canada, 1887. Pages 190. Illustrated. Price \$1.00.
 - Bulletin of the New York State Museum of Natural History, No. 3.*
 - Building Stone in the State of New York.* By John C. Smock, Albany, N. Y. Published by the Museum, Albany, N. Y., 1888. Pages 152 and Index.
 - Tables of the Properties of Saturated Steam and other Vapors.* By Cecil H. Peabody, Assistant Professor of Steam Engineering in the Massachusetts Institute of Technology, Boston, Mass. Published by John Wiley and Sons, New York, 1888. Pages 35. Price \$1.00.
 - Notes on Assaying of Lead, Silver, and Gold.* By Frederick W. Clark, Assistant Professor Mining and Metallurgy, Massachusetts Institute of Technology, Boston, Mass. Published by the author, 1887. Pages, 40 and Index.

DIVIDENDS PAID BY MINING COMPANIES DURING MAY AND FROM JANUARY 1st, 1888.

NAME OF COMPANY.	Paid in May.	Since Jan. 1.	NAME OF COMPANY.	Paid in May.	Since Jan. 1.
Atlantic, Mich.		60,000	Mammoth, Utah		10,000
Alcuras, Idaho		1,225 0	Mary Murphy, Colo.		3,000
Calumet & Hecla, Mich.		500,000	Montana L., Mont.		330,000
Carlisle, N. M.	50,000	50,000	Morning Star, Colo.		25 0 0
Central, Mich.		40,000	Mt. Diablo, Nev.	10,000	10,000
Coto, et c., Colo.		275 0	N. Belle Isle, Nev.	50,000	200 0 0
Confidence, Nev.	49,920	49,920	Ontario, Utah	75,000	375,000
Cons. Cal. & Va., Nev.	108,000	540,000	Original, Mont.		3,000
Daly, Utah		75,000	Osceola, Mich.		50 0 0
Dunkin, Colo.		80,000	Parrott, Mont.		18,000
Eureka, Nev.	12,500	75,000	Pittsburg, Cal.	29,850	29,850
Franklin, Mich.		40,000	Plymouth Cons., Cal.		80,000
Gardid, Nev.		12,500	Quick-silver, Cal., Prof.		172,000
Golconda, Idaho		120,000	Quincy, Mich.		160,000
Gr-nite Mountain, Mont.	100,000	930,000	Sawwood, Mo.	3,000	3,000
Hale & Norcross, Nev.	56,000	56,000	Sierra Buttes, Cal.		15,312
H. & C. Cons. Mont.	15,000	75,000	Standard Cal.	5,000	45,000
Homestake, Dak.	25 0	125,000	Swansea, Colo.		3 0 0
Hope, Mont.		50,000	Tamarack, Mich.		120,000
Idaho Cal.	46,500	139,500	Viola L., Idaho	37,500	37,500
Iron Silver, Colo.		100 0 0			
Jay Gould, Mont.	24,000	136,000	Total	772,270	235,582

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

- PATENTS GRANTED MAY 29th, 1888.
- 383,429. Hydropneumatic-Pressure Apparatus. Thos. Arthur, Bangor, Pa., Assignor of one half to Robert J. Nagle, same place.
 - 383,430. Steam-Engine. William K. Austin, Brooklyn, N. Y.
 - 383,431. Railway Rail. David T. Bennett, Iron on, N. J.
 - 383,448. Valve for Water Gases. Clark B. Dunton, Portland, Me.
 - 383,455. Nailing Machine. Louis Goddu, Winchester, Assignor to James W. Brooks, trustee Cambridge, Mass.
 - 383,463. Dumping Car. George H. Griggs, Elizabethport, N. J.
 - 383,503. Chemical Engine. Randall T. Van Valkenburg, Manchester, Mich.
 - 383,520. Production, Transmission and Distribution of Electric Currents. Charles E. Fritts, New York, N. Y.
 - 383,521. Rolling Tires. Peter Gendron, Toledo, O.
 - 383,530. Rotary Engine. Joseph C. Jarvis, Huntington, W. Va.
 - 383,534. Pipe-Molding Apparatus. Andrew H. McNeal and William A. Stineruck, Burlington, N. J.
 - 383,536. Thermo-Electric Apparatus for Controlling the Temperature of Water in Pipes. Edw. M. Newman, Washington, D. C., Assignor to the Newman Anti-Freezing Water Pipe Co., Chicago, Ill.
 - 383,538. Apparatus for Automatically Generating and Burning Inflammable Vapors. Claude A. Paquin, Paris, France.
 - 383,540. Axle-Box-Milling Machine. Andrew Paterson, McKeesport, Pa., Assignor to the National Tube Manufacturing Company, Boston, Mass.
 - 383,557. Automatic Fuel Regulator for Boilers. George E. Brettell, Rochester, N. Y., Assignor to one third to William A. Wilson, same place.
 - 383,564. Armature for Electric Motors. Frank E. Fisher, Detroit, Mich.
 - 383,565. Dynamo Armature. Frank E. Fisher, Detroit, Mich.
 - 383,567. Armature for Dynamos. Frank E. Fisher, Detroit, Mich.
 - 383,603. Core-Arbor for Hollow Castings. Warren E. Warner and Frank A. Austin, Syracuse, N. Y., Assignors to the J. F. Pease Furace Company, same place.
 - 383,609. Concentric Piston Steam Engine. Abner D. Baker and Francis P. Huyck, Swanon, Assignors of one third to Albert E. Roberts, Norwalk, O.
 - 383,614. Steam-Engine. David Bowen, Shamok, Pa.
 - 383,617. Armature for Dynamos and Motors. 383,618. Synchronizing Device for Alternate Current Dynamos. 383,619. Armature for Dynamos and Motors. 383,620. Combined Alternate-Current and Storage System of Electrical Distribution. 383,621. Alternate-Current and Storage System of Electrical Distribution. 383,622. Alternate-Current and Storage Systems of Electrical Distribution. 383,623. Combined Alternate-Current and Storage System of Electrical Distribution. Henry M. Hylsbury, Pittsburg, Pa., Assignor to the Westinghouse Electric Company, same place.
 - 383,634. Process of Manufacturing Illuminating-Gas from Coal. John H. R. Dinsmore, Liverpool, Eng.
 - 383,635. Apparatus for Washing and Purifying Illuminating-Gas. John H. R. Dinsmore, Liverpool, Eng.
 - 383,651. Governor for Electric Motors. Richard H. Mather, Windsor, Conn.
 - 383,661. Circuit Controlling Apparatus for Electric Lighting Circuits. Oliver B. Schallenberger, Rochester, Assignor to George Westinghouse, Jr., Pittsburg, Pa.
 - 383,662. Coupling of Alternate Electric Current Generators. 383,663. Armature for Dynamos. 383,664. Armature for Electric Machines. 383,665. Indicator for Electric Circuits. 383,666. Apparatus for Detecting Ground Connections in Electric Circuits. 383,667. Method of Indicating Electric Currents. 383,668. Electrical Indicator for Alternating Electric Currents. 383,669. Electrical Indicator. 383,670. Electrical Indicator. 383,671. Electrical Indicator. 383,672. Method of Indicating Electric Currents. Oliver B. Schallenberger, Rochester, Assignor to the Westinghouse Electric Company, Pittsburg, Pa.
 - 383,678. Electric-Meter. George Westinghouse, Jr., Pittsburg, Pa.
 - 383,679. Mounting Armatures of Dynamos. George Westinghouse, Jr., Pittsburg, Pa., Assignor to the Westinghouse Electric Company, same place.
 - 383,680. Electric Meter. George Westinghouse, Jr., and Philip Lange, Pittsburg, Pa., Assignors to the Westinghouse Electric Company, same place.
 - 383,707. Centrifugal Apparatus for Separating Gases. Archibald F. Craig, Paisley, Alexander Neilson, Inkermann, and James Snodgrass, Pumphreston, of Scotland.
 - 383,763. Flap Valve. Selah Phillips, Arnot, Pa.
 - 383,764. Steam-Engine for Equalizing Power. William A. Pitt, Glenbrook, Conn.
 - 383,775. Gas-Engine. Clark Sirtz, Springfield, Ohio.
 - 383,777. Turbine Water-Wheel. S. Morgan Smith, York, Pa.
 - 383,795. Device for Preventing Incrustation in Steam-Boilers. W. B. Bull, Quincy, Ill.
 - 383,822. Current-Collector for Electric Machines. William Stanley, Jr., Great Barrington, Mass.
 - 383,844. Overhead Conducting System for Electric Railways. Granville T. Woods, Cincinnati, Ohio, Assignor to the Woods Electric Company, same place.

PERSONAL.

Dr. J. Magin, mining engineer, has gone to Mazatlan, Mexico, on professional business.

Mr. Eugene G. Barrows, for a number of years connected with the New York iron trade, died on the 27th ult.

Mr. John B. Parish, mining engineer, St. Louis, is making an examination of the Black Girl mine, near Ouray, Colo.

Mr. John M. Watt, Mine Inspector of the Eighth Bituminous district, Pa., has resigned his office, to take effect June 1st.

Prof. Harrison E. Webster, of Rochester University, Rochester, N. Y., has been elected to the Presidency of Union College, at Schenectady.

Mr. R. J. Frecheville of Loudon, mining engineer, has gone to Mexico to inspect mining properties on behalf of Messrs. John Taylor and Sons.

Messrs. Hamilton Smith, Jr., and Henry Janin, mining engineers, have gone to Alaska, it is said, to examine the Treadwell mine on Douglass Island.

Mr. Alex. Glass, the late general manager of the steel plant and nail mill at Hammond, Ill., has been appointed to a similar position at the nail works in Terre Haute, Ind.

We learn that the announcement of the death of Mr. Alfred Nobel, at Cannes, France, in our issue of April 21st, was incorrect. It was Mr. Ludwig Nobel who died, and not the famous introducer of the high explosives.

It is reported that Mr. John Howell, to whose resignation as manager of the Reno Reduction Works, Reno, Nev., we referred in our last issue, has accepted a similar position in Australia at a salary of \$10,000 a year.

Mr. Charles Spang, Sr., of the firm of Spang, Chalfant & Co., and Spang Steel and Iron Co., who has been a resident of France for over twenty years, is at present in this country. It has been about six years since his last visit.

Captain Richard C. Gray, a prominent steel manufacturer of Pittsburg, Pa., died in New York on May 28th, aged 66 years. Captain Gray was a member of the firm of Park Brothers & Co., Lt., of the Black Diamond Steel Works.

The Columbia College School of Mines faculty, it is reported, is about to appoint an examiner in Salt Lake City, Utah, of applicants for admission to the school, so that candidates can ascertain without going to New York whether or no they are qualified to enter.

Mr. E. E. Olcott, mining engineer, New York, is about to go to Surinam, Dutch Guiana, on professional business. During his absence, which will be until about September 1st, he has left his local professional matters in charge of Mr. Wm. Allen Smith, E.M.

Mr. Alexander Lavenberg, known as "Old Walkerville," at Butte, Mont., died there on the 25th ult., aged 54 years. He came to Montana in 1867, and accumulated quite a fortune, which was swept away by fire. Several years ago he came to Butte, where, it is said, he died possessed of \$250,000.

Mr. Joseph Yelloly Watson in London, England, on the 18th ult., aged 71 years. Mr. Watson was a well-known mining man, and was the author of "Compendium of British Mining," "Gleanings among Mines and Miners," etc., and for many years published an annual review of the "Progress of Mining."

James B. Hayes, Chief-Justice of the Supreme Court of Idaho Territory, died on the 31st ult. The first case brought before Judge Hayes after his appointment was the Mormon test oath case, in which he held that the law was constitutional, an opinion afterwards affirmed by the Supreme Court. The opinion was able and widely commented on at the time.

Capt. John Daniels, Superintendent of the Tamarack Mining Company, Mich., who has returned from his European trip, has brought back many new ideas in machinery, which will reduce cost of hoisting and also cost of plant. This illustrates the suggestion we recently made that mining companies generally would find great advantages in securing the services of consulting engineers whose duty it would be to keep them advised of the progress made elsewhere in mining appliances.

The young Earl of Dudley, who arrives at his majority during the present year, inherits an enormous fortune. He owns 25,000 acres of land in Staffordshire and other counties, with a rent-roll of £123,000. This, however, conveys no idea of his wealth, as he owns large collieries in Staffordshire, from which he draws immense revenues. An idea of the magnificence of his mansion, Dudley House, may be formed from the fact that the balustrade to the staircase is made of solid silver.

Mr. John T. Hill, President of the Benton Consolidated Mining Company, of Storey County, Nevada, had Mr. W. J. Collins, Superintendent of the company, arrested at San Francisco on May 22d, on three charges, viz., for forgery, perjury, and embezzlement, while acting as Superintendent of the Benton Consolidated mine and handling its funds. He is said to have committed the crimes with which he is charged by manipulating the pay-roll and sworn vouchers which he rendered to the company. Mr. Collins was

a well-known mining man on the Pacific coast, and his arrest was a great surprise in San Francisco.

Prof. Roland Duer Irving, the eminent geologist, in charge of the United States Geological Survey in Wisconsin and Minnesota, died at Madison, Wis., on the 30th ult., of paralysis, aged forty-one years. He was son of the late Rev. Pierre P. Irving, of New Brighton, S. I., and a grand-nephew of Washington Irving. He was born in New York City, and was a graduate of the Columbia College School of Mines in the class of 1869. The degree of Ph. D. was conferred on him by that institution in 1879. After serving as assistant in the Ohio Geological Survey, he was elected in 1870 Professor of Geology, Mining and Metallurgy in the University of Wisconsin, and he has since retained that position. From 1873 till 1879 he was Assistant State Geologist of Wisconsin. In 1880-82 Professor Irving was one of the United States census experts, and in 1882 he was placed in charge of the Lake Superior division of the United States Geological Survey. He was a member of various scientific societies, and contributed important papers to their transactions, besides publishing valuable official reports on geological subjects. Professor Irving was recently asked by Mr. Powell of the United States Survey to attend a scientific conference to be held in Europe this summer, and was considering the matter when taken down by his last illness. His body will be brought to Tarrytown for burial in the Sleepy Hollow Cemetery.

FURNACE, MILL, AND FACTORY.

The Catoctin furnaces in Maryland have been sold to a syndicate.

The steel plant and nail mill at Hammond, Ill., has been shut down for an indefinite period.

The buildings of the Perry stove works at South Pittsburg, Tenn., were destroyed by fire on May 26th.

The strike at the Joliet Steel Works, Joliet, Ill., has been amicably settled. The men were given an advance of 10 per cent in wages.

It is reported that a Connecticut firm has received an order from the Russian Government for 400,000,000 empty copper cartridge cases.

Swedes Furnace at Norristown, Pa., will in the future be operated by Herksher & Sons, of Philadelphia, and will be put in blast June 4th.

The spiegel furnaces of the Lehigh Zinc Company, at Bethlehem, Pa., have been lighted after a year's idleness, and the first cast was made May 28th. This puts the entire plant in operation.

The Deer Lake Company's furnace at Deer Lake, Mich., which was blown out on May 5th, will probably be put in blast again about June 15th. It was closed down to allow of necessary repairs being made.

The Dayton Coal and Iron Company, whose great plant is situated in East Tennessee, on the line of the Cincinnati Southern Railroad, has announced a reduction of wages of 12½ per cent. The cause given is the current depression in the iron market.

Every department of the Colorado Coal and Iron Company's steel works plant at Pueblo, Colo., it is said, would be in blast by June 1st. The company has received the contract for making the steel rails for the road that is to be built from Seattle to Spokane Falls, Washington Territory.

In the United States Court at Harrisburg, Judge Paul confirmed the sale of the Columbia Liberty Iron Furnaces in Shenandoah County, Va., at \$51,000. The property was sold under a decree of foreclosure last January to George W. Pearson, of Trenton, N. J. The cash payment was \$12,000.

The eight weeks' strike of the puddlers at the rolling mills of McLanahan, Smith & Co., and the Hollidaysburg Iron Company, Pa., have been declared off. The puddlers demanded \$4 a ton and the Philadelphia scale; but have agreed to accept the companies' offer of \$3.75 a ton and the Harrisburg scale.

The boiler in the plate mill of the Eureka Iron and Steel Works at Wyandotte, Mich., exploded on the 1st inst., completely wrecking the entire building. Three workmen, George Green, Patrick Finn and Terry McCoy, were killed and several others injured. The loss on mill and machinery is about \$10,000.

The Stokes & Parrish Elevator Company has been incorporated, with a paid-up capital of \$100,000. Mr. Samuel E. Stokes is President, and Mr. W. H. Ambler Treasurer. The company will manufacture and sell first-class elevators, engines and hoisting machinery, etc. The works will be located at Philadelphia, Pa.

While fixing the bell at the blast-furnace of the Stewart Iron Company, of Sharon, Pa., on May 31st, an explosion of the gas which accumulated in the bell occurred. One man was instantly killed, and the three others so dangerously burned that it is feared they will not recover. Considerable damage was done to the furnace.

In the case of the Woodstock Iron Company, located near Anniston, Ala., the Secretary of the Interior on May 31st decided that the purchase of unoffered lands by said company under the provisions of Section 1 of the Act of June 15th, 1880, was illegal, and directed the cancellation of all unpatented entries to said company.

The Berlin Machine Works, of Berlin, Wis., will remove its works to Beloit, Wis., where it will occupy the former plant of the O. E. Merrill machine shops. The Berlin company moves to Beloit to get better business facilities, the shipping opportunities at Beloit being much better, and the citizens contribute \$9,000 as an extra inducement.

The Wiswell Electric Mining Machinery Company, of Boston, Mass., has advised us that the owners of the Howie gold mine, near Monroe, N. C., who have been using the Wiswell mill with great success the past eighteen months, have just ordered two more mills for the same property. The May Virginia gold mine, Talladega, Ala., has just purchased a Wiswell mill. The Wiswell Company has also just sold an extensive plant for Cuba.

The Harris Corliss Engine Works, Providence, R. I., heretofore conducted under the name of Wm. A. Harris, has by act of the General Assembly of the State of Rhode Island been incorporated, and is now styled William A. Harris Steam Engine Company. Mr. Harris, who established the business in 1864, is president and treasurer of the new company, and the works will be conducted and managed in the same manner as when run in his own name.

The gas furnaces which were built at the Birmingham, Ala., rolling mills some time ago and are being used for burning gas instead of coal, are working satisfactorily. The company now has four of these furnaces in operation and will build five others before the end of the year. In addition to this work, a good deal of repairing will be done through the summer, and several new pieces of machinery will be placed into position also. The mills are now in full operation.

The Blandon Iron Company, which operates an extensive rolling-mill at Blandon, near Reading, Pa., posted the following notice June 1:

"At the present time the cost of manufacturing exceeds the selling price of our products. We have therefore decided to close down the mill to-night for an indefinite period." This will throw nearly 200 men out of work and paralyze affairs at Blandon, as nearly the entire borough depends upon the mill for support.

The Woodstock Iron Company, of Anniston; the Clifton Iron Company, of Jenifer, and the Shelby Iron Company, of Shelby Iron Works, all of Alabama, have entered into an agreement whereby their product can be placed on the market under control of a commissioner, who will sell through a duly accredited agency the product of all their charcoal furnaces. The prime object of the commission is the maintenance of just and equitable prices for their product. There has been no consolidation of the companies. The three companies together now have six large charcoal furnaces completed and two large coke furnaces building.

Carnegie, Phipps & Co. and Carnegie Bros. & Co., Pittsburg, Pa., will, it is said, propose a reduction of wages to their employes, to take effect July 18th. Heretofore these firms have always refused to act with the other manufacturers when the new amalgamated scale for the following year was offered for signature. While they will not unite officially with them this year, they will nevertheless ask for a reduction with the others. The reduction will affect all the mills except the Edgar Thomson, at Braddock, where the sliding scale went into effect some time ago. Among them are the works at Homestead, the Twenty-ninth street mills, the Thirty-third street mills, possibly the Lucy furnaces, and the new steel mill at Beaver Falls.

The Birmingham Hardware Manufacturing Co., Birmingham, Ala., organized with a capital stock of \$150,000, has taken steps looking to the establishment of a large tool and implement factory at Birmingham at an early date. The incorporators are: J. J. Worden, President of the Binghamton (N. Y.) Hoe and Tool Co.; C. B. Russell, of Bridgeport, Conn., and Dr. H. Caldwell, representing the Elyton Lead Co. The latter company alone has subscribed \$40,000 to the capital stock. The incorporators have secured the entire line of machinery of the Binghamton Hoe and Tool Company, Binghamton, N. Y. All this machinery will be removed to Birmingham. The company has also consolidated with the Tack Works of Birmingham, and will enlarge the present plant, and consolidate the whole affair. The tack works are now in full operation.

CONTRACTING NOTES.

Machinery and supplies wanted. See page xiv. Contracts open will be found on page xiii and xiv. New contracts this week: No. 905, Water-Works; No. 906, Pump. No. 907, Storage Dam to be Lined; No. 908, Water-Works; No. 909, Canal; No. 910, Pipe, Hydrants, Pumps, etc.; No. 911, Electric Lights; No. 912, Ship Railway; No. 913, Iron and Steel.

The contract for dredging in the North River at Pier (new) 43 and at the pier at Fifty-fifth street, New York, has been awarded to the Union Dredging Company, for 20 cents a cubic yard.

Messrs. Cofrode & Evans, engineers and contractors, of Pottstown, Pa., have been awarded the contract for erecting an extensive plant for the Roanoke Rolling Mill Company, of Roanoke, Va.

The contract for dredging Crooked Lake and outlet, Albany, N. Y., has been awarded to A. R. Wright, of Portland, Me., at 83 cents a square yard. Fifteen thousand dollars has been appropriated for this purpose.

GENERAL MINING NEWS.

The holders of certificates of the Natural Gas Trust, the adjunct of the Standard Oil Trust, to the number of a dozen or so, held their annual meeting in the office of the trust in the Standard Oil Building, New York, on the 31st ult., and elected John D. Archbold and Benjamin Brewster, Trustees. Mr. John Bushnell, the Secretary, when questioned about the nature of the Natural Gas Trust, said "that it was a non-active trust, which merely exercised a sort of supervision over the affairs of the combined gas companies, declared dividends, and did other harmless things."

The lake shipments of iron ore for the week ended the 23d ult., according to the Marquette Mining Journal aggregated 106,339 gross tons, of which quantity 73,463 tons went from Escanaba, 13,683 tons from Marquette, 2,918 tons from St. Ignace, and 16,575 tons from Ashland. This makes a total for the season to that date of 215,012 tons. The shipments of the corresponding date last spring had reached 386,740 tons.

ALABAMA.

TALLADEGA COUNTY.

SOUTHERN SMELTING AND REDUCING COMPANY.—This company has been organized by Alfred R. Lightfoot, M. T. Singleton, J. M. Sullivan, J. A. Montgomery, J. R. Shields and Goldsmith B. West. The company proposes to build a large smelting plant at or near Talladega, and to smelt and treat ores. The capital stock is placed at \$150,000, with privilege to increase to \$500,000.

ALASKA.

COPPER DEPOSITS.

The Juneau (Alaska) Free Press says: From Lieut. Henry P. Allen's report of his explorations up the Copper River we learn the following interesting facts about the country: "Copper River is a stream of considerable size, very swift, and difficult of ascent in boats. It is not confined to one channel, thus forming many large islands, and its volume of water is so great that the stream spreads over nearly the entire bottom of the valley. Along its banks are large gravel bars, and the country throughout is marked with extensive glacial deposits. After passing the glaciers, which lie about 40 miles back from the coast, the climate in summer is dry and warm, and in the winter it is mild and no great depth of snow falls. The mountain ranges are very high and are marked by many lofty peaks, the highest of which is Mount Wrangel, which is now considered the highest mountain in North America. But a few years ago Mount Wrangel was an active volcano, breathing out flames and molten lava, and now sends out clouds of smoke and vapors. The mountain is situated northeast of Mount St. Elias and about 200 miles back from the coast and in the very heart of the mineral regions of Alaska."

In regard to the mineral resources of that section Lieut. Allen speaks as follows:

"The minerals of Copper River have long been a source of speculation, owing to pieces of pure copper, knives, and bullets of the same metal having been brought down to the coast by the natives. Some of the specimens are supposed to be associated with silver, and in fact I have heard of some brought down which assayed in Boston \$80 per ton silver and 60 per cent of copper. Nicolai's house, situated on the Chittystone, the south branch of the Copper, and six miles above the mouth of the Chittyto River is supposed to be in the heart of the mineral region, and by him we were shown a vein near his house, which, at that season of the year (April) was above the snow line. He gave us, however, some specimens which proved to be bornite, a sulphuret of copper and iron carrying when pure 55 per cent copper. He said the native copper was on the Chittyto River, between his house and the central branch of Chittyna, as well as on other tributaries of the same. He had bullets of pure copper in his possession.

"We found specimens of bornite also in the hands of the natives of Nandellis, just across the divide from the head of the Copper and on the headwaters of the Tananah. The waters of the Chittyto (Copper Water) are of a deep yellow color from flowing through beds of copper, and the natives informed me that the waters were poisonous, and that salmon would not ascend the stream. Its length is probably not over 15 miles. At one place on the main Copper, on an island, were springs so strongly impregnated with mineral that their water could not be drunk. Even a sip left for a long time a disagreeable taste.

"In ascending the Copper River it was observed that the banks were green hornblende rock, intersected by mineral-bearing quartz veins. Up further these gave way to a green basalt, which had at its northern end a fine quality of slate that split easily into laminae transversely to its bed. A few miles from the mouth of the Chittyna it cuts through bluffs of beautiful green stone, intersected by white veins, which appeared to be limestone. The pebbles and boulders in the river bed are much discolored by copper stains, but not to such a remarkable degree as those of its tributary, the Chittystone. The mountains around the headwaters of the latter are sandstone and felspathic granite. A feature of some of the high banks of the Upper Copper is the strata of boulders many feet below the surface."

ARIZONA.

PIMA COUNTY.

PEERLESS MINING COMPANY.—The recent strike has spurred the company on to further explorations in the mine. A contract for 1000 cords of wood has been let and parties are at present engaged in delivering it. The mill is shortly expected to start up.

CALIFORNIA.

MONO COUNTY.

BULWER CONSOLIDATED MINING COMPANY.—During the last fiscal year ended April 1st, 1888, the company at Bodie produced bullion valued at \$10,327.02. At the opening of the fiscal year the company had a cash balance of \$724.20 on hand. The disbursements at Bodie footed up \$29,922.88 and at San Francisco \$8,237.87, in New York \$2,153.28, or a total of \$40,814.03. Thus the expenses at the mine were at the average rate of \$2,493.75 per month.

STANDARD CONSOLIDATED MINING COMPANY.—The company has furnished us with the following official statement: April 1st, balance on hand, \$75,787.25; bullion product, \$11,640.98; tribute ore from lease of old dump, \$2,067.30; total, \$89,495.53. Dividend, \$10,000; expenses, \$15,496.88. May 1st, balance cash on hand, \$63,999.15.

NEVADA COUNTY.

SPANISH GOLD MINE.—Although paying dividends, the Spanish mine is not yielding so profitably as was the case a few months ago. This is accounted for by the fact that the management extracts and crushes all the ore—does not grade it. It is here that ore is extracted and reduced at an average cost of sixty cents a ton.

CANADA.

PROVINCE OF ONTARIO.

A syndicate known as the Michigan and Canada Tunnel Company, with a capital of \$100,000,000, has been organized in Canada, and will at once qualify for transacting business under the Michigan State laws. This syndicate is composed of D. O. Mills, of New York; George Bliss, of Morton, Bliss & Co.; Mr. Laidlaw, of the Bank of California; Mr. Hawkes, of the Michigan Central Railroad Company; Nicol Kingsmill, counsel for the Michigan Central Railroad in Canada; George Laidlaw, of Toronto; and Andrew Onderdonk and James Ross, a contractor and engineer. The purpose of this syndicate is to tunnel the Detroit River at Detroit. Mr. B. Baker, of London, the engineer of the Forth Bridge in Scotland, and James Ross, of Quebec, one of the contractors of the Canadian Pacific, after a thorough investigation have announced that the building of the tunnel can be accomplished with comparative ease.

CENTRAL AMERICA.

HONDURAS.

POTOSI MINING COMPANY.—This company was organized last year with a capital stock of \$1,000,000, 500,000 shares. The principal office is at Philadelphia. The company has a concession of twelve square miles in the department of Cochitla. This area is said to contain several promising mines of gold and silver, the principal of which is the San Benita.

Honduras is rapidly becoming a very active mining country, and many miners are going to this place. We learn from parties who have returned from there, the pay is usually \$50 per month, board and traveling expenses for "hand drill" men, as little machinery is used, and about \$75 for mill engineers. It is claimed that the climate in the interior is healthy, and those returning from the mines very forcibly bear out the assertion.

To mining companies, Honduras offers the advantages of surface mining, cheap labor, and unknown, but certain, mineral wealth. The government is also willing to make very liberal concessions.

COLORADO.

The report of Dr. George C. Munson, director of the Denver branch of the United States Mint, of the production of Colorado for the year 1887 shows \$4,908,637.66 in gold; \$15,883,986.65 in silver; \$6,834,078.08 in lead, and \$34,461,81 in copper, making a total of \$27,661,164.20.

The total production of gold and silver of Colorado mines from 1859 to 1887 shows a total of \$255,818,766.72.

In his introductory remarks Dr. Munson says: A number of features were developed that are deserving of brief mention. The average value of the ore produced was less than during the previous year, and the tonnage was much larger. A reduction in the cost of production, transportation and smelting is noticeable. The establishment of concentrating mills and the increase in the number of skilled men employed is also commented upon, as well as the general improvement in mining, milling and smelting plants.

The average cost of mining an ounce of fine gold was \$8.009, and the expense of milling was \$7.85. The average cost of producing an ounce of silver by the smelting method was 75 cents, this figure including transportation.

The value of the product of the State was calculated on the following basis: Silver, \$1.2929; gold, \$20.00; lead, 4.5 cents, and copper, 11.25 cents per pound.

COLORADO COAL AND IRON COMPANY.—The company has ceased to work on its coal-fields down the river, near Aspen, says the Sun, of that place. The men were all paid off, and the superintendents and managers were discharged. It is stated that the trouble is the cumulative dissatisfaction of years between the C. C. & I. Company and the D. & R. G. Railroad, and the present shut down is preparatory for a new deal all around.

SOUTHERN COLORADO COAL COMPANY.—This company has been organized with a capital stock of \$5,000,000. Incorporators, James K. Robinson, Charles B. Patterson and Lefe Pence. The principal office will be at Denver, and the place of operation in Las Animas and Huerfano counties.

CLEAR CREEK COUNTY.

COLORADO CENTRAL CONSOLIDATED MINING COMPANY.—Work is going along smoothly at the Hall tunnel, which will have a length of 4500 feet. The company is working two shifts per day and two drills, one Ingersoll and one Sargent drill. The tunnel is now in over 500 feet.

The Colorado Central will have three compressor plants with an aggregate of 190 horse-power, two on the south side of the mountain and one on the north, and two 35 horse-power hoisting plants.

KOHINOOR & DONALDSON MINING COMPANY.—Five new Gilpin County concentrating tables are being put up in the Donaldson mill at the mouth of Fall River. Twenty-five stamps in this mill are at present being run constantly on ore from various mines. The tramway from the Champion mine is now in good working shape and ore is being dumped into the mill at a lively rate. The entire fifty stamps in the mill will soon be pounding out gold.

NEATH MINING COMPANY.—The officers of the company have just visited the property, and have authorized the sinking of the main shaft 100 feet deeper, and the running of new levels to open up more ground. Fifteen stamps will be added to the Neath mill.

PIONEER MINING COMPANY.—The property will be thoroughly developed and the old Pioneer mill will be replaced with a new mill.

CUSTER COUNTY.

SECURITY MINING AND MILLING COMPANY.—The Security mine at Silver Cliff has closed down under instructions from the East, and all of the miners have been discharged. The mine is rapidly filling up with water, and the prospects of an early resumption of operations are not very flattering. An attachment for \$27,000 has been placed on it at the instance of "Dr." R. C. Flowers, of Boston. The sheriff is in charge. A refusal on the part of a majority of the stockholders to pay the voluntary assessment probably accounts for this. The ENGINEERING AND MINING JOURNAL long ago predicted that this company would come to grief. This would appear to be a good time for the swindled stockholders to review "Dr." R. C. Flower's statements concerning the property and to make him disgorge some of the money they brought him. Is he now proposing to get the mine for its true value—nearly nothing—and get up a new company to buy it again?

LAKE COUNTY.

The Antioch mill is running successfully, and is treating 100 tons of ore daily at a total cost for mining, tramming and milling of \$1.10 a ton.

ADAMS MINING COMPANY.—The ore recently struck is most identical with the Maid and Henriett second contact and though not so high grade as that found in the upper contact is good shipping ore. The high excess of iron and per cent of lead carried make it a desirable smelting ore. The present ore chute, which was cut from the Discovery shaft though the same as the ore opened in Brookland of the Adams, is practically virgin ground. The output of concentrating ore at the Adams continues about the same.

LILLIAN MINING COMPANY.—There is in contemplation the running of a 500-foot tunnel from the Lillian forty-stamp mill into the mines of the company, which will at once develop the property 100 feet deeper than the present workings and expedite and economize the conveying of the ore from the mine to the mill.

LITTLE PITTSBURG CONSOLIDATED MINING COMPANY.—The Supreme Court of Colorado has decided that the Little Pittsburg Company shall pay to the Little Chief Company \$34,000.

OURAY COUNTY.

BLACK GIRL MINING COMPANY.—This company has been organized with a capital stock of \$4,000,000, to conduct a mining business in Ouray County. The incorporators: A. D. Pendleton, W. C. Schultz and C. M. Napton.

CARBONATE QUEEN.—This mine has been leased and bonded to the Carbonate King owners. The shaft will be sunk to a depth of 106 feet and the vein thoroughly prospected. The Carbonate Queen is an extension of the Carbonate King.

PARK COUNTY.

LONDON.—This gold mine will be extensively worked this summer, and the mill is being repaired preparatory to the treatment of the quartz.

PITKIN COUNTY.

The shipments of ore from Aspen during the week ended May 25th amounted to 2188 tons. Of this amount 954 tons went to Denver, 523 tons to Leadville, 531 tons to Pueblo and 131 tons to Kansas City.

ASPEN MINING AND SMELTING COMPANY.—The weekly shipments now amount to 900 tons.

SUMMIT COUNTY.

MONITOR MINING AND MILLING COMPANY.—The company has just issued a circular from which we take the following: During the year various improvements have been made at the mine and include the deepening of the main shaft fifteen or more feet, and it is now down nearly seventy feet, showing mineral. The main tunnel to connect with this shaft was run in fifty feet additional on surveyor's lines, making this tunnel sixty-five feet in length, and which, if continued about one hundred feet further, will undoubtedly make a good showing for the company in the way of development.

The total expenses at the mine have been between \$400 and \$500 while the expenses at the New York office for this, the first year, have been much heavier than they will be the coming year, as the listing fee

to the Consolidated Stock and Petroleum Exchange. State taxes, legal expenses, etc., will not have to be incurred again. They have amounted to about \$1,100. The treasurer's report shows a balance on hand of \$154.75, besides 14,500 shares of stock-working capital. The company is entirely free from debt. The funds have been very economically expended, no salaries having been paid, with the exception of a small amount for office boy.

The Wiswell Electric Mining Machinery Company's offer (through their Western agent) to erect a milling plant and take their pay out of the net product of the mine, provided the Monitor Company furnishes the motive power (and this includes boiler, engine and building to cover the same), still holds good. It is hoped that enough interest will be taken by the stockholders to try and dispose of the stock held by the company (working capital), at a fair market price, so that the property may be more fully developed.

The company has advised us that they are less than 1500 feet from the Victoria Mining Company, which is now producing \$75,000 per month, and that the Monitor Company will be a producer in less than six months from date.

CUBA.

According to a royal order recently published, Cuba will be divided into two mineral districts, the Eastern district being composed of the provinces of St. Jago de Cuba and Porto Principe, and the Western district of the provinces of Havana, Santa Clara, Matanzas and Pinar del Rio. Each district will be placed in charge of a special mine inspector.

DAKOTA.

LAWRENCE COUNTY.

DEADWOOD-TERRA MINING COMPANY.—The company is working low-grade ore, and little more than paying expenses it is said.

IDAHO.

CASTLE CREEK GOLD MINING COMPANY.—Official reports to us of the annual meeting of this company, held on the 28th ult., show that nothing outside of assessment work had been done the past year, owing to scarcity of water. The company has no outstanding debts. Of the \$100,000 capital there was represented \$53,442 at the meeting. The old board of directors were re-elected.

CASSIA COUNTY.

SHOSHONE GOLD MINING COMPANY.—We are officially informed that work is being pushed vigorously on the company's property, which consists of about 200 acres of gravel bars, with about one mile of water frontage on Snake River, and that it is the intention of the management to put the company again on a dividend basis.

CUSTER COUNTY.

DICKENS-CUSTER COMPANY.—It is stated that the company will soon start its diamond drill in prospecting the Badger mine on Custer Mountain. The mine has been a paying one, and has produced a large quantity of high-grade ore, but most of the rich in sight has been taken out, says the *Challis Messenger*. It is evident to our mind that the Badger contains considerable wealth, and by proper amount of prospecting will prove it. The mine at present contains a large ledge of low-grade ore running from \$8 to \$10 per ton, but does not pay for milling.

IOWA.

WHITEBREAST FUEL COMPANY.—In our last issue we stated that the company's mines at Cleveland had been abandoned. We have been officially advised that this statement is not correct, and that the company's mines at Cleveland have not been abandoned. The company is still operating there on a large scale, and has recently equipped a new shaft with what is possibly the finest coal mining equipment in the West. We are advised that it was only the old shaft No. 1 at Cleveland, which has been worked now for the last twelve years, that was abandoned, and a portion of the machinery moved to Illinois where the company is about to work extensively.

KANSAS.

The *Boston News Bureau* publishes the following: Salt beds have been found at Hutchinson, as already reported in previous issues of the *ENGINEERING AND MINING JOURNAL*, on the line of the Atchison, Topeka & Santa Fe Railroad. Wells have been sunk in various directions, and it has been accurately determined that a bed of rock salt underlies the city and surrounding country, at a depth of 400 to 475 feet. It is about 300 feet thick. The area tested includes about 100 square miles. The profits of the business have induced several new companies to organize, some of which have already purchased locations and materials.

The South Hutchinson Salt and Mining Company has already enlisted considerable capital. The Diamond Salt Company, with a capital of \$50,000, has commenced a well. The Hutchinson Salt and Mining Company, with capital of \$500,000 is also organized to work these salt deposits. The president of this company, Dr. N. B. Wolf, and the treasurer, John A. Tobey, are both pork packers of Chicago and Hutchinson. The Sunflower Company is composed of prominent business men of Hutchinson. Besides these there is the Wyoming Salt Company.

The Gouinlock Salt Company, of Warsaw, N. Y., was the first to commence the manufacture of salt at Hutchinson. Its works were planned to produce 500 barrels per day, but owing to the brine being stronger than at any eastern works, the output is considerably greater than anticipated. The discovery of rock salt at Hutchinson was first made by Benjamin Blanchard, of South Hutchinson, in the fall of 1867. In drilling for coal, gas or oil, salt was unexpectedly struck 465 feet from the surface. The

drill was sunk 1100 feet, and not far from the salt it passed through a 27-inch vein of coal of splendid quality. This salt business is expected to materially increase the earnings of the Atchison R. R. Co.

MEXICO.

A dispatch from the City of Mexico says that Luis Huller has concluded a cash purchase of 5,000,000 acres of land for colonization purposes in the States of Chiapas and Chihuahua. Mr. Huller's agents in Europe have forwarded a number of German families during the last month to Chiapas.

The Mexican *Financier* reports the following:

MARAVILLAS MINING COMPANY.—It is stated that this company has adjusted its trouble regarding the La Luz mine by paying the claimants \$280,000, of which \$100,000 was in cash, the remainder to be delivered in monthly installments of about \$30,000. As soon as the Supreme Court gives the Maravillas people possession, the La Luz mine will be again operated.

REAL DEL MONTE COMPANY.—The shares are quoted at \$1100.

SANTA GERTRUDIS MINING COMPANY.—This company is looking finely, with shares at \$550 to \$600. The Amistadset, belonging to this company, is doing excellently.

TROMPILLO MINING COMPANY.—The property is in a good condition. A dividend on payable shares will soon be declared. The dividend on free shares \$10. Quotations, \$500 to \$550.

MICHIGAN.

COPPER MINES.

AMYGDALOID MINING COMPANY.—The mortgage given by the company December 12th, 1881, at two years, for \$10,000, is overdue and unpaid, and liable to foreclosure and sale of all of company's property under the same.

CALUMET & HECLA MINING COMPANY.—President Agassiz has returned to Bo-ton. It is understood that the main engine was pretty seriously damaged, if not destroyed by the late fire, but underground damage is thought to have been comparatively light. The *Bo-ton Herald* says that there is a belief that the new general manager, S. B. Whiting, will be less experimental and more practical than some who have directed affairs in the past. A dividend of \$5 per share is expected in July.

KEARSARGE MINING COMPANY.—The rock house is about to be erected. Stopping will be started as soon as it is up and the rock ready to be handled. The mine will probably be producing early this summer. Stamping will be done at the Osceola stamp-mill.

MASS.—The tributaries have cleaned and sent forward all of their copper taken out through the winter about thirty-two tons. Most of them will go back to work again on tribute, satisfied they can find good copper in the ground left standing by the company and in the old stulls.

IRON MINES.

ANVIL MINING COMPANY.—The mine is sending out about 200 tons per day and is looking well.

RUBY MINING COMPANY.—The property of the Furitan Mining Company, which was recently sold to M. A. Hannah & Co., will hereafter be known as the Ruby mine, the new company having been organized under that name. The trustees of the company are M. A. Hannah, L. C. Hannah, S. W. Folsom and G. Gould.

MONTANA.

The report of Spruille Braden, assayer of the Helena mint, of the output of gold and silver in Montana in 1887, shows that the total output of gold was \$5 778,596 28; of silver, \$17 817,548 95; total of gold and silver, \$23,796,085.23. Mr. Braden, speaking of the placer mines, says: "They are fast dropping in the rear. While I believe there are many placers, the quartz mine is the best reliance now. Though this as-a-y office was established principally for the benefit of placer mines, we find the production of gold on the whole is increasing every year; though in some sections it is diminishing. From the Cœur d'Alene District we got in 1885, \$450,000 worth; in 1886, we got in \$150,000, and it has been decreasing ever since. Our principal gold producing district is from the counties of Lewis & Clarke, Deer Lodge, Missoula, Silver Bow, Madison and Beaverhead. Railroads do not increase the production of gold by stimulating miners to prospect, or offering advantages of easy transportation."

BEAVERHEAD COUNTY.

HECLA MINING AND REDUCTION COMPANY.—The company's works are running to their full capacity. The three furnaces treat about seventy-five tons of first-class ore and concentrates, and the output in lead (carrying silver) is about two car loads per day. The most of this ore comes from the Cleopatra mine on Lion Mountain, which produces about 2000 tons of ore per month.

DEER LODGE COUNTY.

COMBINATION MINING AND MILLING COMPANY.—This company at Black Pine is getting ready for the starting of its entire mill. The Buena Ventura, the claim over which the company has been in litigation, shows very favorable prospects, with about 875 tons of ore already on the dump. The Combination No. 1 is also looking well and there is ready for working over 800 tons from this claim.

WEST GRANITE MOUNTAIN MINING COMPANY.—At the annual meeting of the stockholders held at Helena May 28th, the following officers were elected:

for the year ensuing: A. M. Holter, President; E. T. Zimmerman Vice-President; H. L. Parthen, Treasurer; C. K. Mills, Secretary; J. K. Pardee, General Manager; A. A. McDonald, S. T. Hauser, A. H. Wernz, of St. Louis, and A. J. Weil, of the same place, were elected directors.

LEWIS AND CLARKE COUNTY.

HELENA SMELTING COMPANY.—Articles of incorporation have been filed by this company, which has a capital stock of \$1,000,000. The trustees are: S. T. Hauser, J. T. Murphy, O. R. Allen, A. J. Davidson, A. J. Seligman, H. M. Parthen, A. M. Halter, all of Helena; R. R. Rossiter and Mr. Haberman, of New York. The works will be built at once within six miles of Helena.

SILVER BOW COUNTY.

HUMBOLDT.—Colonel P. R. Dolman released to George W. Farlin and Thomas C. Gorrie his interest in the Humboldt mine, situated just west of the Clear Creek, for ten thousand dollars. He has had a bond on the property just two years, and it has yet three months to run. The original bond was for \$35,000 and it was renewed last October. It is thought that the purchase is for a company who intend to use the carbonate ore for fluxing purposes.

SILVER BOW MINING AND MILLING COMPANY.—The Parrot Company has relinquished the lease of the Pacific mine and the latter is now being run by the Silver Bow Company.

SYDNEY CONSOLIDATED MINING COMPANY.—Sinking has been resumed. The shaft is now down 125 feet and will be continued to the 250-foot station before crossing the vein. As the volume of water in the mine is quite large two pumps will be used. There is now in the treasury a sufficient sum to sink the shaft 400 feet, with cross-cuts and drifts at every 100 feet. There is yet remaining in the treasury of the company 12,500 shares of stock, which will be held as a reserve fund.

NEVADA.

ELKO COUNTY.

NORTH BELLE ISLE MINING COMPANY.—The superintendent of the mine at Tuscarora has advised the company that, owing to the stoppages at the mill occasionally, the bad condition of the boiler and a shading off in the grade of ore, he advises the suspension of dividends pending the expenses to be incurred in the erection of the new concentrating plant and the setting up of a new boiler in the mill.

ESMERALDA COUNTY.

BLUE LIGHT.—This copper mine is about to become the property of New Yorkers.

HUMBOLDT COUNTY.

According to reports, a new company has been organized to work the Cottonwood nickel and cobalt mines. Reduction works are to be built on the ground.

STOREY COUNTY—COMSTOCK LODGE.

We condense the following from the *Virginia City Chronicle*:

BALTIMORE MINING COMPANY.—The 382 level will be drained in a few days to admit of the resumption of operations in the west drifts on that level, in the face of which ore was showing at the time they were flooded. The pump is able to handle three times the amount of water now coming in.

BROPHY.—The test run at the Courser mill in Six-mile Canyon, of ore from this mine in Flowerly district is completed and the stamp hung up until the bullion result of the clean-up is ascertained. If the test proves satisfactory the extraction of ore from the mine on a more extensive scale will immediately begin. The mine is controlled by San Francisco capitalists who are determined to thoroughly prospect the property. The Brophy ground was patented as early as 1867, and was located several years prior to that date by William Brophy and A. J. Davis. The Brophy has never been prospected to a greater depth than 150 feet below the surface, but has yielded considerable bullion. The 900 level can be chiselled by prospecting by running a northwest drift from the bottom of the North Bonanza incline shaft—but a few hundred feet distant from the Brophy line.

CHOLLAR MINING COMPANY.—The electric plant at the Chollar mill will be in place and ready for a test run about July 1st.

CONFIDENCE MINING COMPANY.—The total bullion shipment for May up to the 21st ult. amounted to \$106,314 90.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—The stamps at the California battery mill will begin dropping on ore from this company whenever the crushing capacity of the Carson River mills is curtailed by a lack of power to operate them during the summer months. Bullion shipment for May up to the 23d ult. have amounted to \$189,338 70.

HALE & NORCROSS MINING COMPANY.—The ore shipments to the Mexican mill for the week ended May 21st aggregated 1009 tons, showing an average value of \$37 per ton by pulp assays. The stores throughout the mine are looking very well. There is bullion on hand, and previously shipped for the month amounting to \$70,574 97.

KEYES MINING COMPANY.—A report of the survey of the underground workings, just made, recommends the opening of the level below the 240 to explore the vein at that depth, with a strong probability that a fine body of high-grade ore will be developed. There are 25 tons of ore on the dump, extracted from the development on the 240 level, which will produce \$200 in bullion to the ton. The ore will be hauled to the Fisher mill in Six-mile Canyon, for crushing.

in domestic coal. The price last year was in the immediate vicinity of \$2.60 delivered.

The freight situation is a strong one, and rates hold well up.

We quote, exclusive of discharging: New York, 80 @85c.; Philadelphia, \$1@1.10; Baltimore, \$1.10@ \$1.15; Newport News and Norfolk, \$1.05@1.10; Richmond, \$1.15@1.25.

The demand for coal at retail has now simmered down to very small proportions; but as it held on longer than usual, the dealers feel that they have nothing to complain of.

The unusual harmony which has prevailed in the retail coal trade at this port for a year past has borne further fruit in the organization of an exchange, which already has 80 members, and is to be put into working order at once.

Buffalo, May 31.

[From our Special Correspondent.]

The yearly contract for the supply of bituminous coal to the Vanderbilt railroads was made a few days since. The quantity is stated to be in the neighborhood of one million tons.

The Buffalo Water Commissioners advertised for 15,000 tons of grate coal some weeks since, as announced in the ENGINEERING AND MINING JOURNAL at the time.

Last Monday forenoon Governor Hill signed the bill appropriating \$570,000 for improving the canals of our State by enlarging the locks and deepening the prism, etc., etc.

The communication of the Fire Commissioners, recommending that the supply of natural fuel gas should be cut off from our city, was referred and the City Engineer authorized to visit cities in Pennsylvania where the gas is in use, to ascertain what safeguards are used to guard against the dangers of explosions, etc.

There was a large fleet of ore vessels awaiting cargoes of coal in our harbor the beginning of this week, and some delay was experienced in loading them.

Lake freights on coal are strong; business very brisk for Chicago and Milwaukee, and all vessels taken freely on arrival, besides many on their way down.

The receipts by canal of coal from May 22d to 31st were 1175 net tons; shipments, same period, 476 net tons.

Canal freights reported: 2 loads coal dust to Syracuse, 50c. gross ton free on and off; nominally asking 100c. to New York and 85c. to West Troy or Albany, gross ton, free on and off.

Steam hoisting apparatus is to be used at Sheboygan before long. This will lower coal rates at least five cents a ton.

The long delayed fleet of twenty vessels with 24,000

tons of coal entered Port Arthur on May 23d. Navigation is fully opened at last.

Pittsburg, May 31. [From our Special Correspondent.]

Coal.—The situation here remains unchanged. There were no further shipments to the Southern and Western markets, the water in the Ohio not being sufficient.

Table with 4 columns: Pool name, Price per 100 bushels, and other details. Includes First pool, Second pool, Third pool, Fourth pool, and Railroad coal.

Connellsville Coke.—The situation is unchanged. Manufacturers have not yet come to an understanding in regard to the price of coke.

Freights.—New rates to Pittsburg, 80 cents per ton; Chicago, \$3; Springfield and Urbana, Ohio, \$2.75; Tole to, \$2.90; Cincinnati, \$2; Indianapolis, \$2; all valley points, \$1.50; East St. Louis, \$3.50; St. Louis, \$3.65.

FREIGHTS.

Southern Freight.—The Southern Railway and Steamship Association have issued a circular announcing a reduction of freights from Birmingham and Chattanooga to points on and beyond the Ohio River.

The latest actual charters to May 31st, per ton of 2240 pounds:

From Philadelphia to:—Alexandria, .85; Bath, Me., 1.00*; Boston, 1.00@1.05*; Charleston, .75@.80; Charlestown, .90*; Crown Point, Mass., 1.05*; Fall River, .90*; Gloucester, 1.10*; Lynn, 1.25*; Marblehead, 1.05*;

From Baltimore to:—Bangor, Me., 1.05@1.10; Bath, 1.10@1.15; Boston, 1.10; Bridgeport, Conn., .95@1.00; Charleston, .80@1.00; Fall River, .95; Galveston, 2.90@3.00; Gardner, Me., 1.40@1.50; New Bedford, .95; Newburyport, 1.30; New Haven, .95@1.00; New London, .95; New York, .90; Portland, 1.05@1.10; Portsmouth, N. H., 1.10; Providence, .95; Richmond, Va., .70; Salem, Mass., 1.10; Savannah, .80; Somerset, .95; Williamsburgh, N. Y., .90; Wilmington, N. C., 1.00@1.10.

* And discharging. 3c. per bridge extra. † Alongside.

MARKETS.

NEW YORK, Friday Evening, June 1. Prices of Silver per ounce troy.

Table with 8 columns: Date, Sterling exchange, Lond'n Pence, N. Y. Cents, and other market data for May and June 1st.

* June 2. † 41 13-16.

Foreign Bank Statements.—The governors of the Bank of England at their weekly meeting made no change in its rate for discount, and it remains at 3 per cent.

Copper.—Another week has passed, during which business has remained very quiet in the copper market. Owing to the policy pursued by the syndicate the current range of prices is becoming more and more established and settled, and no fluctuations in prices or other charges in existing conditions have recently taken place worth recording.

The business transacted on the Metal Exchange since our last report has been very restricted, and quotations remain altogether unaltered.

delivery up to the end of July at 16'60. Our closing quotations to-day are: Spot, 16'60; June, 16'60; July, 16'60; August, 16'55. In London the only change of importance has been a pretty sharp advance in the price of Chili Bars, three months prompt, which closed last week at £75, and are now quoted up to £78 10s.

According to cable advices just received from Messrs. Henry R. Merton & Co., of London, it is estimated that the statistics of visible supplies of copper for the second half of May will show an increase of 1000 tons.

Our correspondents in Valparaiso write that the smelters there are experiencing difficulties in fulfilling their previous engagements, and that there is no doubt that the scarcity of laborers and the enormous advance in prices of coal are sadly interfering with the production of copper.

The following statistics are supplied by Messrs. Henry R. Merton & Co., of London:

Table titled 'STATISTICS OF COPPER, MAY 15TH, 1888.' with columns for Stocks in Europe, Tons, and various copper types like Liverpool and Swansea, Ores and reg., London-Fine foreign, etc.

Advised from Chili. By mail and cable, fine copper 6,000. Afloat from Australia. Fine copper 550.

Against 64,349 tons on 30th April; increase, 4,037 tons.

The exports of copper from New York during the week were as follows:

Table with 4 columns: Destination (To Marseilles, To Liverpool, etc.), Copper type, Lbs., and other details.

THE INCREASE IN COPPER STOCKS IN EUROPE.

Messrs. James Lewis & Son., who are recognized as "bears," under date Liverpool, May 16th, 1888, report as follows:

"A very uneasy feeling was caused in the copper market during the early part of the past fortnight, owing to the sudden collapse of the speculation of the French syndicate in tin, the value of which fell in a week from £166 to £79 per ton, a depreciation in the market value of the stock in England and Holland of nearly a million and a half sterling, apart from that on the 4725 tons afloat.

"The syndicate agents, however, supported the value of cash Chili bars by offering £80, while other buyers who required them to cover prompts falling due, paid £80 2s. 6d. In the absence of speculative demand, bars with about three months prompt fell to £74 5s.

"On the 10th inst. the scarcity of cash warrants caused a sharp advance, and up to £83 5s. was paid for them on the 14th inst. The demand to meet prompt, however, being met by the syndicate agents £82 5s. was accepted yesterday, while to-day up to £83 has been paid. For three months prompt not more than £75 10s. is at present obtainable.

"Those English smelters who are now controlled by the French syndicate have practically ceased to do any business, the 'free' smelters and manufacturers supplying what little demand there is for English copper considerably under the official quotations. Best selected ingots offer at £79 in Birmingham without finding buyers.

"The production of copper by the Rio Tinto Company for the year 1887 was 25,733 tons of 2352 pounds, or 27,064 tons of 2240 pounds fine, against 23,532 tons in 1886. The chairman stated at the meeting on the 11th inst. that the company had entered into a contract with the Société des Métaux for the entire copper production of the company at the mines in 1888, 1889 and 1890 in excess of what is required to satisfy the already existing contracts.

"The report of Mason & Barry, Limited, states that the quantity of ore broken and raised at their mine during the year 1887 was 329,128 tons, as against 289,767 tons in 1886. The price upon which the company's contract with the Société des Métaux is based is £65 per ton for copper in the shape of precipitate. The chairman stated that the managing director entertains no doubt that the company's production of copper precipitate for the years 1888, 1889 and 1890 will be continued on the same scale as during the past three years.

"At the annual meeting of the Tharsis Company, the chairman stated that the company's production of about 10,500 tons per annum for three years had been sold to the Société des Métaux on the basis of £70 per

cept for choice, and there are standing orders at fixed prices for all that can be had.

Pittsburg. May 31. [From our Special Correspondent]

The market since our last has undergone very little change. Appearances certainly indicate that prices must be very near the bottom. Just how long this condition of affairs will continue is what we would all like to find out. Under the circumstances, there is only one thing that can be done—wait. Well, we have all been waiting for some time for an improvement in the iron trade, which has failed to materialize. The iron scale is being arranged, and it is hoped that there will be a satisfactory arrangement made in regard to the scale. Developments during the week have not been of an important character. A feeling of doubt and uncertainty continues, and seems likely to do so for some time to come. There is a variety of re-irons that finds its way to this market, some of an inferior kind being offered at prices below quoted rates, the owners being anxious to realize without regard to first cost. City furnaces and established brands are selling at rates current at date of last report. Holders of that description do not seem disposed to sell below their prices. As a matter of course, consumers are buying sparingly, so that the natural shrinkage in consumption is intensified by the determination not only to buy as little as possible, but to carry as little stock as possible. Of course, there will be an end to this kind of thing some time, and however much it may be desired, there is too much reason to fear that it is still a long way in the distance unless something unforeseen occurs to give matters a new turn for the better.

Iron Ore.—We can report the following sales: 2000 tons Lake Superior Champion No. 1, on docks at lake ports, \$5.85 per ton, cash; 5000 tons Colby No. 1 Lake Superior, on docks at Lake ports, \$4.50 per ton, cash.

Labor troubles are being adjusted slowly. The outlook for an early settlement between capital and labor looks favorable.

Quotations will be found in our weekly register of prices.

The following sales describe the market fully:

Table with multiple columns listing sales for Coal and Coke Smelted Lake Ore, Coke, Native Ore, Steel Slabs and Billets, Muck Bar, Steel Rail Ends, Steel Wire Rods, Old Iron Rails, Scrap Material, and various other items with their respective prices.

FINANCIAL.

NEW YORK, Friday Evening, June 1.

The business in mining stocks continues to decline, and this market is apparently in sympathy with other markets, which are dull and featureless. The prices, in consequence, show a downward tendency.

Plymouth Consolidated shows no change, and remains steady at 110m \$9.33@9.50. We have received no further news from the mine.

Taylor Plumas was dealt in only last Saturday at 1c. Bodie Consolidated and Bulwer were neglected all week. A few sales of the former was made to-day at \$3, and of the latter at from 73c. to 80c.

Holywood shows an advance of a few cents, from 29c. to 32c. Amador was active, and is steady at from \$2.15 to \$2.30.

Middle Bar ranged at from 43c. to 45c.

Deadwood-Terra appeared on the list, after a long absence, at \$1.75. The sales of Homestake are about the same each week, and the price remains firm at from \$10.50 to \$10. Cleveland tin is resting for the present.

Barcelona again attracted attention, and the price went from 72@92c.

There was nothing doing in the Tuscaroras. Sales were made of Navajo at \$2, and North Belle Isle at \$3.40 in the beginning of the week.

The interest in Sutor Tunnel has vanished for the present. The stock sold at 12@14c. Consolidated California & Virginia continues on the downward grade, and went to \$9.75 to-day. The other Com-

stocks were almost entirely neglected, notwithstanding that many of these companies are producing largely, and are on the best way to begin and continue the payment of dividends.

Some 35 shares of Ontario sold at \$30. Horn-Silver shows no sales.

Silver King declined from \$5@4.50; selling to-day at \$4.75.

San Sebastian shows an advance from 88c. to 94c., some 2000 shares changing hands.

Rappahannock was more active, and advanced from 11 to 14c.

Security has gone down to 4c., the price predicted for this stock by the ENGINEERING AND MINING JOURNAL a year ago, when the "boomers" were dealing it out at from \$6 to \$9.

Silver Cliff shows a few sales at 7 and 9c. Silver Cord, one at 50c. Monitor, one at 13c. Robinson Consolidated, one at 70c. Little Pittsburg, a few at from 13 to 15c. Little Chief at 24 to 25c. Leadville at 28 to 30c. Iron Silver shows one transaction of 100 shares at \$3.90 per share. Dunkin was

dealt in at 75c. Breece at 13c., and Bassick at from 12 to 16c.

The decline of El Cristo shown last week has continued, and the price this week has gone from \$2 to \$1.50, at which figure it sold to-day.

The dealings in Shoshone amounted to 6800 shares, and the price declined from 14@11c. Proustite also showed a declining tendency, the price going from \$1.20@1.00, ruling to-day at from \$1.05@1.15. Castle Creek was only dealt in in the beginning of the week, at 9@7c. Holyoke shows one sale at 4c.

Meetings.

The annual and special meetings of the following companies will be held on the dates given:

Amygdaloid Mining Company, of Lake Superior, No. 629 Walnut street, room 7, Philadelphia, Pa., June 16th, at twelve o'clock noon.

Boulder & Buffalo Hunter Consolidated Mining Company, Hallack's Block, Denver, Colo., June 11th.

Cariboo Mining Company, Salt Lake City, Utah Territory, June 30th, at eight o'clock P.M.

IMPORTATIONS AT NEW YORK DURING 2 DAYS ENDING MAY 25, AND FROM JAN 1 TO SAME DATE.

Large table with multiple columns listing importations for various commodities including Spelter, Zinc Sheets, Nickel, Antimony, Pig Lead, Tin, Tin Plates, Pig Iron, Steel and Iron Rods, Old Iron Rails, Scrap Iron, Charcoal Iron, Iron Ore, Copper, Copper Matte, and various other items, with weekly and yearly totals.

WEEKLY REGISTER OF CURRENT QUOTATIONS.

CHEMICALS.

Table listing various chemical products and their prices, including acids, alkalis, and salts.

Table listing various metals and their prices, including Sulphur, Iron, and Steel.

Table listing various building materials and their prices, including bricks, stone, and slate.

Table listing various rare metals and their prices, including Aluminum, Bismuth, and Cadmium.

Table listing various common metals and their prices, including Aluminum, Copper, and Lead.

Table listing various iron and steel products and their prices, including American Pig-Iron and Scotch Pig-Iron.

Table listing various steel products and their prices, including Steel Blooms, Billets, and Slabs.

Table listing various structural iron and steel products and their prices, including Bridge Plate and Angles.

Table listing various iron plates and their prices, including Tank and Ship plates.

Table listing various merchant steel products and their prices, including American tool and Special grades.

Table listing various cast-iron pipe products and their prices, including Wrought Iron Pipe.

Table listing various boiler tubes and their prices, including Rail Fastenings.

Table listing various wrought scrap products and their prices, including Cast Scrap and Old Cast Wheels.

Table listing various hot blast iron products and their prices, including So. Coke and Mahoning Valley.

Table listing various pitsburg prices, including Coke or Bituminous Pig-Iron and Foundry No. 1.

Table listing various charcoal pig products and their prices, including Foundry No. 1 and Foundry No. 2.

Table listing various Philadelphia prices, including Foundry No. 1 and Foundry No. 2.

STOCK MARKET QUOTATIONS.

Table listing Baltimore, Md. stock market quotations, including Atlantic Coal and Baltimore & N. O.

Table listing Birmingham, Ala. stock market quotations, including Ala. Cons. C. and Bir. Min. & Mfg.

Table listing Pittsburg, Pa. stock market quotations, including Allegheny Gas and Bridgewater Gas.

Table listing Foreign Quotations, including Alturas Gold and Arizona Copper.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS, DIVIDENDS, and NON-DIVIDEND-PAYING MINES. Includes entries for Adams, Alice, Alturas, Amy & Silvermith, etc.

G. Gold. S. Silver. L. Lead. C. Copper. * Non-assessable. † This company, up to Dec. 18th, 1881, paid \$1,400,000. Non-assessable for three years. ‡ The Deadwood previously paid \$276,000 in eleven dividends, and the Terra \$75,000. Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1875, the Copper Queen had paid \$1,350,000 in dividends.

Eagle River Copper Company, Room 55, Mason building, Boston, Mass., June 20th, at ten o'clock A.M. Special meeting for the purpose of changing the by-laws, to remove the office from Boston to New York, and to elect Board of Trustees.

Holbrook & Cave Mining Company, No. 102 Broadway, Room 7, New York City, June 11th, at twelve o'clock noon.

Pittsburg & Lake Superior Iron Company, Office of the Westinghouse Machine Company, corner of Twenty-fifth and Liberty streets, Pittsburg, Pa., June 16th, at two o'clock P.M. Special meeting for the purpose of empowering the Board of Directors to sell and convey certain portions of the real and personal property of the company.

Quicksilver Mining Company, of California, No. 20 Nassau street, New York City, June 20th, at one o'clock P.M.

Salem Mining Company, of Michigan, Room 55, No. 70 Kilby street, Boston, Mass., June 29th, at two o'clock P.M.

Silver Age Mining and Milling Company, Idaho Springs, Colo., June 7th, at eleven o'clock A.M. Special meeting to act upon a proposition to increase the capital stock from \$1,500,000 to \$2,000,000 and to authorize the issue of fifty thousand shares of stock of the par value of ten dollars.

United Gas Improvement Company, No. 333 Walnut street, Philadelphia, Pa., June 4th, at twelve o'clock noon.

Dividends.

Charleston Mining and Manufacturing Company, of South Carolina, has declared a quarterly dividend of two dollars and a half per share, payable June 1st, at No. 132 Walnut street, Philadelphia, Pa.

Delaware & Hudson Canal Company has declared a quarterly dividend of one and one half per cent, payable June 15th, at No. 21 Cortlandt street, New York City.

Ohio Valley Gas Company has declared a quarterly dividend of two and one half per cent, payable at Pittsburg.

Pittsburg & Chicago Gas Coal Company will pay the interest coupons due June 1st upon presentation at the Masonic Bank, Pittsburg.

Seattle Coal and Iron Company, of Seattle, Washington Territory, will pay coupons on first mortgage bonds due June 1st on and after that date at the Manhattan Trust Co., No. 10 Wall street, New York City.

The United States Finance, Development and Trust Company has declared its first dividend of two and one half cent, payable June 15th, at No. 35 Wall street, New York City.

Assessments.

COMPANY.	No.	When levied.	Delinquent in office.	Day of sale.	Am't per share.	
Alta, Nev.	37	May 12	June 12	July 9	.50	
Arvola, Ariz.	4	May 1	June 4	June 28	.75	
Baltimore, Nev.	1	Apr 16	May 21	June 8	.25	
Big Hole Pl., Utah	3	May 7	June 2	Aug 15	.01	
Bulwer Cons., Cal.	4	May 3	June 7	July 5	.20	
Crown Point, Nev.	49	Apr. 13	May 16	June 6	.50	
Eclipse, Dak.			May 30	June 15	.004	
Florence, Dak.	2	May 10	June 17	July 2	.004	
Golden Reward, Dak			June 8	June 25	.0 1/2	
Homeward B'd, Dak.	5	Mar. 24	May 26	June 21	.00	
Himalaya, Utah.	3	Apr 26	May 26	June 26	.005	
Justice, Nev.	46	May 7	June 11	July 2	.25	
K. of the West, Ida.	3	Apr. 21	May 24	June 16	.15	
Last Chance, Nev.	10	May 7	May 8	June 30	.10	
Mayflower Cal.	41	Apr. 9	May 10	June 4	.25	
Navy, Nev.	19	Apr. 12	May 17	June 7	.30	
New La Plata, Dak.	2	May 7	June 7	June 25	.001	
Paradise Valley, Nev.	5	Apr. 21	May 9	June 18	.15	
Quincy, Dak.	3	Mar. 3	May 2	June 9	.02 1/2	
Rochester, Utah.			May 15	June 16	July 2	.05
Rorpion, Nev.	23	May 25	June 22	July 16	.10	
Silver Bar, Dak.			Apr. 16	May 14	June 9	.005
Spanish, Cal.	2	Jan 4	Mar. 10	June 2	.04	
Utah, Nev.	4	May 4	June 8	June 26	.25	
Wilkinson, Dak.			May 2	June 16	.01	

* One half cent a share is delinquent if unpaid June 12th, and the other if unpaid July 12th.
 † Delinquent day and day of sale postponed to these dates.

Pipe Line Certificates.

Messrs. Watson & Gibson, brokers, 49 Broadway, report as follows for the week:

Oil, which for a long time held in the neighborhood of 86@87c., has finally given away, breaking three cents on Thursday and five on Friday, closing last night at 77c. There have been no buying orders in the market, and we have steadily advised our clients that any attempt to sell would cause a sharp break. The chief causes are increasing development work in the Pennsylvania field, increasing fears of the utilization of Ohio oil, increasing danger to the market in Europe for American oil from Russian competition, and the indisposition of the public to buy oil held by a clique of producers under a shut-down agreement. We believe the market will go lower.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
May 26	86 3/4c.	87 1/4c.	85 3/4c.	85 3/4c.	275,000
27	85 3/4	86 1/4	85	85 3/4	56,000
28	85 3/4	86	85 1/4	85 3/4	234,000
29	85 3/4	86	85 1/4	85 3/4	
30	85 3/4	85 3/4	82 1/4	82 1/4	1,658,000
31	85 3/4	85 3/4	82 1/4	82 1/4	1,658,000
June 1	82 1/4	82 1/4	77 3/4	77 3/4	2,907,000

Total sales in barrels..... 5,238,000

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
May 26	87 1/4c.	87 3/4c.	85 3/4c.	86 3/4c.	113,000
27	8 3/4	8 1/2	8 1/2	8 5/8	257,000
28	8 5/8	8 3/4	8 1/4	8 5/8	1,21,000
29	8 5/8	8 3/4	8 1/4	8 5/8	
30	8 5/8	8 5/8	8 1/4	8 5/8	538,000
31	8 5/8	8 5/8	8 1/4	8 5/8	1,102,000
June 1	82	82	77 3/4	77 3/4	

Total sales in barrels..... 2,231,000

* Decoration Day.

Boston Mining Stocks. May 31.

[From our Special Correspondent.]

There has been a very fair amount of business the past week in copper stocks, considering the prevailing dullness in the general stock market and the occurrence of a holiday. The favorable report from the Calumet & Hecla mine has had a tendency to stiffen up the price, and nearly all the sales have been at \$245 1/2 @ \$246. There was also quite an active demand for Boston & Montana, and the stock advanced from \$44 to \$48 on good sales; but orders seem to have been filled, and the price has receded to \$46 1/2. The talk is for \$60 in the near future for this stock, and it is not thought an improbability, in view of the present outlook. Quincy was a little heavy; just why, no one seems to know. The sales have been light, but there seemed to be no sustaining orders, and a little pressure to sell caused a drop from \$72 to \$70.

Franklin holds steadily at \$14 1/4 to \$15, with sales of about 600 shares.

Osceola firm at \$21 to \$21 1/2. Atlantic advanced from \$17 1/2 to \$18. Kearsarge sold up to \$6 1/2 and closed at 6 1/2.

A small sale of Central at \$20 1/4 to \$21 1/2 is noted.

Tamarack sold from \$160 to \$165, reacting to \$164 1/2. Tamarack, Jr., subscription closed May 15th. Every right was taken, and more were wanted. The first payment of \$3 is due the 1st of June, and a negotiable receipt will be given for the money.

Bonanza seems to have subsided; only 100 shares sold at \$1 1/2 for the week.

There has been very little doing in silver stocks, except at the Mining Exchange, and business there is confined to a few specialties. Dunkin sold at 80c., declined to 75c., with last sales at 77 1/2c. Security has been quite active, holders being anxious to unload the stuff at the most they can get, in view of the near approach of assessment day. Sales reported at 6@8c. These prices for a stock which sold within two years at over \$8 per share, fully confirms the exposure and advice of the ENGINEERING AND MINING JOURNAL when it was brought out. In balance of list there is no special feature.

The Boston News Bureau says the Boston & Montana Company has bonded three properties to the south of it, through which a tunnel costing already some \$50,000 has been built, running toward the Montana property. It is understood the bond is for \$100,000, for which the company has paid \$5000, and is bid now \$50,000. If further developments warrant its acceptance, the property will be purchased by sale of bonds now in the treasury. By means of this tunnel the cost of production could be greatly lessened, as all work would be underground, the ore going directly through the tunnel to the mill. Mr. Lewisohn and one of the French syndicate have gone abroad together, it is believed for the purpose of interesting the French public in the stock.

Dispatches from Boston on the 1st inst. give the following prices: Calumet & Hecla, \$245; Boston & Montana, \$46.50; Franklin, \$15; Osceola, \$20; Tamarack, \$163 bid, \$168 asked.

Pittsburg Stocks.

The Pittsburg stock market has been dull and weak for the last few days.

Philadelphia Company, which advanced to \$51 a few months ago, is now at \$46. Charters Valley, which, it was lately predicted, would soon reach par,

or \$100, is still at \$1, with no signs of an immediate advance. Wheeling Gas has, however, more than held its own since January 1st, and is quoted at \$26. Pine Run is weaker at \$90; La Noria Mining, which rose to \$6.37 a year ago, is now at \$2. Doubtless, our remarks concerning this company have hastened the decline. Yankee Girl Mining is quoted at \$7.75.

St. Louis Mining Stocks.

A Mining Stock Exchange has been organized at St. Louis, which will shortly begin business. The membership is restricted to brokers in St. Louis. The initiation fee is \$250; annual dues \$100.

Name of company.	Opening.	H.	L.	Closing.
Adams, Colo.	4.00	4.00	3.50	4.00
Anderson, Mont.	1.00	1.00	.80	.80
Black Oak, Cal.	.50	.50	.28	.33 1/2
Bi-Metallic, Mont.				
Caribou Idaho	48 1/2	.50	47 1/2	.50
Central Silver, Ariz.				
Cleveland, Colo.	.13	.13	.10	.10
Conecutor, Mex.	.25	.25	.23 1/2	.23 1/2
Dinero, Mex.	1.69 1/2	.20	1.75	.20
Golden Era, Mont.	.95	.95	81 1/4	9.16
Gordon	1.05 1/2	1.05 1/2	.68	.68
Granite Mt., Mont.				
Hope, Mont.				
I X L, Colo.				
Jumbo, Colo.	.25	.25	2 1/2	2 1/2
Juniper, Idaho.	.50	.50	.43	.43
Mascotte, Colo.	.72 1/2	.50	.27 1/2	.31 1/2
Mexican Imp., Mex.	.20	.20	1.75	1.75
Neato, Colo.	1.20	1.25	1.10	1.10
Pat Murphy, Colo.	.72 1/2	.92 1/2	.71 1/2	.85
Peacock, N. Mex.	.17 1/2	.17 1/2	.16 1/2	.16 1/2
Phillips				
Pilot	.10	.10	.07 1/2	.07 1/2
Queen of the West, Col.	48 1/2	.50	47 1/2	47 1/2
Redro, Colo.				
Reus, Mont.	.22 1/2	.22 1/2	.20	.20
San Francisco, Mont.	1.60	1.60	1.25	1.40
San Pedro, Ariz.	.45	47 1/2	37 1/2	37 1/2
Small Hopes, Colo.	1.05	1.20	1.05	1.10
Silver Age	.55	.62 1/2	.53 1/2	.62 1/2
West Granite, Mont.	.52 1/2	.52 1/2	.4 1/2	.4 1/2

Bid and asked prices during the week ending May 29th.

USEFUL BOOKS.

Engineering and Mechanics.

- Practical Workshop Companion for Tin, Sheet-Iron and Copperplate Workers, Blinn. 2.5
- Principles of Economy in the Design of Metallic Bridges, Charles B. Bender. 2.50
- Principles of Design, E. L. Garlett, 1886. 1.00
- Railroad Engineers' Practice, F. M. Cleemann. 1.50
- Railroad Spiral, W. H. Searles, N. Y., 1886. 1.50
- Relative Proportions of the Steam Engine, W. D. Marks, C. E. 1887. 3.00
- Retaining Walls for Earth, M. A. Howe. 1.00
- Silversmith's Hand-Book, Geo. E. Gee. 1.75
- Steam Engine, G. Holmes. London, 1887. 2.25
- Statics and Dynamics for Engineering Students, Irving P. Church, C. E. 1886. 2.30
- Teeth of Gears, G. B. Grant. Boston, 1887. 1.00
- The Windmill as a Prime Mover, A. R. Woff. 3.00
- Young Engineer's Own Book, S. Roper. Philadelphia, 1884. 3.00

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American Methods of Copper Smelting.

BY DR. H. D. PETERS.

A record of practical experience, with directions how to build furnaces and how to overcome the various metallurgical difficulties met with in copper smelting. Figures of cost from actual work, both of building all sorts of furnaces and of running them on all sorts of ores. This is the best work on Copper Smelting in the language. It has been revised, enlarged and brought up to date since its original publication in "The Engineering and Mining Journal."

TABLE OF CONTENTS.

Chapter.	Chapter.
I. Distribution of the Ores of Copper.	VIII. Chemistry of the Calcining Process.
II. Description of the Ores of Copper.	IX. Smelting of Copper
III. Methods of Copper Assaying.	X. Blast-Furnaces of Brick.
IV. The Roasting of Copper Ores in Lump Form.	XI. Blast-Furnace Smelting.
V. Shaft-Roasting.	XII. Reverberatory Furnaces.
VI. Kiss-Roasting.	XIII. Treatment of Gold and Silver-Bearing Copper Ores.
VII. Calculation of Fine Ore and Matte.	XIV. Bessemerizing Copper Mattes.

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