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The earnings of the Delaware, Lackawanna & Western Railroad Company for the first half of this year were 5-85 per cent.

CHARLEMAGNE'S letter from the San Juan region, Colo., in another column, affords the first trustworthy information regarding the new developments at the Summit, including the telephone line twenty-seven miles in length from the mines to Del Norte.

THE gentleman now in Arizona, who in a card published in this number of the JOURNAL, refers to Mr. JOHN P. ADAMS, is personally known to us, and should be of valuable assistance to those who desire business done in connection with mining enterprises in that territory.

A DISPATCH from Pittsburg, Pa., dated July 27th, says that there was on that day a well-attended meeting of the Western Nail Association. A general discussion developed the fact that the stocks everywhere were unusually light. The Wheeling mills reported that they were never so lightly stocked, and that the demand was unusually good. A resolution was adopted reaffirming the rates adopted at the meeting of June 15th; that is, a \$2.75 selling rate, subject to no discount except 2 per cent for cash. The outlook, it is stated, is an unusually bright one for the trade; little or no speculation is indulged in, and the demand is considered a legitimate and healthy one.

THE STATE LINE MINES.

A pool has been formed in the State Line stocks, and once more efforts are making to advance prices; but so far, they have been fruitless. The fact is, that the public is thoroughly disgusted with its previous treatment in regard to these stocks, and takes no interest in the speculation, except in cases where it was caught in the late rise; and this interest only amounts to an anxious waiting for higher figures, so as to be able

to unload on the pool. The indications lead us to believe that the shrewder operators interested in the late "deal" made a good harvest, and have but little interest in the present one. Our readers will bear in mind the sound advice we have been giving all along in respect to these properties, and then carefully weigh our present advice, which is, that if the present pool is encouraged, dealings in the stock will be even more dangerous than in the last operation, and the efforts to enlist the public will be even more unscrupulous than in the past. Every person interested in mining should make all possible efforts to prevent the public from touching these stocks; for they must bring disaster if dealt in. Mining stocks are rapidly assuming as legitimate a position as railroads; and if the brokers would adopt business ideas in advising their customers, rather than recommend purchases of stocks on the hopes of drawing profits from the manipulations of unscrupulous operators, this position for mining would be attained. Let there be a united movement on the part of the press, the brokers, and the public, to prevent the disasters which must follow a successful bull movement in the State Line stocks. As a further word of caution, we desire to say that it is equally unsafe to "short" these stocks; for it is our belief that the pool holds too many shares to make this safe.

BRITISH EXPORTS OF IRON AND STEEL.

Messrs. W. W. & C. RICHARDSON, of London, furnish us with the following statistics extracted from the government returns:

RAILROAD IRON EXPORTED TO	Month ended June 30.			Six months ended June 30.		
	1879.	1880.	1881.	1879.	1880.	1881.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
United States.....	4,834	34,215	31,063	7,738	128,088	159,309
Russia.....	4,271	672	1,688	14,900	906	6,902
Turkey.....	8	37	20	754	41	4,372
British India.....	6,811	22,816	10,003	53,158	83,790	48,301
British North America.....	7,903	18,086	22,311	19,824	35,828	45,546
Egypt.....	2	123	55	1,332	3,705	3,706
Australia.....	3,011	15,842	5,171	37,783	45,665	41,587
Brazil.....	3,535	850	6,729	20,056	10,754	23,598
Holland.....	801	355	.....	1,812	1,875	161
Spain and Canaries.....	1,367	585	279	7,950	4,088	5,699
Sweden and Norway.....	810	337	921	10,310	1,208	1,605
Chile.....	11	22	72	616	428	418
Denmark.....	1,354	3	18	1,429	45	81
Peru.....	325	36	.....	1,856	72	585
Germany.....	555	127	.....	2,413	176	66
British Possessions in South Africa.....	212	1,145	338	3,168	4,569	1,539
Italy.....	2,323	1,584	3,791	10,137	8,722	13,498
Other countries.....	2,859	3,487	8,589	14,263	27,750	32,625
Total.....	40,992	100,332	92,548	209,599	359,354	389,590
Total exports from Great Britain of iron and steel to all countries.....	194,628	361,865	362,263	1,213,628	2,094,995	1,728,207
Estimated total of iron rails.....	1,264	25,417	13,254	19,268	83,781	73,427
“ “ steel rails.....	33,689	66,582	69,527	151,759	233,559	267,387
Total of rails.....	34,953	91,999	82,781	171,027	317,340	340,814
Exports of the following to the United States:						
Pig-iron.....	5,295	51,855	29,015	25,289	483,660	177,294
Bar, angle, bolt, and rod.....	359	3,207	1,091	1,501	43,136	6,271
Steel unwrought.....	375	4,894	15,246	2,833	29,584	49,345
Fin plates.....	12,779	11,671	11,833	69,780	82,805	80,253
Hoops and sheets.....	379	4,314	2,428	1,059	31,312	11,940
Old iron for remanufacture.....	3,795	10,280	9,864	10,733	177,506	44,643

The total exports were greater for June of this year than for May or June, 1880. The demand for railroad material was greater than in May, but not so great as in June of last year. The United States still holds the first position as a purchaser of railroad material, but British North America is coming to the front very strongly. British India, although taking liberal supplies, is not up to last year. Australia only took about one third as much as in June, 1880. Although there was a greater quantity of rails shipped for the first half of this year than for the same period of last year, the shipments of iron rails have fallen off, while those of steel rails have increased over 14 per cent.

The shipments of all kinds of iron and steel to the United States for the first half of this year were 529,055 tons, as compared with 976,091 and 117,933 tons for the like period of 1880 and 1879 respectively. The shipments during the month of June in 1881, 1880, and 1879 were 101,440, 120,536 and 27,816 tons respectively. The shipments for last month were, therefore, at the rate of over 1,200,000 tons per annum.

Much has been said of the influence of foreign pig-iron on our own market. The shipments to this country for June were only at the rate of about 300,000 tons, while for the six months they only amounted to 177,294 tons. Of course even this quantity has its effect, but it is insignificant when compared with the consumption going on. Our market is affected more by the large imports of last year, which have not yet been fully absorbed. The shipments of British pig-iron to this country for the first half of last year reached the large quantity of 483,660 tons. The quantity of old iron shipped to this country has been small, which should also help out our makers of pig-iron.

AMERICAN IMPORTS AND EXPORTS.

From the report of the Bureau of Statistics for the eleven months ended May 31st, we take the following :

	IMPORTS.		EXPORTS.	
	Quantities.		Values.	
	11 months.	1880.	11 months.	1880.
Tin.....	156,804	271,547	\$3,656,573	\$5,693,549
Brass.....			399,917	347,195
Coal:				
Bituminous.....	610,580	430,202	2,850,047	1,463,021
Copper:				
Ore.....	88,279	38,416	164,040	174,684
Pigs, Bars:				
Ingots, old, etc.....	680,120	5,239,002	82,928	818,667
Manufactures.....			364,324	398,861
Iron and Steel, and Manufactures of:				
Pig-iron.....	844,607,779	1,492,039,368	7,870,379	12,338,919
Castings.....	291,660	120,308	9,123	3,560
Bar-iron.....	99,324,155	227,602,885	2,407,473	4,640,366
Boiler-iron.....	231,013	496,120	4,097	11,681
Band, hoop, and scroll-iron.....	17,520,299	17,213,772	344,715	361,647
Railroad bars or rails, of iron.....	227,182,308	143,214,681	3,251,254	1,968,000
Sheet-iron.....	10,858,278	22,428,433	596,603	807,704
Old and scrap-iron.....	250,806	528,909	6,084,796	11,059,473
Hardware.....			73,220	156,072
Anchors, cables, and chains of all kinds.....	1,861,617	3,174,302	91,586	149,853
Machinery.....			1,522,211	1,078,439
Fire-arms.....			1,052,205	753,254
Steel ingots, bars, sheets, and wire.....			5,313,278	4,018,695
Railroad bars, or rails, of steel.....	360,988,449	112,451,577	5,868,462	1,517,214
Cutlery.....			1,720,876	1,590,234
Files.....			129,848	147,015
Saws and tools.....			14,818	4,804
Other manufactures of iron and steel, n. e. s.....			5,527,614	4,624,381
Lead, and manufactures of:				
Pigs, bars and old.....	3,128,926	7,833,725	110,539	292,702
Manufactures of.....			17,276	1,918
Metals, metal composition and manufactures of.....			1,252,732	1,184,883
Tin plates.....	2,992,026	3,137,620	12,895,323	15,914,671
Manufactures of tin.....			65,234	57,410
Zinc:				
Pigs.....	1,692,351	8,293,558	68,794	382,111
Sheets.....	2,230,151	5,079,771	102,184	258,851

IMMIGRATION STATISTICS.

The Bureau of Statistics, at Washington, furnishes the following table, showing a larger immigration than during any previous year :

CUSTOMS DISTRICTS.	Year ended June		Increase.
	30, 1881.	30, 1880.	
Baltimore.....	40,017	17,394	22,623
Boston.....	41,018	34,062	6,956
Detroit.....	10,087	4,921	5,166
Huron.....	111,170	94,375	16,795
Key West.....	1,441	996	445
Minnesota.....	1,829	1,725	104
New Bedford.....	501	274	227
New Orleans.....	3,284	2,663	621
New York.....	400,871	263,726	137,145
Passamaquoddy.....	2,724	2,886	*162
Philadelphia.....	34,865	21,727	13,138
San Francisco.....	12,432	7,153	5,279
Total.....	660,239	451,902	208,377

During the twelve months ended June 30th, 1881, the number of immigrants arrived in the above-named districts was as follows: From Germany, 209,500; Dominion of Canada, † 118,664; England and Wales, 65,977; Ireland, 72,336; Scotland, 15,164; China, 10,498; and from all other countries, 168,100.

RUBY CAMP, GUNNISON COUNTY, COLO.

Special Correspondence of the Engineering and Mining Journal.

The feverish excitement that existed in this camp (Irwin P.O.) during its incipency is now a thing of the past. The hundreds of prospectors' tents, hastily-constructed cabins, Kansas wagons, etc., that covered the valley in 1880, have all disappeared, and given place to more substantial buildings constructed on a town site. The speculative and fictitious prices that existed for staple articles have receded to those of a more healthy and legitimate basis. Capital is slowly creeping in and developing the best properties, and establishments for the sampling and reduction of the ores are in process of construction. From all points in the valley and across the mountains, daily advices of new and rich discoveries are received.

THE MINES.

The oldest mines of established reputation as producers are still in the infancy of their development. The Forest Queen, of which so much has already been written, has, it is true, shipped but little ore since spring, owing to the high freight charges for transportation. Mr. Ira Brown, superintendent of this property and the Ruby King (an extension upon the same vein), promises to ship from 75 to 100 tons per day when it is required of him. The development on the Forest Queen at this writing consists of one shaft 210 feet deep, and a tunnel running upon the vein northward from the south-end line. The vein has been explored 250 feet by the tunnel, which will intersect the shaft at a depth of 262 feet. In all the developments, the ore continues in quantity and quality with wonderful persistency. In the bottom of the shaft, the pay-streak is 24 inches in breadth, running next to the hanging-wall. Ruby silver, stephanite (brittle silver), auriferous arseno pyrites (mispickel), and native silver constitute essentially the rich streak; but the entire vein-matter, consisting principally of quartz, contains these minerals in a finely-divided state. The exact width of the vein has not yet been fully established, although it is known to exceed ten feet.

The deposition of the lode is at once interesting and peculiar. The foot-wall is porphyry, hard, compact, and separated from the vein-matter by a thin gouge. The hanging-wall is a fine-grained white sandstone, with a shallow dip toward the west.

The whole Ruby Valley is overlain by this Cretaceous deposit. Dr. Bauerman, of London, England, who visited these properties in May of this year, under very unfavorable circumstances—the snow being from ten to twelve feet deep—gave his opinion that the vein in question was the well-defined line of demarcation of the igneous and sedimentary deposits throughout the region. This theory is, however, applicable only locally; and I agree perfectly with the doctor, as far as it pertains to this particular property; but from the lithology of the country, both north and south of this district, and developments in other properties of the camp, an acceptance of the theory so universal is hardly possible, and to substantiate it for the whole region would be rather difficult. For at the head of the valley, west of the town, the Tertiary and Cretaceous formations are broken through and overflowed by igneous rock, porphyry, trachyte, etc. Again, to the east, at Crested Buttes, we have another lime and sandstone valley, in which the stratifications and dip are the same as at Ruby. Between the limestone and sandstone in both localities, lie the anthracite and semi-bituminous coals, and the formations throughout the whole region are broken through by dikes and chimneys of eruptive rocks.

In the Ruby King recent development has disclosed an interesting example of the decomposition and disintegration of the country-rock *in situ*. There are two shafts on the property, whose depths are respectively 50 and 75 feet, connected by a drift. In these workings, the vein-matter and country-rock remain intact. At a distance of 139 feet from shaft No. 2, or 239 feet from No. 1, a tunnel was driven, the mouth of which is 26 feet below the bottom of shaft No. 2. It was calculated that the vein would be cut at a distance of 125 feet. In driving the tunnel, the superintendent was much surprised to find that he was working in what he supposed to be waste or *debris*, and continued work some distance beyond the anticipated intersection of the

* Decrease.

† A part of the immigration into the United States from the Dominion of Canada consisted of immigrants from Europe who came by steamer to Montreal, and thence reached the lake ports of the United States by railroad.

vein and the tunnel. Col. Theodore H. Lowe, Consulting M.E., on his arrival at the mines caused a drift to be run at the supposed intersection and in the strike. The vein was disclosed after proceeding a few feet, but not in its original position. The material in which all this work had been prosecuted has, to a casual observer, every appearance of being *detritus* washed down from the hills above. It consists of a clayey matrix, in which are imbedded pebbles and small boulders, but of exactly the same character and composition as the matrix. Colonel Lowe is of the opinion that the feldspar in the porphyry has been decomposed by the percolation of water into kaolin, leaving the quartz as a fine sand. The pebbles are simple portions that have thus far resisted the solvent action, probably from the presence of an excess of SiO_2 ; although, from the aspect of these soft and rounded exteriors, they are gradually disintegrating. The vein, which in the solid formation dips 80° toward the west, has, under the pressure of the superincumbent mass, been borne over, and, in the breast of the drift, 30 feet from the tunnel, dips at an angle of about 85° toward the east, producing a sort of screw-thread. Any one who has visited the property can hardly fail, with a little reasoning, to coincide with his views.

Some fine mineral is at present extracted from the face of the drift referred to above, and I took some specimens of ruby, brittle, and native silver from the dump at the mouth of the tunnel. The continuity of the vein is therefore well established.

In regard to the value of the ores in both properties, assays may be obtained running high up into the thousands. But an average yields 300 ounces in both lodes.

The Lead Chief Mining Company's property is situated at the upper or western extremity of the valley, and comprises the Lead Chief, Little Chief, and Ruby Cross, all on one claim. The first two are parallel veins, running northeast and southwest. The Ruby Cross is a cross-lead. All are incased in sandstone. A shaft 105 feet deep is sinking in the Lead Chief lode, and a drift to tap the Little Chief is driving at the bottom. The character of the ore is similar to that in the Forest Queen and Ruby King. Ruby, brittle, and native silver, and galenite occur in a matrix of quartz and calcite. The company is composed of New York capitalists, who intend to thoroughly develop and work the mineral. Under the present development, the indications of a large and valuable ore-body are most favorable.

The Standard Mining Company, of which Mr. M. M. Pomeroy, of Denver, is president, has some properties that are looking finely. The Ruby Chief has two shafts and a tunnel 150 feet long developing the lode. Three feet of rich sulphides have been opened up, and it bids fair to be one of the foremost producers in the district.

Other claims belonging to this corporation on which work is vigorously prosecuted are the Hopewell, Mexico & Durango, Howard Extension, etc., etc. The ores are similar to those already described, and are characteristic of the camp.

ELK BASIN.

In this basin, just north of Irwin, the Venango mine presents a fine showing. Bullion is shipped regularly, and the ore increases in quantity and value as depth is gained.

The Micawber is a low-grade galena deposit, which, however, is energetically worked, and gives fine returns. The quantity makes up well for the deficiency in quality. The Independent and Diablo are properties of the future.

COAL.

On the South Fork of Anthracite Creek, about two miles from Irwin, is one of the finest beds of anthracite coal in the country. Two thousand acres have been located, and at present considerable coal is mined. In the winter of 1880, 100 tons were burnt in the town; but with better facilities of transportation and storage, it is anticipated that fully 1000 tons will be consumed the coming winter. All the works intend to use it for fuel. The specimens that I have seen were hard, brittle, very lustrous, and with a clear, sharp, conchoidal fracture. It is said to leave but very little ash after consumption.

MILLS.

A want long felt is about to be supplied by the erection of a chlorinating mill of twenty tons' capacity. Mr. Webb, of New York, is the owner. The mills are situated at the southern approaches of the town, and will be completed and in running order by the first of August. At first, the plant will consist of ten stamps and two revolving Brückner cylinders; but the capacity can be increased at will.

Messrs. Rose, Reed & Co. have erected and, at present, are running a ten-ton sampler. They have all they can attend to.

The Denver & Rio Grande and Denver & South Park railroads will have pushed their lines into the camp by next spring. Many of the citizens look to their advent with doubt and distrust. They quote Leadville and many other camps as examples of prosperous and ambitious towns laid low by the intervention of this great factor of civilization.

Ruby's prosperous future is well assured, and the judicious expenditure of capital in developing its great mineral resources will place it in the front ranks as a producer of bullion.

IDAHO SPRINGS, July 19.

TEXAS-MEXICAN RAILROAD.—Articles lately filed by this company with the Secretary of State of Texas provide for an extensive system of branches and extensions, including the following lines: From Pena, Duval County, to El Paso de los Arrieros in Starr County, 65 miles; from Corpus Christi to Aransas Pass, with a spur to Rockport, 35 miles; from near San Diego to Burr's Ferry in Newton County, 390 miles; from Beeville by San Antonio to Fredericksburg in Gillespie County, 140 miles; from near Beeville to Rockport in San Patricio County, 45 miles; from a point on the Brazos at the crossing of the branch to Burr's Ferry, down the Brazos to its mouth; from a point on the same branch in Wharton County to Galveston; from a point on the same branch in Chambers County to Sabine Pass; from a point on the same branch in Goliad County north by east to Tyler. These branches make in all a system of about 1100 miles of road, including lines from Corpus Christi to Tyler and to the Sabine, with branches to all the ports along the coast. Surveys are in progress on several of these proposed lines.

THE SAN JUAN REGION, COLORADO.

Special Correspondence of the Engineering and Mining Journal.

PAGOSA SPRINGS.—A large amount of building is going on, and population, resident and transient, is increasing. Good mineral has been discovered on the East Fork of the San Juan, and plenty of coal at Pagosa; so that the prospect there is flattering. The main basin at Pagosa is the largest hot spring in America, being over-seventy feet in diameter, water in constant ebullition, and containing valuable medicinal constituents. It is resorted to from near and far by persons in search of health and recreation.

SUMMIT MINING DISTRICT, RIO GRANDE COUNTY.—Judge Thomas M. Bowen started his mill for the 1881 campaign on June 4th, and in the first twenty-four days took out 524 ounces of gold. He has been mining partly on ore that has been lying on his dump since 1876, up to a short time past, realizing from it \$30 to \$50 per ton.

This brilliant record, so far only paralleled at the Summit by the production of the Little Annie in her best days, has been nearly eclipsed by later results. Judge Bowen has just taken from a twenty-seven hours' run of his thirty-stamp mill eight thousand dollars in gold. The yield of his mill is averaging from five to six thousand dollars daily. The retorts are going into Del Norte daily, and their size and beauty attract universal enthusiasm.

The Southern Overland Mail and Express Company (Sanderson & Co.) put a daily line of stages on the route from Del Norte to the Summit on July 11th—four horses to Howard's Ranch at foot of the range, and six the remainder of the way.

The telephone line built by Major Henry Foote from Del Norte to the Summit (name of latter now changed from Summit to Summitville) is completed and works well. Voices in a low tone can be easily distinguished through the distance of twenty-seven miles; there being over one mile of vertical difference between the Del Norte office and the highest portion of the wire. The telephone enables Judge Bowen to direct operations at his mines and mill from Del Norte almost as well as if he were at the Summit.

From the discovery of gold in this district, eleven years ago, until the close of 1879, the Little Annie mine led *longo intervallo* all competitors.

LITTLE IDA now comes to the fore; and if it continues during the remainder of the present season to yield \$150,000 a month from an ore-reduction of twenty tons a day in a thirty-stamp mill, South Mountain will be the next focus of interest in the Colorado Sierra Madre.

CHARLEMAGNE.

PETROLEUM—THE SITUATION AND THE OUTLOOK.

The pipe lines received from the wells in June 2,659,248 barrels, averaging 88,641 barrels per day; being decidedly the largest amount ever received from the wells in a single month. Of this amount, production furnished 2,377,860 barrels, averaging 79,262 barrels per day, and the balance, 281,388 barrels, averaging 9379 barrels per day, came from stock at the wells. For well stock in the Bradford field we are indebted to the Producer's Committee for the following report:

"Reports from 6694 wells show an average decrease of 16 9-10 barrels at each well during the month of June.

"The stock in private iron tanks in the Bradford field not connected with either pipe line was reduced during the month of June. Reports from all these tanks, except those owned by one firm, show an average daily decrease in June of 3512 barrels."

The shipments out of the producing fields during this month were 1,729,697 barrels, being larger than in any previous month, except August, 1879.

The production of the new wells on the last day of the month was estimated at 7269 barrels, against 8425 for the previous month, being 1156 barrels less, and it is considered by the trade that the aggregate production of the new wells hereafter will lessen each month, especially in the older portion of the Bradford field.

In the drilling-well department, we find less activity than has been manifested for several months previous. At the close of this month, 408 wells were drilling, against 470 last month, and an average of 431 for the first half of this year, also averaging 495 for the year 1880. The stock held in the producing regions continues to increase each month, which has become colossal, amounting to 24,441,191 barrels. The addition to this month's stock, however, has been less than for any previous month during this year; and if the present large shipments are maintained in supplying an increasing export demand and the home consumption, for the balance of the year, which is anticipated by many in the trade, we may look for the whole production to be absorbed, and the accumulated stock to be drawn upon in supplying the demand.

The production for the month is found to be 2,376,860 barrels, making a daily average of 79,262 barrels, which is an increase over last month of 2059 barrels per day. It is quite evident that the Bradford field proper can not be made to increase the amount now produced, and it is conceded to be rather on the decline. The Wellsville or Alleghany field seems to be somewhat in doubt in regard to several of the new wells which were expected to be completed before this time; just enough is known in regard to the wells already in to keep the market in an unsettled condition. The territory is considered to be very spotted, with no well-defined lead or line to follow, but occasionally a large producing well is found by the lucky producer striking into a pool, while many dry holes are put down in the immediate vicinity of the large producing wells.

The crude market for the month has averaged $81\frac{1}{4}$ cents per barrel. The highest price paid was $84\frac{3}{4}$ and the lowest $76\frac{3}{8}$. Refined in New York sold through the month from 8 to $8\frac{1}{2}$ cents per gallon; average for the month, $8\frac{1}{2}$.

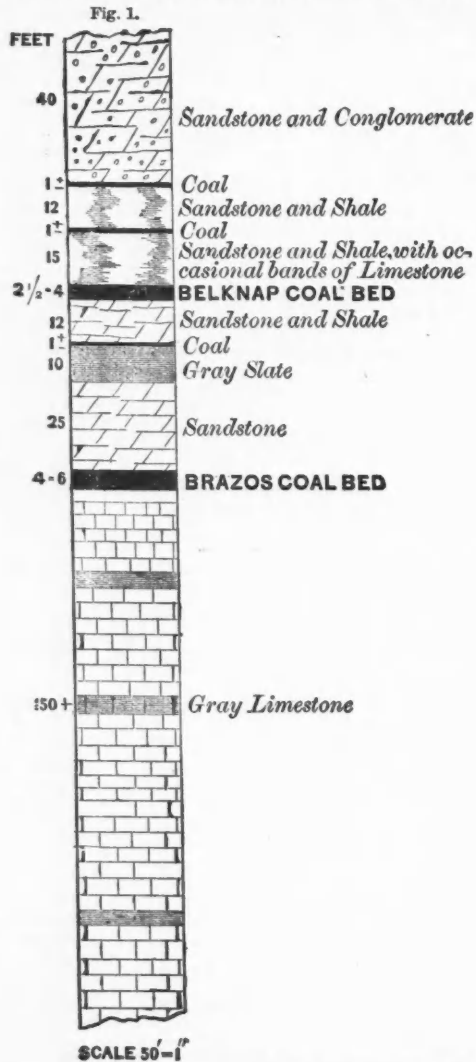
At the present writing, July 20th, the price of crude is $73\frac{3}{4}$ cents per barrel, and refined in New York is $7\frac{3}{4}$ cents per gallon. The present price of both crude and refined seem like safe investments, and promise a profitable venture to investors, as the average price for all these years has never been as low as at the present market value.—*Stowell's Petroleum Reporter, July 23.*

BRAZOS COAL-FIELD, TEXAS.*

By Charles A. Ashburner, Philadelphia.†

Very little is known of the economical value of the coal-beds of the State of Texas. The first authentic statement in regard to their occurrence is that contained in the reports of the United States Explorations for the Pacific Railroad, near the 32d parallel of latitude, published in 1853-55. Professor William P. Blake reports, "that a number of seams of bituminous coal, varying in thickness from two to four feet, have been opened along the Brazos River, in Young County, about one hundred and fifty miles west of Fort Worth." Dr. Shumard also states "that the characteristic fossil forms of the Carboniferous era have been found with this coal, and considers the age of the formation established. Fossils obtained from the carboniferous limestone remove all doubt of the age of these deposits."‡

In the spring of 1879, I was called upon by some Eastern capitalists to make an examination of the Brazos coal-field, in order to obtain the



thickness, extent, and value of the coal which could be mined and be made merchantable for steam, heating, and metallurgical purposes. The demand for coal in this section of the country is great, and a fuel which in our Eastern markets might be considered of inferior quality would here find a ready sale.

It must be remembered that the market value of a coal does not depend upon its absolute purity, but upon its actual value in heat-units which it is capable of producing. A poor coal which can be cheaply mined near the consumer is infinitely more remunerative to a mining company than a superior coal whose cost to the consumer is greatly increased by high mining charges and railroad freights. The value of the Texan coals does not depend upon their purity, but upon their low first cost and nearness to a market.

A glance at a geological map of the United States will show that the Brazos coal-field is the extreme southwestern extension of what may be called the Missourian, Fourth, or Western bituminous coal-basin. This basin spreads over the southwestern part of Iowa, Western Missouri, and Eastern Kansas, eastern part of the Indian Territory, Western and Central Arkansas, and ends in Northern Texas. Professor C. H. Hitchcock, in the Report of the Ninth Census, estimates the area of the basin, which is the largest in the United States, as 84,000 square miles. The area embraced within the State of Texas, according to A. R. Roessler, is 6000

square miles. Professor B. F. Shumard estimates the thickness of the measures at 300 feet.*

The official geological reports of the several States all claim that the Missourian coal-field is continuous from Iowa to Texas. My knowledge of the main features of the field is too general to add much corroborative testimony. From the dissimilarity of the coal at McAllister, in Indian Territory, to that found in the vicinity of Fort Belknap, Texas, many of the local geologists deny the statement that the basins in the territory and State are connected. The principal ground upon which the objection is made is, that along the Red River carboniferous strata are not found, and that the coals in the two localities are entirely different. When it is remembered that the Red River rocks belong to a newer and overlying formation to the coal measures, there seems to be but little doubt that the coal strata must pass considerably below the bed of the Red River, and connect the otherwise severed fields. The mere fact that the Texan coals, so far as at present known, are so very much inferior to the coal which is mined at McAllister amounts to nothing. I have examined the coal-bed in the mine at McAllister and the coal-bed in the drifts at Fort Belknap, over 205 miles distant, and have found less difference than exists in Pennsylvania between beds of the coal measures in localities only a few miles apart. We know nothing yet as to the relative

Fig. 2.

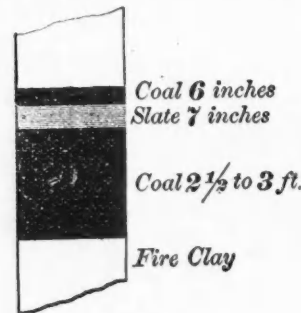


Fig. 3.



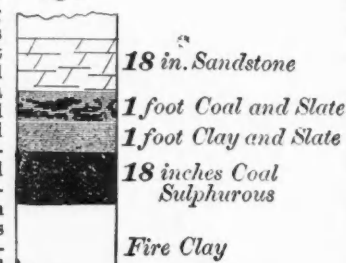
position in the measures of the Belknap and McAllister beds, so that their great difference in quality can not establish the fact of a break between the two basins.

The area in which my examinations were principally made lies in the northern part of Stephens County, along the Clear Fork of the Brazos River, and in the southern part of Young County.

There are but two beds which may possibly prove to be commercial. The upper bed I have called the *Belknap* bed, because it has been opened for a great many years in the vicinity of old Fort Belknap; and the lower bed the *Brazos*, since as yet it has only been found in the tributary waters of the Brazos River. Besides these two beds, there are a number of associated coal-seams which have never been found of workable thickness.

The vertical interval containing the coal-beds is less than 100 feet in thickness, and lies between a sandstone and conglomerate and a hard gray limestone. A general section of the strata, compiled from measurements made in the vicinity of Crystal Falls, Stephens

Fig. 4.



County, and Fort Belknap, Young County, is shown in Fig. 1.

The sandstone and conglomerate at the top of the section immediately underlies most of the prairie flat between Crystal Falls and Fort Belknap. The sandstone is a comparatively soft, friable, and ferruginous stone. The conglomerate beds have no marked persistency; the rock itself bears no resemblance to the carboniferous conglomerate so familiar to the geologists in the Eastern States. It is quite soft, very ferruginous, and the pebbles are small, often quite irregular in shape, and are generally formed from sandstone, which at times is very calcareous. Below this sandstone and conglomerate is a group of strata, 85 feet thick, composed of sandstones, shales, slates, fire-clays, and coal-beds, and below these coal measures occurs a hard, gray limestone, the total thickness of which is unknown. I have measured 150 feet in the valley of the Brazos River. This succession of the strata is not unlike that to be found in many localities where the carboniferous rocks are found in the Middle States. It seems to point clearly to the conclusion that the top sandstone and conglomerate is the representative of the Carboniferous conglomerate or Millstone grit; that the limestone is the sub-carboniferous or Mountain limestone, known generally throughout the Mississippi Valley as the St. Louis or Chester limestone; and that the included coal measures are really sub-conglomerate.†

The upper or Belknap coal-bed has been most extensively prospected. It covers a large extent of territory, especially in Stephens and Young counties, as is proved farther on. The bed usually consists of two benches or layers of coal, as shown in the section. (Fig. 2.)

The upper bench of coal is usually about 6 inches thick, while the lower bench varies from 2 1/2 to 3 feet thick. The two benches are separated by 7 inches, more or less, of black slate or clay, containing a great deal of sulphur in the form of iron pyrites or sulphide of iron. The coal

* A paper read at the Philadelphia Meeting of the American Institute of Mining Engineers, February, 1881. From the Transactions of the Institute.

† I am permitted by the gentlemen for whom the examination was made to publish the general statements contained in this paper.

‡ Macfarlane's *Coal Regions of America*. More recently, brief mention has been made of the coal-field in the pamphlets of the State Geological Survey. These reports are, however, too general, too indefinite, and too impracticable to permit of any conclusions as to the value of the coal as an economical, merchantable fuel.

* This is very much in excess of the thickness which I determined between Crystal Falls, Fort Belknap, and Graham. Professor Shumard does not state the exact position in the basin at which his measurement was made.

† In many places in Northwestern Pennsylvania and West Virginia, sections have been constructed which compare in many respects with the Brazos section. In the former locality, no Mountain limestone has been found, but coal occurs under the base of the Pottsville or Carboniferous conglomerate No. XII.; in the Virginia, the same section exists, and in addition the Mountain (locally called Lewisburg) limestone is boldly developed.

itself is poor, bony, and extremely sulphurous. The bed is always overlain by a very ferruginous sandstone or conglomerate. From the unvarying character of this rock, it seems quite probable that the territory underlain by the coal-bed is coextensive with the area underlain by the sandstone, the latter being easily recognized wherever it occurs. The bed was found to outcrop in the following localities :

1. The Belknap coal-bed may be seen about three quarters of a mile southwest of Crystal Falls, at an elevation of 1115 feet, the barometric elevation of Widow Nash's house, in Crystal Falls, being assumed at 1100 feet above ocean level.*

At this point, the following section is exposed. (See Fig. 3.)

Where this coal is seen, there are only from 5 to 15 feet of cover. When the coal-bed contains a large amount of sulphur, and occurs under only so little cover as at this point, little can be judged of what its condition and character would be when drifted on under good solid cover, which would prevent the infiltration of surface-water. About 300 feet south of this point, the Belknap bed outcrops again at about the same elevation. At this latter outcrop, a fire-clay bed is observed immediately under the coal. This is an invariable accompaniment of our bituminous coal-beds, and doubtless will always be found under the Belknap bed.

On account of the imperfect character of the diggings, the fire-clay is not always observed where the coal-bed is seen to outcrop. Below the fire-clay at this last locality, occurs a hard iron sandstone, which is immediately underlain by an outcrop, indicating a coal-bed about one foot thick. This bed is about 12 feet below the bottom of the Belknap bed. A number of small coal-beds, such as this last, are seen in a number of localities either above or below the Belknap bed. I do not think they will ever prove workable.

2. The next place where the Belknap bed was visited was at the O'Neill opening, about 600 feet southeast of the first outcrop mentioned. The character and thickness of the bed are the same as at the former outcrop; the elevation of the opening is 1100 feet. The coal-bed has been drifted on for 200 feet, more or less, and proves no better under 15 or 20 feet of sandstone cover than on the outcrop. The bed is overlain by a hard ferruginous sandstone. Three hundred feet northeast of the mouth of the drift, there are 40 feet of cover to the coal-bed; and a quarter of a mile north of the opening, the prairie flat is 1185 feet high, showing 80 feet of cover to the bed.

3. The same bed outcrops on the Walker tract, to the south of Samuel Sloan's house, and about three quarters of a mile a little north of east of the O'Neill opening. The elevation of the bed at this opening is 1105 feet, and 35 feet above the level of the Clear Fork, which flows at the foot of the hill immediately below the outcrop.

4. I found another outcrop of the same bed in the bank of the creek, about 450 feet southeast of the last mentioned. The elevation of this outcrop is 1110 feet. This last locality is about half a mile north of Crystal Falls.

5. The next outcrop visited was found on the east bank of the Clear Fork, about a quarter of a mile north of the above outcrop, and in the northwestern corner of the J. T. Pinkney tract. This is known as the Ballard opening. The following section is exposed. (See Fig. 4.)

The coal is rather hard and bright, but has the invariable character of the Belknap bed of being very slaty and very sulphurous. The elevation of the coal at this opening is 1080 feet, and about 10 feet above the Clear Fork.

(TO BE CONTINUED.)

TRADE NOTES.

THE INTERNATIONAL VACUUM DREDGE.—We are advised that one of these dredges is now building, to work in Vermont for raising iron ore. The Whittier Machine Company is busy on a sixteen-inch machine for the Georgia Gold Mining Company. A thirty-inch dredge is also building for the Kennebec Dredging Company, of Maine. This latter dredge will be in operation early in August.

PATENT PACKING.—This packing is composed of rubber combined with talc, graphite, and similar refractory substances, and, while readily manipulated, becomes vulcanized by the action of heat and pressure, so that it well-nigh equals in hardness the contiguous metal itself. Other advantages claimed for this article by Messrs. Jenkins & Co. are, that ordinary usage will not rot or wear it out, that it is proof against acids, and that it makes the best joint of any packing made.

THE CHASE ELEMENTAL STEAM GOVERNOR, manufactured by the Chase Machine Company, of Boston, which has been in use nearly six years, was constructed with the idea of producing a regulator for steam-engines which should be free, as far as possible, from the difficulties that interfere with the accurate working of other forms of governors. It has neither balls, fans, paddle-wheels, pumps, jointed arms, valve-stems, nor bevel gears. By a novel device, a pair of valves are hung upon pins, connected together with a large C spring, made to revolve, and are actuated directly by centrifugal force, without the intervention of any supplementary parts. These centrifugal valves take the place of balls, etc., in other forms of governors. This machine is especially adapted for elevator, electric light, mill, and other work where great changes are frequent. Its working parts are protected from grit and rust. The governor is quickly taken apart and put together. It will run in any position, its parts are interchangeable, it has an adjustable speed, does not easily get out of order, it is readily understood, and requires very little care.

THE SEIBERT CYLINDER OIL-CUP COMPANY, of Boston, is the sole manufacturer of oil-cups for locomotives, marine, and stationary engine cylinders, under the Seibert patents, with sight-feed. The working principle is as follows: A condensing-pipe and a discharge-pipe being connected with the steam-pipe, the pressure in both pipes is equal; but the steam entering the condensing-pipe condenses and fills a pipe for condensed water, and the weight of this column of water causes the oil in an oil-cup or reservoir to pass out through the discharge-pipe, and thus into the steam-pipe, as fast as the water from the pipe for condensed water is fed into the reservoir by a valve feeding the condensed water under the oil.

* The elevations given in this paper were determined by a Hicks aneroid barometer. No opportunity was afforded of determining the elevation of Crystal Falls instrumentally.

The sight-feed comes into play in the following manner: The oil forced from the reservoir passes down through a tube, from the top of the reservoir to the bottom of the gauge-glass, and is there discharged into the water with which the glass is filled, and can be seen as it passes to the cylinder, rising drop by drop through the water. The quantity of oil used is thus seen at a glance, and the feed regulated. The oil is fed in just the quantity needed continuously, and, passing into the steam-pipe, vaporizes and lubricates all of the internal parts of the engine. It is claimed that numerous cases show the engines to have made an average gain of several revolutions per minute since the use of this oil-cup was adopted.

PETROLEUM STATISTICS.

COMPARATIVE SYNOPSIS OF REPORTS FOR MAY AND JUNE, 1881.

42 GALLONS = 1 BARREL.	1881.			
	May. 31 days.	June 30 days.	Increase in June.	Decrease in June.
Production for the month..... bbls	2,393,203	2,377,860	.....	15,433
Daily average	77,203	79,262	.....	2,059
Stock at the wells..... "	22,321,141	23,063,085	.....	741,954
Iron tank stock..... "	23,793,028	24,441,191	.....	648,163
Total stock..... "	16,150	16,700	.....	550
Number of producing wells.....	470	408	.....	62
" drilling wells.....	408	374	.....	32
" " completed.....	7	17	.....	10
" dry holes.....	.....	.....	.....	.....
Aggregate daily production of new wells..... bbls	8,425	7,269	.....	1,163
Average daily production of new wells..... bbls	20 3/4	19 4-10	.....	1 3-10
Number of rigs building.....	450	403	.....	47
Total shipments out of the region, bbls	1,568,436	1,729,697	.....	161,261

—Stovell's Petroleum Reporter, July 23.

THE HISTORY OF PETROLEUM IN GALICIA.

Under the above title, Herr K. K. Oberberg-Commissär Heinrich Walter has contributed two papers to the *Oesterreichische Zeitschrift für Berg- und Hüttenwesen*, which we think of sufficient general interest to warrant us in reproducing them in a somewhat condensed form.

The author commences by altogether denying the generally received opinion, that the use of distilled naphtha as a lighting material only dates from the year 1854, when it was introduced for the purpose by the Americans. Its earlier origin is proved by official data, obtained from the Lemberg office of the department of mines, and from other authentic sources. In 1810, Josef Hecker and Johann Mitis obtained a concession for working sulphur and lead ore, from some very old abandoned workings, in the neighborhood of Truscovich, in the Drohobycz district. Between 1810 and 1817, they obtained petroleum from workings in the neighboring imperial forest; and the first mention in the archives of distilled petroleum occurs in the latter year, in connection with the report of a lawsuit. In the same year, a trial of the lighting powers of "naphtha and mineral oil" (by which terms distilled and raw petroleum are probably intended, though it can not be positively decided) was organized by the mayor of Prag, and was carried out in the Alstädter Ring. The result is stated in the municipal records to be, that "naphtha possesses great advantages, both as regards economy and intensity of light."

In consequence of this trial, the mayor ordered from Josef Hecker 15 tons of the material, on the condition that 17 cwt. mineral oil and 23 cwt. naphtha should be delivered within a specified time. The price was 26 florins per cwt., and 34 florins for naphtha. Owing to some mistake, delivery was not made until the spring of 1818, when the goods were refused by the mayor, on the ground of their being useless during the summer, and nothing further came of this attempt.

From the accounts of the works which Hecker and Mitis had established in Hubicze, it appears that a still had been worn out in January 1818; so that it is clear that the distillation of petroleum must have been carried on previous to 1817. These details establish the fact that previous to 1817 petroleum was known and used for lighting purposes.

Soon after 1818, the Hubicze Works were closed, Hecker's partner throwing the whole of the expense of the trials and working upon him. After the lawsuit which resulted from this, Hecker retired, and nothing more was heard of petroleum until 1838, when it is mentioned as a mineral product, in connection with a mining action at Starunia, in the district of Bohoroczan, and the fact that distillation had been carried on seems to have been entirely forgotten. On October 27th of the same year, the department of mines and currency decreed that mineral oil, mineral tar, and asphalt came under the classification of minerals subject to a state royalty. In 1840, there were in the Stanislaw district 6 petroleum works, with 75 wells, and a total product of a little over 5000 gallons. The royalty received in this year was 563 florins 51 kreutzers. The wells were leased to peasants, the product being simply used for wagon-grease.

Matters stood in this condition until 1853 or 1854, the use of petroleum not as yet extending beyond the manufacture of wagon-grease, and only the heavier parts of the oil being utilized at all. The best and least liquid grease was made by a peasant in Boryslaw, who on his death-bed communicated the secret to his wife. The method he employed was simply to boil the mineral oil in an open pot, by which means the more volatile matters were evaporated, leaving a thick, tarry residuum. The widow carried on the manufacture in conjunction with a Jew named Schreiner, who thought he could prevent the waste of material through evaporation by covering the pot with a lid. On one occasion, when he removed the lid, the whole liquid took fire. From this, Schreiner got the idea that some kind of schnapps might be distilled from the raw material. He fixed the cover on the pot, under which a gentle fire was kept burning, and collected the drops which condensed under it. He took a sample of the liquid thus obtained to Herr Mikolasch, an apothecary in Lemberg, whose two assistants, Ze and Ignacz Lukasiewicz, refined it with alkali and sulphuric acid, and discovered its value for lighting purposes.

These gentlemen furnished Schreiner with a complete still, instructed

him in the best methods of using it, and required him to supply the product to them. Lukasiwicz, in 1855, lighted the Lemberg General Hospital with petroleum lamps, bringing—in addition to the refined petroleum supplied by Schreiner—that produced at Starasol and Peczenizyn, which was being thrown away as useless. After wandering about, and carrying on this business in various places, he settled down at Polanka, and established the present works at Bobrka, near Krosno. He remained in Lemberg, and continued the work, which was soon taken up by a number of Jews, who (seeing the lucrative possibilities of the trade) entered into it energetically. A man named Toch, who was acquainted with the American petroleum industry (which had in the mean time taken its rise), arrived in Vienna in 1859 or 1860, and communications having been opened between him and the refiners at Boryslaw, a large trade soon sprang up.

For some time, the uncertain attitude of the government with regard to this industry threw great difficulties in the way of its development. Contradictory edicts were issued from time to time; but in 1862 it was definitively decided that mineral oil and stearine for lighting purposes were not subject to any government royalty.

From these papers, which have been compiled by Herr Walter in a very systematic and complete manner, there can be no doubt that to Galicia must be given the credit of the discovery of the value of petroleum as an illuminating agent; but it is clear, according to our opinion, that the Americans were the first to bring it generally into the market. This was the case even in Austria, as it was only by the help of a man who had been connected with the trade in the United States that the Galician refiners could successfully bring their produce into use in Vienna.—*Engineering.*

GOVERNMENT COAL LANDS.

The officials of the General Land Office at Washington, says *Bradstreet's*, have made a compilation from their surveys, from which they estimate that the total number of acres of coal lands now owned by the United States is 5,528,970. New discoveries in Colorado, Utah, Wyoming, and Dakota will considerably increase this amount. The principal acts relative to the disposition of coal lands are those of July 1st, 1864, March 3d, 1865, and March 3d, 1873. Under these several acts, coal lands became subject to preemption at the minimum of \$20 per acre, after having been offered, under proclamation of the President, at public sale, to the highest bidder, in suitable legal subdivisions. Citizens who are engaged in coal mining for commerce have the right to enter at the proper district land office 160 acres of land each, or less, at \$20 per acre. An association may preempt 320 acres upon payment of not less than \$10 per acre where the lands lie not more than fifteen miles from a completed railroad, and \$20 per acre where the lands lie within less than fifteen miles of such a road. A private individual, upon the same conditions, may preempt 160 acres. Any association, numbering not less than four persons, after expending \$5000 in working a mine to the limits above indicated, may make an additional entry of 640 acres at the several limit prices. The following is the estimate of the area of coal measures on the public domain, together with the number of acres which remain the property of the United States:

	Acres.	Acres.
Washington Territory—		
Area.....	829,440	
Sold.....	3,350	826,090
Oregon—		
Area.....	414,720	
Sold.....	185	414,535
California—		
Area.....	247,820	
Sold.....	1,800	246,020
Colorado—		
Area.....	1,128,225	
Sold.....	600	1,127,625
Utah—		
Area.....	2,764,800	
Sold.....	2,180	2,762,620
New Mexico—		
Area.....	10,800	
Sold.....	720	10,080
Wyoming, at least.....		42,000
Dakota, at least.....		50,000
Montana, at least.....		50,000
Arizona, no coal yet discovered.....		
Nevada, no coal yet discovered.....		
Nebraska, the coal-bearing rocks cover an area of 3600 square miles, but on account of the smallness of the veins—none exceeding one foot—the coal is of no commercial value.....		
Indian Territory, the coal-bearing rocks cover an area of 13,600 square miles.....		
Arkansas, the coal-bearing rocks cover an area of 12,000 square miles.....		5,528,970

THE MATERIAL WEALTH OF UTAH.

Since 1847, Utah territory has been growing gradually but surely, with no spasms of excitement. Its commerce is in a healthful condition. The territory is very rich in the finer and coarser minerals. Silver, coal, and iron are practically inexhaustible. To develop some of these fields, new railroads have been projected, and some extensions are now in course of construction. The principal one is the Sevier Valley Railroad, connecting Denver with Salt Lake City, and forming a competing line to the Union Pacific. Grading is going on rapidly between the Utah and Pleasant Valley roads (thirty-eight miles east of Provo City) and Green River, to be completed by November 1st. There is also another line, to run from Salt Lake City to Kanab, on the border of Arizona, which will connect with the Sevier Valley line at Salina. Grading is going on from Salina to the southern line of Utah, and from Salt Lake City to Coalville. These roads will open up and develop large coal-fields and iron regions. There are also new lines projected in extension of the Utah Western and of the Utah Southern, which will penetrate Nevada, and one, if not both, will ultimately extend to the Pacific coast.

The last census gave Denver a population of 22,000, but it is estimated that fully 3000 have been added since, making a total of 25,000. But, by reason of its valuable mineral deposits and the increasing facilities for distributing merchandise, it is believed that in ten years the population will have more than doubled.

The principal products of this territory at present are the finer metals. The value of these products for each year, from 1869 to 1878, are as follows:

1869.....	\$200,000	1875.....	\$7,000,000
1870.....	1,300,000	1876.....	6,600,000
1871.....	3,000,000	1877.....	7,113,755
1872.....	2,500,000	1878.....	6,064,613
1873.....	3,800,000		
1874.....	4,000,000	Total.....	\$41,578,368

The statement of Wells, Fargo & Co. for 1880 will show the comparative amounts and values of the finer metals:

Lead, lbs.....	32,213,141	\$766,455.22
Silver, ozs.....	3,663,183	4,029,501.30
Gold, ozs.....	8,020	160,400.00
Total value.....		\$4,956,356.52

Coal and iron have not received much attention until recently. The output of coal is estimated at about \$325,000 tons annually. The coal lands explored cover 100,000 acres, and the iron district may be given as equal to it. The increased railroad facilities will, no doubt, give an impetus to the production of these minerals. It is proposed to erect two blast-furnaces in Salt Lake City within a short time. There is one already in operation at Ogden.

The production of grain for 1870 and 1880 was as follows:

	1870.	1880.
Wheat, bushels.....	558,473	1,167,288
Oats, ".....	65,650	417,938
Barley, ".....	49,117	216,535
Corn, ".....	95,557	164,244
Rye, ".....	1,312	9,719
Buckwheat, ".....	178	448
Totals.....	770,281	1,976,152

There is not much room for expanding the agricultural interests, as very little grain is raised without irrigation, and the water-supply from the mountains is about all taken up, although there are thousands of acres of good farming land unused, which might be made productive with irrigation by means of artesian wells.

The wool product for 1880 was about 3,500,000 pounds. One firm in Salt Lake City shipped to Nevada and Colorado, last year, 1,000,000 dozen of eggs. The dried fruit product here is very superior in quality, and commands a ready sale in Chicago. The annual shipments are valued at about \$100,000.

Manufacturing is in its infancy, and shows an annual product valued at about \$4,000,000. Among these are ten woolen mills, with about \$1,000,000 worth of products annually, and two boot and shoe factories.

—*Bradstreet's.*

PROGRESS IN SCIENCE AND THE ARTS.

Mr. William Inman.—This gentleman, well known as the proprietor and manager of the Inman line of American steamers, died July 3d at his residence, Upton Manor, near Birkenhead. He was fifty-six years of age.

Electricity in the Kitchen.—The electrical cooking-range of M. Salignac will be a feature at the Electrical Exhibition. The apparatus will be fitted up in the grill-room of the restaurant, in order to furnish a great variety of meats cooked by heat generated from the electric current.

Centenary Celebration.—On Saturday, June 2d, Messrs. Deykin & Sons, the well known electro-plate manufacturers, of Birmingham, England, celebrated the centenary of the establishment of the works. The firm originally started business in the present premises in 1781, as makers of gilt buttons, then an important industry in Birmingham. In 1854, the firm opened the electro-plating business.

French State Railroads.—Judging from an experiment made by the French government, the plan of forming a net-work of state railroads does not yet appear to be a financial success. The Budget Commission estimates the deficit on working in 1882 at \$1,130,000. It should be remarked, however, that the net-work at present only accommodates second-rate towns. The length of mines in operation is 1137½ miles, and the receipts are about \$80,000 a week.

Mexican Antiquities.—From the City of Mexico, under date of July 21st, we learn that Mr. Porter C. Bliss, of this city, has published in the *Monitor* an interesting letter, dated Merida, concerning his examination of the celebrated ruins of Uxmal and Habha, Yucatan, in company with United States Consul Aimée and his wife, and their meeting with Dr. Plongeon and his wife. He has been occupied in taking copies of ornaments and hieroglyphics, and has discovered new sculptures of great merit.

Caucasian Petroleum.—Two of the foremost chemists of St. Petersburg, Messrs. Beitstein and Kurbataw, have subjected the Caucasian petroleum to a critical examination, which has been published in full in the proceedings of the German Chemical Society. The peculiarity of this petroleum consists in its high specific gravity as compared with American petroleum of the same boiling-point. For a long time, this fact caused the consumers to be mistrustful of their own oil. Experiments and comparisons, however, proved that the Russian oil gave ten per cent more light than the American, and it was also found that the illuminating oil even of this high gravity was drawn up the wick to the flame more easily than the American oil. The high gravity of Caucasian oils has for some time been taken advantage of by the manufacturers of lubricating oils.

Phosphor-Lead Bronze.—A firm near Dresden claims to have produced a new metallic alloy of a composition distinctly different from any other metal or combination of metals. It is designed to serve as a substitute for gun-metal, brass, etc., where these are used in the construction of machinery to withstand the heavy wear and tear of continuous friction. Through the introduction of lead, and the homogeneity of its component parts, it is said to be very efficacious for bearings and kindred pur-

poses. Experiments have shown that it possesses self-lubricating properties, great tensile strength, and remarkable coolness under extreme friction. It is said that its usefulness has been recognized by a number of ship-builders, implement-makers, machinists, and others, who are employing it for bearings and bushes, guide-blocks, slide-valves, connecting-rods, piston-rings and similar objects.

Russian Mineral Statistics for 1879.—The Russian mineral statistics, which have just been issued, show the following quantities to have been produced during that year :

	Tons.		Tons.
Gold.....	42.5	Iron bars, angles, etc.....	206,438.0
Silver.....	11.2	" sheets and plates.....	69,325.0
Copper.....	3,074.5	" rails.....	6,131.0
Tin.....	2.0	" wire.....	1,899.0
Lead.....	1,335.4	Sulphur.....	341.8
Zinc.....	4,250.0	Alum.....	80.9
Platinum.....	2.2	Naphtha, refined.....	106,531.0†
Pig-iron.....	429,865.4	Asphalt.....	9,043.0
" castings.....	50,974.4	Salt.....	583,287.0
Steel, blister and puddle.....	3,084.0	Coal.....	2,378,138.0
Bessemer and Siemens-Martin.....	203,636.0*	Anthracite.....	477,972.0
Crucible.....	4,284.3	Brown coal.....	16,157.0

Professor Sainte-Claire Deville.—London *Chemical News* of July 15th gives the following concise sketch of "one who for the past thirty years has had few equals and no superior in the fields of mineral chemistry and inorganic analysis." Etienne Henri Sainte-Claire Deville was born March 18th, 1818, in the island of St. Thomas, in the West Indies. At an early age, he manifested an ardent passion for the study of chemistry, which at that time found in France so many of its most distinguished professors. His abilities were manifested so early that at the age of twenty-six he was commissioned to organize the Faculty of Science, newly created in Franche Comté, and to preside over it as its dean. Here he undertook the analysis of the waters of the Doubs, and of the springs around the town of Besançon, and greatly improved the methods then known for water analysis. Shortly after, he succeeded in preparing nitric anhydride, which previously had been attempted in vain. Toluol was another of his discoveries. In his thirty-third year, he succeeded Balard in the chemical chair at the Ecole Normale Supérieure, at Paris. Here, his emoluments only reached the modest sum of 3000 francs; chemistry in France, as well as in England, being supposed to be its own reward. His next researches related to the properties and the industrial preparation of aluminium—discoveries which attracted public attention throughout the world. He then turned his attention with signal success to the metallurgy of platinum, and its separation from its associated metals. His investigations on boron and silicon are also well worthy notice, and his production of sodium at a cheap price has placed a powerful reagent in the hands of chemists, and has led the way to valuable results, both in the laboratory and in industrial establishments. His highest achievement, from a strictly scientific point of view, was the establishment of the laws of dissociation. Previously, decomposition was regarded as a simple phenomenon, effected and completed, in the case of every substance, at a fixed temperature. Deville showed that in some cases it is effected within certain limits of temperature, being arrested at a given heat by the equilibrium established between the decomposing body and the products of decomposition. A most admirable characteristic of the deceased *savant* was his strict accuracy—an attribute all the more deserving of honor in a man of his ardent and impetuous temperament. Among his pupils may be counted not a few of the most meritorious among the younger French chemists, such as Debray, Troost, Hautefeuille, Grandeau, Gernez, and others. M. Deville died on July 1st, at Boulogne-sur-Seine, and was buried on the 5th. His old friend, M. Pasteur, pronounced an eloquent and impressive *éloge* at the funeral. All honor to his memory, and may his experimental accuracy, which M. Pasteur calls the "probity of the chemist," find abundant imitators.

New Railroad Construction.—The *Railroad Gazette* for July 29th reports 52 miles of new railroad for the week, making 2615 miles this year, against 2424 miles reported at the corresponding time in 1880, 1122 miles in 1879, 900 miles in 1878, 751 miles in 1877, 1010 miles in 1876, 538 miles in 1875, 839 miles in 1874, 1872 miles in 1873, and 3237 miles in 1872. The construction of this year has not yet reached that of 1872.

DENVER & RIO GRANDÉ RAILROAD.—DENVER, COLO., July 27.—The completion of this road to Durango, southwest of Denver, which is to be opened to freight and passenger traffic on August 1st, will be celebrated on August 3d, by an excursion in which the State officials, municipal authorities of the principal cities, and representatives of the press and of the commercial interests of the State will participate. This road opens up the San Juan mining regions which have so long been isolated.

DISCOVERY OF COPPER AND SILVER IN WYOMING.—CHEYENNE, WY., July 22.—The discovery of copper and silver-bearing ore near Fort Laramie is creating great excitement. The miners are stampeding to the new district. The latter is six miles wide, and is swarming with prospectors, all of whom are making locations. The surface assays vary from \$60 to \$150. Smelters are to be erected at once, as the ore starts from grass-roots. The site of the town of Hartville is laid out and buildings are already going up. A great immigration has set in from this city. Miners are receiving \$4 per day; tenderfeet, \$3. There is a large demand for labor.

THE COAL DEPOSITS IN THE PUGET SOUND REGION.—The coal regions of Puget Sound are slowly developing. The *San Francisco Chronicle* says that it is not yet certain that anthracite coal has been found in these new northern mines. Reports of such discoveries have from time to time appeared in the newspapers of some of the Sound towns, but they need confirmation. As to the bituminous region, it is practically everywhere, from the Cascade Mountains to the sea. It is a source of future wealth and stable prosperity to San Francisco and that country; worth probably more than all the mines of the precious metals.

* Out of this quantity, steel rails 144,801.2 tons.
† The quantity of raw mineral oil raised was 346,274.9 tons.

MEXICAN RAILROAD NEWS.—CITY OF MEXICO, July 27.—The State of Chihuahua, on the Texas and New Mexico border, has granted to the Central Construction Company permission to erect a railroad bridge over the Rio Grande at El Paso Del Norte. A similar privilege has already been conceded by the Mexican government, and there will probably be no great delay in beginning the work of construction.

CITY OF MEXICO, July 26.—The difficulty having terminated between the Central Railroad, and city council and the inhabitants of Paso del Norte, the Mexican government gave orders to continue the works on the bridge of the Rio Bravo. The president denies that he authorized the agent at London to make arrangements with English bondholders. The government will not make, for the present, any arrangements.

PENNSYLVANIA RAILROAD.—A branch is to be built from the Bellefonte & Snow Shoe Branch to some newly-developed coal mines in the Snow Shoe Region. It will be four miles long. The company's statement for June shows for all lines east of Pittsburg and Erie, as compared with June, 1880 :

An increase in gross earnings of (18.2 per cent).....	\$585,961
An increase in expenses of (4.9 per cent).....	109,665
Net increase (47.1 per cent).....	\$476,296

For the six months ending June 30th, as compared with the corresponding period last year, the same lines show :

An increase in gross earnings of (10.9 per cent).....	\$2,119,769
An increase in expenses of (10.7 per cent).....	1,217,022
Net increase (11.2 per cent).....	\$902,747

All lines west of Pittsburg and Erie for the six months of 1881 show a surplus over liabilities of \$1,625,783, being a gain over the same period in 1880 of \$284,676.

SADDLE MOUNTAIN COAL-FIELDS, ARIZONA.

The newly discovered coal-fields of Saddle Mountain, though not so extensive as those of Deer Creek, produce equally good coal, and the same kind—bituminous—which bears every indication of being an excellent coal to coke for smelting purposes. These fields are situated about six miles east of San Pedro River and four miles south of the Gila, on the line of 33° north latitude, according to Eckhoff and Riecker's map of Arizona for 1880. It is a little south of east from Florence and a little east of south from Globe, and about twelve hours' ride on horseback from the latter place.

It is approachable with wagons without any grading, having a natural road right to the mines. There are now about twenty-five locations made of 160 acres each. Many of these claims are now being vigorously prospected with such means as the prospectors can command. Some of them are showing good coal and others looking very favorable. There are quite a number of veins, all striking in the same general course; but as they lie almost flat, but few crop to the surface.

GENERAL MINING NEWS.

ALASKA.

A dispatch from Victoria, B. C., by way of San Francisco, says: The steamer California has arrived from the North with the following advices: Nearly all the business citizens of Sitka have removed their goods to Harrisburg. Very little work has been done on the ledges, but the prospects are better than ever, the ledges showing up well and having every appearance of being solid and permanent. All the placer mines are paying wages of from \$3 to \$5 per day, and some are yielding handsomely. The hills are full of prospectors, many having gone far into the interior. New discoveries and locations have been made, but none of any great value.

ARIZONA.

Our latest Arizona exchanges contain the following :
MINERAL CREEK.—All the necessary machinery and lumber for the mill have arrived. A drift is driving to connect with the E shaft.
OLD DOMINION.—The tunnel on the New York lead has been connected with the main shaft by a short cross-cut, showing fine ore, chiefly green carbonates and red oxides. The distance from the left wall of the tunnel to the right wall of the shaft is 18 feet, all in ore. The main tunnel on the Old Dominion lead is within 10 feet of the main shaft. The ore continues as fine as previously reported.
SILVER KING.—The ore coming from the depth of over 700 feet is said to be very rich and full of free silver. The mill is running full force.
TIP TOP.—The secretary reports that the mill shut down July 1st, in order to sink the shaft deeper, the shaft not being large enough to sink and hoist ore at the same time.
TUCSON.—A dispatch from that city says that, in consequence of the heavy floods in the San Pedro River, all dams have been carried away except that of the Boston mill.

CANADA.

PROVINCE OF ONTARIO.

We condense the following from a letter written to the *Toronto Globe* of July 15th, on mining in Ontario :
CANADA CONSOLIDATED GOLD MINING COMPANY.—The company has evidently determined to give the property a thoroughly fair trial, and to spare no expense in providing all the necessary appliances for working the mine profitably and extracting the gold from what has hitherto proved itself a somewhat refractory ore. So far there has been but little done in the way of underground working, though very extensive and complete preparations are making for the vigorous prosecution of this portion of the work.
The bottom of the deep shaft shows good ore. The upper levels are about 78 feet below the surface, and extend about 115 feet along the vein. At a depth of 140 feet from the surface, two more drifts have been run, exposing about 65 feet of the vein, which at this point appears to be very rich in mispickel, and fully ten feet thick. At this latter level, a cross-cut has been started into the hanging-wall for the purpose of cutting a more westerly vein which shows very rich and strong in the outcrop. The shaft has been sunk some twenty feet farther, and at that depth the vein appears to be as thick and as rich as ever. The Tuttle shaft was just being emptied of water by a steam injector at the time of the writer's visit. It had attained a depth of 40 feet, and here the vein shows even greater thickness than it does in the deep shaft; but as these quartz veins in Marmora have always proved themselves very irregular as to thickness, I do not regard the extreme width of the

vein at the 40-foot level as a feature of extraordinary promise. It is possible, of course, that the vein may be stronger at this point than at the deep shaft; but I can not help but think that the persistence of the vein in the deep shaft is a more valuable evidence of the strength of the deposit than its extraordinary thickness 40 feet below the surface in the Tuttle shaft. Here it is fully 15 feet wide, and shows itself rich in mispickel all the way down. Over this shaft a substantial structure for a skip-road has been built, it being the intention of the company to send the ore down to the new mill (some 200 yards farther down the river) by means of an elevated tramway.

A mill is building having a capacity of over 125 tons per day. This new mill will reduce the ore by means of Cornish rollers; it will then be concentrated, roasted, and afterward treated by what is known as the chlorine process. It is expected that by this means the vein-matter, with very moderate sorting, will yield an average of \$18 per ton from wall to wall, which, of course, will represent an enormous daily profit as soon as the new works shall have been put in running order. It is expected that the arsenic in the ore can be so treated and marketed that it will nearly or quite cover the cost of mining and treating the ore; but even if it should fall a little short of doing so, a net income of \$3000 per day from the property would not be an extravagant estimate after the mill shall have been put in order for the treatment of 125 tons per day, as is at present intended.

GLADSTONE.—This gold mine, which is situated near the old Feigel mine, has been purchased by Messrs. Truiasch & Stewart, of Belleville. Mr. Stewart, the managing partner (formerly lessee of the Feigel), has the little five-stamp mill on the property fitted up in a neat and workmanlike manner, and the mine is now doing a profitable though not very extensive business. Mr. Stewart is following the old raw crushing and amalgamation system, and in this way handles at a very low cost some thirty tons of ore per week, which yields at the rate of from \$8 to \$10 per ton. Altogether, gold mining in Marmora never wore a more encouraging aspect than it does at present.

CALIFORNIA.

The Nevada City *Transcript* of July 17th says that arrangements are making by the South Yuba Water and Mining Company to work its Nevada hydraulic claim at You Bet by the drifting process, as the very rich gold-bearing matter in the channel is getting too hard to be disintegrated by the hydraulic method sufficiently to save all the gold. Hoisting-works are erecting, and a ten-stamp cement mill will soon be put in place. Numerous attempts have been made in the past to work claims in that part of the country by this plan, but we believe none of them has been successful.

BODIE DISTRICT.

In reviewing the operations on these mines for the week ending the 16th inst., the *Free Press* says: The Standard has a great deal of ground on the 1000-foot level yet to investigate; in fact, it may be said that that level is entirely unexplored. The character of the ground they are now working in is favorable, and the management feel no discouragement. A cross-cut has been started west from the 600-foot level of the Red Cloud. This drift will, it is believed, show up something good, as it is to explore a portion of the Concordia ground. Ore never looked better than it does at present. During the past week, a large number of visitors were admitted to look at the developments recently made, and they all speak in glowing terms of the prospects. The Addenda has also the prospects of becoming a good mine. Bechtel is crushing ore, and it assays better than at first expected. Grading for the Bodie Tunnel mill has commenced, and the work will be pushed forward as rapidly as possible. The Bodie Tunnel has a very largeshowing of ore, and the ground is but little prospected. The superintendent of the Consolidated Pacific states that a streak of rich ore has been encountered on the 600-foot level, and it assays well. Prospecting is still going on in the Noondays, and the Bodie Consolidated continues to ship bullion.

BODIE CONSOLIDATED.—During the week ending July 16th, 128,562 tons of ore were extracted from the several stopes. There were 100,377 tons hauled to the mill, and 95,375 tons were crushed. The average of the pulp assayed for the week \$45 and the tailings \$8.93. The shipment will be \$7335.21. At the 206-foot level of the mine, the east cross-cut was driven 9 feet; its present length is 32 feet. In the south drift (No. 2) at the 2d incline level, only one shift of men was employed; but the rock broke easily, and they added 12 feet to the drift, which is now 37 feet long. The north drift (No. 2), 5th incline level, has been advanced to 141 feet, a gain of 10 feet since last report. In the face of this drift, the vein shows a faulting along a line of broken country-rock that will soon be passed through. The stopes above this drift continue in excellent ore. At the 6th incline level, north drift No. 3 has been advanced 10 feet; total length, 79 feet. The vein looks well in the face of this drift, and is carrying good milling ore. The water has begun to drain from the 6th level, so that they hope to start an incline upon the vein therefrom.

BULWER CONSOLIDATED.—The west cross-cut from the 1000-foot level of the Standard new shaft has not cut any thing new during the week.

STANDARD CONSOLIDATED.—This company extracted and shipped to the mills 1208 tons of ore during the past week from 300, 385, 500, and 550-foot levels. The average pulp-assay for the week was \$26.82; crude bullion received, 8600 ounces, and the amount shipped to San Francisco \$41,396.05. During the week, some repairs and changes were made in the working of the pumps, which caused considerable stoppage of the work on the 1000-foot level. The east cross-cut has been advanced during the week 6 feet; total length, 346 feet. The west cross-cut is in 228 feet; progress, four feet. The face of this cross-cut shows no change. The south drift, 700-foot level, has been extended since last report 10 feet; total length, 56 feet. The south drift, 500-foot level, is in 346 feet; progress, 11 feet; showing the vein four feet wide. The west cross-cut from this drift has been advanced 12 feet; total length, 52 feet, in hard blasting rock. The uprise from this south drift has reached a height of 64 feet; progress, 14 feet. The north drift, No. 1, 385-foot level, has been run since last report 14 feet; total length, 443 feet, showing the vein 15 feet wide. The uprise on the West Standard has been advanced during the week 12 feet; total height, 231 feet, where the vein is five feet wide. The different stopes are looking well. On the 385-foot level, the vein in the stopes holds its width of from 15 to 25 feet. On the 550-foot level, it is about 30 feet wide.

GREENVILLE DISTRICT.

GOLD STRIPE.—The superintendent reports that there is an improvement in the ores from Kerr tunnel, and the ledge is showing greater strength within the past 20 feet. The ore-body gives promise of large extent and the ledge making into the country that rises abruptly west gives much larger backs in ore-reserves. This improvement is of large value to the mine. The mills are running full time on good ore. A large quantity has accumulated in the mine-chutes ahead of mill demand.

COLORADO.

CLEAR CREEK COUNTY.

CONSOLIDATED HERCULES & ROE.—About 70 men are working, mainly lessees. They all seem to be doing well.

DUNDERBERG.—The superintendent, writing under date of July 22d, says: I hope to strike the ore-pocket in drifts soon. The stope back of second level is producing good ore. D level drift has a strong vein 18 inches wide. The mill starts on full time to-day.

FAIRMONT-SCHAFFTER.—The Idaho Springs *Advance* of the 21st says: The Schaffter & Fairmont lode is developed by the Philadelphia tunnel and adits on the vein 400 feet in the mountain. No ore is taken out, and the reporter saw in the

middle level two feet of black oxide of copper for a distance of 300 feet, which had been broken into about every 50 feet to determine the continuity of the ore-vein. In this way, considerable ore has found its way to the mouth of the adits; but the manager's idea is to let the ore remain until the company is prepared to ship continuously, thereby avoiding waste of the principal matter—black oxide of copper—which can be easily carried away by the wind or lost in taking down by mixture with the gangue or crevice-matter, which is 5 feet wide and heavily charged with iron and copper pyrites.

PAY ROCK.—The Georgetown *Miner* says that at the present time there are 42 men employed, mainly under lease. On the No. 5 lode west of the Silver Bank tunnel, a party of men are working under the company, taking out from three to six inches of good ore. This is opened but a short distance west of the tunnel. The breast of the main drift running east from the tunnel is being driven ahead, and shows a great deal of scattered mineral, but nothing except streaks about the width of a lead-pencil. All the lessees in the mine are working on more or less ore.

SHIVELY.—The *Courier* says that the fourth level, 255 feet below the tunnel level and 605 feet below the surface, is driving east on a good body of ore that mills from 300 to 400 ounces of silver to the ton. Work is also progressing on the 185-foot level, where the ore-vein continues good, and on the 75-foot level the drift has been driven through the porphyry dike, and now a cross-cut is being driven to the ore-vein.

CUSTER COUNTY.

BASSICK.—The daily output of this mine is estimated at 70 tons. The Silver Cliff *Gazette* says: The ore-body struck in the 700 level ten days ago is said to be of great extent, and high in grade. The flow of water has increased materially, and for the first time is ample for the reduction of the mine's output. In order to obtain the best results in concentrating, an abundance of clear water is essential, and the lack of a full supply has heretofore been the chief obstacle in the way of successful work.

BULL-DOMINGO.—The same paper states that the heading of cross-cut at the 350 level is 144 feet from shaft. Forty-eight feet of forward work must yet be gained to reach the ore-body at that level, which, barring accident, will consume twenty-four working days. As several days' time will be required to prepare for stoping, ore extraction can not be resumed until about September first.

SILVER CLIFF.—The superintendent telegraphs that this mine is looking well. Ore is running better. Taking ore from the Racine Boy. Expect it to improve daily.

GUNNISON COUNTY.

We are indebted to the *Elk Mountain Pilot* for the following regarding the two leading mines of Ruby District:

FOREST QUEEN.—The Forest Queen is still working ahead on the tunnel. The shaft is 180 feet deep, and no more work can be done in the way of sinking until the machinery arrives. Ore is taken out and stored in the ore-house to await treatment.

RUBY KING.—The Ruby King is working three shifts on the tunnel, which is in on the vein. This tunnel is running toward the new shaft, now 75 feet deep. No more sinking will be done on this vein until the machinery arrives, as the water comes in too fast to be drawn out by the windlass and bucket. Plenty of pay mineral, however, is taken out of the tunnel.

LAKE COUNTY.

The Leadville *Circular* of the 22d inst. approximates the daily output of the camp as follows:

Mines.	Tons.	Mines.	Tons.
Miner Boy	15	Carbonate Hill	0
Florence	2	Henriette	57
Little Silver	0	Evening Star	60
Colorado Prince	0	Dunkin	55
Little Pittsburg	15	Robert E. Lee	75
Chrysolite	90	Long & Derry	10
Little Chief	15	Brian Boru	5
Iron Mine	225	Crescent	4
Silver Cord-Wave	70	Highland Chief	0
Catalpa	15	Comstock	3
Little Ella	14	Matchless	40
Amie	5	Hibernia	12
Oro La Plata	33	Climax	10
Glass-Pendery	30	Big Pittsburg	0
Morning Star	30	Dyer	6
Columbia	70	Others, say altogether	30
Argentine	25	Etna	15
Little Prince	5	Agassiz	15
Half-Way House	20	Leadville	10
Robert Emmet	5		
Shields	10	Total	1,071

BIG PITTSBURG.—Superintendent telegraphs as follows: Lent shaft 232 feet deep in lime. Am starting drift east from bottom of Heytrosser.

CATALPA.—The *Herald* reports that the new shaft on the west end is down 100 feet, and that a new engine has been put up. The new shaft-house is contracted for, and will soon be up. The ore-shippments for the month will amount to about 450 tons. The mine is doing well as usual, and especially to the northeast the ore-bodies are improving.

CRESCENT.—The mine is sending out about six tons per day. The new west shaft is down 115 feet, and is reported to have struck porphyry.

EVENING STAR.—A new engine has been put up on the west shaft. The mine is doing as well as usual, and shipping about 80 tons of ore a day.

GLASS-PENDERY.—The *Herald* says that the new strike in the east incline from the Pendery shaft is looking well, and is producing some exceedingly rich chloride ore. Near the Glass shaft also, a drift running south is in a very large ore-body. It is the intention of the company to soon commence stoping on some of its large developed ore-bodies, when the production will be very large.

HIGHLAND CHIEF.—Little is doing on this mine, only four men being employed at present. It is probable that some arrangement will soon be made by which the indebtedness will be paid and work resumed.

IRON.—Ore delivered during the week ending July 17th, 1124 tons; previously shipped this month, 1280 tons; amount received last week, \$16,330; for seventeen days, \$45,357; ore delivered and unsettled for, 1974 tons.

LEADVILLE CONSOLIDATED.—This company is employing forty men in the Carbonate and adjoining mines, and is producing about 10 tons of \$100-ore per day.

LITTLE PITTSBURG.—The superintendent telegraphs that there were shipped from the Little Pittsburg, last week, 91 tons of ore; 142 tons are settled for; and a balance of 178 tons shipped, but not settled for.

MORNING STAR.—According to the *Democrat*, the ore-shippments average from 50 to 60 tons a day. Over 900 tons have been sent to the smelter already during the present month, and the full amount for the month will reach fully 1500 tons. The mine is looking finely at all parts, and no stoping whatever is doing on the ore-bodies except along the Evening Star line. The north incline extending east from the No. 5 north level is down 60 feet. It pitches at a dip of forty degrees, and in the face eight feet solid of sand carbonates are exposed. The incline starts a short distance north from the new cage shaft. The Waterloo shaft is sinking, and the pump is working well. The present depth is 180 feet. From this shaft, connections are made to the old Waterloo workings, and also the drift along the Henriette line. The dip of the ore, however, is all to the east and south, and therefore it is necessary to sink the shaft deeper so as to get beneath the ore-bodies.

SILVER CORD.—The Leadville *Herald* says: The ore-shipments are keeping fully up in quantity to what they were last month, and the grade of the ore has greatly increased. There would be no difficulty in increasing the amount of ore produced, but because of the lack of the hoisting capacity. The ore-bodies are greater than at any time before exposed in the mines, and the ore now produced comes only from new drifts and openings being made in the mine. The shipments at present are about 60 tons a day, and this amount will be largely increased as soon as the new machinery, which is being put up, is in place. The new assay office, surveyor's room, and general office for the company are all complete. Another large surface improvement going up is a large ore-house. This is being built below the south incline and on ground recently acquired from the Iron Silver Mining Company, which gives a portion of the surface ground of the Bull's Eye claim. The building is to be built along the side-hill, and is 60 feet in length. From all three of the inclines into the ore-house, iron tracks lead, and the upper floor, 15 feet in width by 60 in length, is used as a sampling-floor. From this, ore-bins, seven in number, extend down at an angle of 85 degrees. Iron screens are over the bins, so the coarse ore is separated from the fine.

DAKOTA.

FATHER DE SMET.—Report of superintendent from July 8th to July 15th shows ore extracted from first level, 1600 tons; ore extracted from second level, 320 tons; ore extracted from third level, 40 tons; ore milled, total, 1960 tons. The work on the mine for same period was as follows: On sill-floor, McGinty chamber advanced 1½ sets. Rise from end east cross-cut Golden Gate, from second to first level, advanced 5 feet. Ledge on third level looking well.

LITTLE RAPID.—We learn from the Rapid City *Journal*, of the 23d inst. that work has been commenced successfully on this property. The company has been working energetically for some time past to get its machinery in operation, and the superintendent announces that it is a complete success. The Roy Stone Hydraulic Excavator, the machine used by this company, has never before been tested in the Black Hills, and a great many miners expressed grave doubts as to whether it would do the work advertised by its manufacturers. The machine is set up on the ground known ever since the first settlement of the Hills as Ross's Bar, located upon Little Rapid Creek, about five miles below Rochford. The workings give employment to quite a number of men, and in the vicinity quite a little village has sprung up, named, in honor of the first discoverer of gold on Little Rapid Creek, Rossville.

MEXICO.

In an interview with a Boston *Traveller* reporter, Mr. Simmons gave the following information regarding the Mexican mining properties in which he is interested: The mines are owned by a syndicate of a few people, and their development is prosecuted simply as a business enterprise, the stock of the corporation never having been put upon the market. We are mining for silver and for antimony at a place about thirty miles east of the Gulf of California. Our ores are shipped to Port Salinas on the gulf, thence by vessel to our reduction-works at Oakland, Cal. We ship about 300 tons of oxide of antimony ore per month. We have in our mines the only known deposit of oxide of antimony ore in existence, and the mines have been visited by several leading scientific men, and the theories of science in regard to the presence of oxide ore at any depth have been somewhat disturbed. The ore produces from 50 to 70 per cent of pure antimony metal, and we ship it to Oakland, smelt it there, and the metal is sold in the New York and London markets. The first invoice was shipped several weeks ago.

MICHIGAN.

COPPER MINES OF LAKE SUPERIOR.—The Portage Lake *Gazette* gives the yield of these mines for the first half of 1881 as follows:

	Tons of ore.		Tons of ore.
Allouez	504	Huron.....	90
Atlantic.....	898	Pewabic.....	409
Calumet & Hecla.....	9,782	Quincy.....	875
Franklin.....	791		

All other mines on the lake about 2600 tons; total, 16000 tons.

MONTANA.

Our Montana exchanges contain the following:

ACQUISITION.—The new double-compartment shaft is going down at the rate of 2 feet per day, which is good progress considering that the rock is hard.

ALICE.—In all the levels, from the 100-foot down to the 700-foot level, the work of extracting ore proceeds daily without interruption. At the 600-foot level, the ore-body has been explored to the west, about 180 feet. From all the stopes worked in the mine, a good quality of ore is taken out daily. The sinking of the main shaft, from the 700-foot station has not begun yet. Both of the Alice mills are running with unusual smoothness, and it is said they are saving more than 90 per cent of the assay value of the ore treated.

ANSELMO.—The west shaft is down about 380 feet, and the east is about 230 feet deep. From twelve to fifteen tons of ore are daily produced, which goes to the Silver Bow mill for treatment.

BELL.—This property is said to be well developed. The deepest working is about 300 feet, and the vein at that depth is of equal strength with the upper openings. On the Bell vein, 400 feet have been explored at a depth from the surface of about 260 feet.

BELLE OF BUTTE.—The new shaft-house is nearly completed. The machinery used at first in sinking the Moulton shaft will be put up immediately on this line. Workmen are engaged in putting up the machinery, which will be in operation in another week, when sinking will be commenced.

LINGTON.—Fair progress has been made in sinking the main double-compartment shaft during the past week; it has been timbered at the bottom. No increase in water to any considerable extent is encountered.

MAGNA CHARTA.—The three-foot vein of milling ore opened in the grade shows finely, and yields, it is said, assays of more than \$50 to the ton. Work on the Howland Pulverizer is pushed ahead energetically.

MOULTON.—Active sinking of the three-compartment main shaft was resumed on the 14th inst. The shaft has attained a depth of 420 feet; it will be sunk rapidly, until a depth of 800 feet has been attained. The Ingersoll drills, driven by Bowers's air-compressor, are doing rapid work in the bottom of the shaft, where the rock is moderately soft. From the 300-foot level, yesterday, fine-looking ore of a good grade was coming out from the second vein, south, on the Moulton. This vein is fully thirteen feet in width. At the 200-foot level, no ore is extracted at present.

STEVENS.—The sinking of the main (hitherto called the middle) shaft goes on favorably. It has now attained a depth of about 185 feet. Heretofore the Morning Star mine, to the east, had drained the Stevens; but on sinking deeper, water was met, and a few days since a Knowles pump was put in, which easily keeps out the water and works smoothly. The bottom of the shaft is in the foot-wall at present, the vein having dipped a little more than usual in the last few feet. The company is prospecting the vein on the south of its ground, but the vein is small, and is producing very high-grade ore.

NEVADA.

EXCHANGE.—The Exchange Silver Mining and Milling Company, of Nevada, paid its first dividend on the 20th inst., and the officers report more than sufficient profits on hand to pay the next. In the mean time, arrangements are making for additional reduction-works at once, which, it is expected, will enable in-

creased dividends to be paid. During the last five months, this company extracted and shipped here bullion valued at \$50,000, which was all done by means of a small 8-stamp mill. During this time, the developments on the mine have been extended, opening up such large resources of ore that the company feels justified in building new works as soon as possible.

The summary of the Gold Hill *News*, for the week ending July 20th, gives the following: The situation, as it appears to-day, is most encouraging for the Gold Hill group. Yellow Jacket has but fairly commenced the work of prospecting. The strike made in its ground by the south header of the Suro Tunnel is of great importance, and in days gone by all eyes would be attracted to that point and the stock would be the liveliest on the list; but now there seems to be a serpent fascination for dealers at the north end which prevents them from glancing around or investing elsewhere. Crown Point and Belcher, too, are extracting no small amount of ore at the present time, and they have good indications of finding in their lower levels something better than the low-grade ore now taken out above. The Kentuck has but recently been started up, and is not now in a condition for active work, yet ten tons of ore are daily taken from it, and quite a number of men are given employment. In fact, it is worthy of note that more men are to-day given employment in the Gold Hill mines than at any time in the past two years and a half, and it is exceedingly probable the number will be increased before long. It is expected that the Bullion will be worked shortly; the substantial preparations made there would surely indicate as much, outside the assurance of the management that such is to be the case. More or less prospecting is now carried on in the mines from the Hale & Norcross to the Sierra Nevada. Good air circulation has been secured in all the mines under Bonanza control, and drifts and cross-cuts have been, or will be shortly, started in every direction and pushed rapidly. Taking every thing into consideration, the outlook is by no means as dark as many would fain to believe, and there will surely be found a silver lining of prosperity to the present cloud of depression.

EUREKA DISTRICT.

EUREKA CONSOLIDATED.—The new shaft has reached a depth of 900 feet. The work of sinking has been temporarily suspended, pending the cutting out of a station on the 600 level. The new and heavy machinery is being put in place as rapidly as possible.

LEWIS DISTRICT.

STARR-GROVE.—The Starr-Grove and Eagle mills are kept constantly running on ore from the Starr-Grove mine. The new forty-stamp mill will be running within three weeks, and will be the means of doubling the bullion output of the district.

NORTH CAROLINA.

KING'S MOUNTAIN.—The Charlotte *Observer* announces the sale of the King's Mountain gold mine to Mr. George Bull for \$100,000.

UTAH.

Utah exchanges say:
BARBEE & WALKER.—This mill started on the 17th, and is running smoothly. Two bars of bullion have already been shipped.

HAWKEYE.—The men are cutting a station on the 300-foot level. The prospects at this time are favorable.

PINYON-CLIMAX.—The Park Mining *Record* says that Judge Hunter has finally come to a decision in the Pinyon-Climax litigation, and rendered it on the 15th of July. He decides that the Pinyon and Climax respectively must commence on the vein and work up on it to find the apex. This, we presume, is a preliminary decision preparatory to a finale.

WAHSATCH.—The lower tunnel is now in about 300 feet. The workmen have encountered a body of hard quartzite, and they expect it will take them about six weeks to get through it.

PROPOSALS AND SALES.

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

Furnishing and Delivering at the Washington Navy-Yard 245,000 Pounds of Best Quality American Refined Copper; J. Adams Smith, Pay Inspector, U. S. N., Navy Pay Office, Washington, D. C.	July 30, 1881.
Supplying the United States Public Buildings in New York City with Fuel; Custodian of the U. S. Court-House and Post-Office Building, New York City	Aug. 1, "
Lighting the Streets of the Town of Ashland; B. F. Keister, President of the Town Council, Ashland, Pa.	" 2, "
Furnishing all the Flagstone necessary for Street-Crossings in the several Street Districts of the City of Pittsburg, from August, 1881, to April, 1882; Office of the City Controller, Pittsburg, Pa.	" 3, "
Drilling a Well near the Water-Works of the City of Jackson; Board of Public Works, City of Jackson, Michigan	" 6, "
Blasting and Removing Solid Rock and Boulders from the Columbia River, adjacent to and below the Site of the Locks at the Cascade. The amount available for this work is \$50,000 or more. Contractors are requested to visit the site for the purpose of examining the charts, which locate the obstructions, and of determining for themselves the character of the work required. Specifications and blank forms may be obtained on application to G. L. Gillespie, Major of Engineers, Brevet Lieut.-Col. U. S. A., U. S. Engineer's Office, Portland, Oregon.	" 6, "
Furnishing and Delivering at the Navy-Yard, Pensacola, one Bement's Suspended Countersinking Drill, with Table on Rollers, for Countersinking Ship Plates, with Counter-Shaft, Hangers, and Pulleys complete; L. T. Brown, P. A. Paymaster, U. S. Navy-Yard, Pensacola, Fla.	" 10, "
Furnishing 36 Spring Wagons (Dougberty Pattern) and 25 Ambulance Wagons (Army Pattern) for the United States Army; Depot Quartermaster's Office, Philadelphia, Pa.	" 16, "
Furnishing Cotton Duck and Materials for the Manufacture of Tents; Depot Quartermaster's Office, Philadelphia, Pa.	" 24, "

ASSAY DEPARTMENT OF THE ENGINEERING AND MINING JOURNAL.

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

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

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

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

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

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

DIVIDEND-PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, Feet on Vein, Capital Stock, SHARES (No., Par Val), ASSESSMENTS (Total levied to date, Date and amount per share of last), DIVIDENDS (Total paid to date, Last Dividend), HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE (July 23, July 25, July 26, July 27, July 28, July 29), SALES.

G. Gold. S. Silver. L. Lead. C. Copper. * Non-assessable. † The Deadwood mine paid in dividends, previous to the consolidation, \$275,000, and the Golden Terra paid \$75,000. Total shares of Dividend-Paying stocks sold during the week, 260,907.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, July 29.

The business in mining shares has been quiet, and prices, as a rule, have been quite weak, the greatest weakness having been developed to-day. The sales have been a little less than last week, amounting to 773,568 shares.

The Bodie stocks show more activity. Bodie, with a small business, was stronger, selling at one time up to \$7 3/4, although declining again to \$7. Standard continues quiet but steady. Consolidated Pacific declined to 15c. Goodshaw was active at 45@67@48c. North Standard records sales of 39,000 shares at 7@17@14c.

Alice ranged between \$7 1/2@8 1/2, with small sales. Amie was moderately active on a decline from 46@37c. Chrysolite announced a dividend of 50c. per share, as we intimated was likely to occur, and touched \$6 1/2, but declined to \$5 1/2 to-day. Copper Knob was quite active at 9@12c. Eureka had a moderate business, and declined from \$30 1/2@29. Hibernia was quite active, but developed marked weakness to-day, selling down to 55c. Horn-Silver, under small sales, has declined to \$14. Hukill was quiet and weak, dropping to 70c. Iron Silver, under a moderate business was steady. It is said that at the next regular dividend period this company will again resume its dividends. Leadville shows a moderate business and some strength. Little Chief had a moderate business at steady prices. Ontario sold at \$35 to-day. Robinson Consolidated holds at about \$10, with small sales. Stormont is almost neglected at \$2.50@2.65. Tip Top has been fairly active at \$5.50@6@4.90@5.50. Early in the week, there were some sales of Alta-Montana at \$2.05@2. Barcelona declined from \$1.50@1, and recovered to \$1.10@1.15 to-day.

Bear Creek was active at \$7@7 1/2. Bull-Domingo, on sales of 2200 shares, declined from \$1.85@1.60. Bye-and-Bye, under sales of 16,000 shares, declined from 29@21c. Calaveras, under a moderate business, was weak. Central Arizona still attracts great attention; the sales amount to 99,815 shares at \$2 1/2@1 1/2@2 1/2. Mineral Creek, under a moderate business, declined from 55@45c. Miner Boy declined from 76@65c. Silver Cliff had a moderate business at steady prices. The Silver Nugget stocks both show important declines. Oriental and Miller appears to have been left to take care of itself. The sales aggregate 65,600 shares at 94@59c. The business in the State Line mines has been confined mostly to Nos. 1 and 4 and Nos. 2 and 3. The sales of the former amount to 60,150 shares at \$1.10@89c., and of the latter to 48,500 shares at \$4.30@3.65. These stocks are being manipulated, and it is difficult to judge the real amount of business done. It is safe to say that it is not nearly what the official records represent.

The Tuscarora stocks have been a little more active but weak.

The Comstock shares still attract a very liberal amount of attention with the old bonanzas as the favorites. California records sales of 8145 shares at \$1.20@1.05 assessment paid, and 65@72c. assessment unpaid. Consolidated Virginia was quite active, the sales aggregating 23,265 shares at \$2.30@2. Suro Tunnel was very quiet and weak, selling down to \$1 1/2. The other stocks were quiet and weak.

A telegram from Leadville, dated July 27th, says: A decision rendered to-day by Judge Helm declares the tax on the income of the mines illegal, and frees Chrysolite, Little Pittsburg, and other companies from immense assessments. There is general rejoicing among mining men here.

Judge Evans made an order of attachment against the Mariposa Land and Mining Company for \$300,

000, says the Mariposa Gazette, against the late receiver, Meyer. The court also made an order of reference to S. H. Dwinelle, to ascertain whether the permission granted the receiver to mine on the premises has been pursued in good faith, and whether there has been any abuse of the proceeding of the court.

A Supreme Court judgment of \$4236.19 was filed on Saturday, July 23d, in the office of the County Clerk for New York County, against Samuel L. Harris and the Bald Mountain Mining Company, in favor of Nathaniel W. Emerson.

The application by the Matchless mine for an injunction against the Dolphin has been dismissed.

The people of Yuba and Sutter counties, California, and the southern portion of Butte, have subscribed \$60,000 to fight hydraulic mining in the courts.

UNLISTED QUOTATIONS.

Mr. L. V. Deforest, No. 70 Broadway, under date of July 29th, 3 P.M., reports the current quotations of unlisted stocks as follows:

Table with columns: Bid, Offer'd, Bid, Offer'd. Rows include Brece, Empire, Fremont, Highland Chief, Lowland Chief, May Flower, Hite, Native Silver, Patagonia, Sacramento, Santa Cruz, Sir Roderick, Dhu, Glass-Fendery.

DIVIDENDS.

The Chrysolite Silver Mining Company has declared a dividend of 50 cents per share, payable August 10th. Transfer-books close July 30th, and reopen August 11th. This is the first dividend declared by this company for over a year, the last one of 50 cents per share having been declared in April, 1880. With the above dividend, which aggregates \$100,000, this company will have returned to its stockholders \$1,200,000. It is understood that a considerable surplus will be carried over, after providing for the above

NON-DIVIDEND PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, NUMBER OF SHARES, Par., ASSESSMENTS (Total levied to date, Date and amount of last), HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE (July 23-29), SALES.

Boston. Quotations and Sales of Mining Stocks for week ending July 27th.

Table with columns: NAME OF COMPANY, Opening July 21, Highest during the week, Lowest during the week, Closing July 27, Total shares sold.

c. Copper. s. Silver.

Philadelphia.

Quotations and Sales of Mining Stocks for week ending July 27th.

Table with columns: NAME OF COMPANY, Opening July 21, Highest during the week, Lowest during the week, Closing July 27, Total shares sold.

total shares of Non-Dividend Paying Stocks sold during the week, 508,861. Total shares sold at all the Exchanges during the week, 773,568.

The Boston Lead Manufacturing Company announces a dividend of \$4 per share.

The La Plata Mining and Smelting Company announces a dividend of 7 1/2 cents per share, equal to \$15,000; payable on August 1st. Total dividends to date, \$355,000.

The Leadville Chronicle of July 16th says, and Messrs. Long Brothers & Derry indorse the same:

We have before us a printed report of the transactions on the Philadelphia Stock Exchange on July 2d, from which it appears that on that day 1000 shares of Long & Derry stock sold at eight cents.

The simple fact is, that the Long & Derry mine listed in Philadelphia is not the real Long & Derry mine, but some concern utterly unknown here and unknown on Long & Derry Hill.

men of Philadelphia who are interested in real mines, and propose to deal fairly by the public, ought to consider whether the further existence of that institution is desirable.

REVIEW OF THE SAN FRANCISCO MARKET.

The Comstocks are generally firm, and the low prices recently attained seem to be well supported, but whether from a general abiding faith by the public in an intrinsic merit in the value of properties themselves, or whether these prices are sustained by speculative rings and what not, we can not say.

Balcher is very firm, as also Crown Point. It is said that these mines are each now yielding an average of 260 tons of ore per week, of course low-grade.

The following statement of the construction cost of the new shaft was submitted at the meeting:

Total cost to date, \$1,674,203.53. Union Consolidated is somewhat lower. It is anticipated that the pumps on the 2700-level of this mine

will be running in ten days. The annual meeting of this company was held in San Francisco on the 17th inst., when 74,000 shares were represented, and the old board re-elected, without opposition, as follows: Robert Sherwood, President. George Wallace, Cornelius O'Connor, Charles H. Fish, and L. P. Drexler. Owing to the illness of the secretary, J. M. Buffington, no financial reports were submitted. In his annual report, Superintendent Patton gives the following as the ore product for the year ending June 30th: The Union Consolidated mine has produced 1621 1600-2000 tons of ore, all of which has been milled, and has yielded the sum of \$49,240.31, or \$30.36 per ton, that being 80 per cent of the assay value, no allowance being made for moisture. The value of the gold in the bullion was \$31,250.92, and of the silver \$17,989.39. This ore was all extracted from the 2500 level.

Savage shows some improvement. A recent number of the Gold Hill News states that at the annual meeting of this company for the election of officers, the old management succeeded in gaining control, and the officers and trustees elected were H. M. Levy, President; D. T. Lazure, Vice-President; J. B. Russell, George J. Ives, and M. Hoefflich, directors. R. P. Keating was chosen Superintendent, and E. B. Holmes Secretary. There are 112,000 shares of stock in the mine, of which 103,261 were voted yesterday.

The men who have gained control promised to resume operations in the mine at an early date should they succeed; and if the promise is kept, the general public and small shareholders will welcome the change.

Overman is fairly maintained at the low prices recently quoted. The annual meeting of this company was recently held in San Francisco, and the secretary's report for the year showed disbursements aggregating \$229,000, for which some \$63,000 for labor was spent. The item of wood figures in the statement to the amount of \$33,743. The Forman shaft calls for \$69,799. The receipts were principally derived from four assessments. Ore sales during the year amounted to \$226. The Forman shaft, it is stated, is down over 2000 feet.

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

Table with columns: NAME OF COMPANY, CLOSING QUOTATIONS (July 23, 25, 26, 27, 28, 29), and Open ing. July 29.

The Philadelphia Mining Market.

The first meeting of the united Exchanges was held on Monday last, at the original rooms of the first Mining Exchange, 310 Chestnut street. The assembled members were called to order by the President of the Philadelphia Stock Exchange at half-past ten, who, in a few well-chosen remarks, favorably impressed the audience. The mining industry, he said, is attracting the attention of capitalists and investors everywhere; and it is the duty of each one of us to

COAL STOCKS.

Table with columns: NAME OF COMPANY, Capital Stock, SHARES (No., Par Val., Last Dividend), Rate per Share, and Quotations of New York stocks (July 23, 25, 26, 27, 28, 29). Includes Am. Coal Co., Cameron C.I., Col. C. & L., etc.

use his best efforts to prevent all but legitimate undertakings from seeking public patronage. By protecting the interests of the public, your own interests will not suffer; but, on the contrary, you will enjoy a large and increased patronage. The chairman of the call, Mr. Camblos, then instructed the members as to the rules to be observed, stating that he would administer them impartially, as well as strictly enforce them. His first official act consisted in fining a member for bidding improperly.

Following are the new rates which have been decided on by the Governing Committee of the Philadelphia Stock Exchange for the Mining Annex. Commission: Stocks under \$1, 1c. per share; \$1 and up to \$2, 2c. per share; \$2 and up to \$5, 3c. per share; \$5 and up to \$10, 5c. per share; \$10 and over, 12 1/2c. per share.

The sales for the past few days have not equaled in amount those of previous days, but this may be attributed to the prohibition of washed sales. What there is of business is solid, and the public may place reliance in the business that is hereafter transacted.

The market has been low, offering a good opportunity to those who wish to buy for speculative purposes. A number of purchases can be made that would afford good investments for the next sixty days.

The preliminary work required in the erection of sampling, smelting, and separating works for the Philadelphia Mining and Smelting Company, has begun. The capacity at first will be 40 tons, and will be considerably raised. The company is composed of about a dozen of the leading capitalists of Philadelphia. The capital stock of \$2,000,000 is all subscribed for. The company owns five mines on the west fork of Wood River. It will work the ore of these mines and will also buy outright any ores offered for sale in whatever quantity. The works will be in operation in sixty days.

Copper and Silver Stocks.

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

The mining share market continues much the same as previously reported, dull and comparatively inactive, particularly the copper stocks of Lake Superior, which fail to attract the public attention. It should be stated, however, that we are in the middle of the summer, and these periods of apathy are not unusual at this season. At the Mining Exchange, where the business covers a line of stocks outside of what are known as "coppers," there is increased activity in some few of the special stocks, with a largely increased business the past few days.

Calumet & Hecla farther declined from \$215@220, but has since rallied to \$220, which is fully up to the price of two weeks ago. The annual meeting of this company will be held on the 17th of August, when a statement of the results of the year's business will be made public.

Alouez is firmer, and has advanced from \$24@25. It is understood that orders from the Lake are in the market, which is always considered a good feature for a stock.

Brunswick Antimony has sold at \$12@13, with a fair demand for the stock. It is generally believed that the new managers will present a plan for arranging the finances of the company that will increase the value of the property.

Blue Hill is without sales, but holds firm at \$3 1/2 bid. Central, no sale since May 6th, at \$31. The company has declared a dividend of \$3, payable in August. It also paid \$4 in February last. This is the first semi-annual payment ever made by the company.

Douglas steady at \$3, with more buyers than sellers. The new mill at the mine is now working satisfactorily. Franklin, not a sale since July 21st, at \$10 1/2; now \$10 bid, \$11 asked. Osceola, a single sale at \$30, and offered at the same. Pewabic receded a fraction to \$107, but later rallied to \$113, and closes \$11 bid. Quincy advanced from \$36@37, and closes \$36 1/2 bid. As suggested last week, a dividend of \$3 per share has been declared, payable August 22d.

Ridge, no sales, but \$3 is firmly bid, and the stock could not be obtained better than \$3 1/2@3 3/4.

In the silver stocks, the market was very dull early in the week, and declined, but rallied later in some cases. Bonanza Development fell from \$5 1/2@5, rallying later to \$5 1/4, which is bid.

Catalpa settled from \$1 9-16@1 1/4, but rallied sharply to \$1 1/4 on better reports from the mine.

Crescent, in sympathy, advanced from 75@93 1/4. Harshaw, reported weak at the date of my last letter, has since receded from \$7@5, but selling to-day at \$5 1/2@6, and closes at \$5 1/4 bid.

Indian Queen, no sales, but firmly held at \$3. The accounts from this mine are of a highly favorable character; and when the increased milling facilities are in operation, a larger product will allow the payment of increased dividends.

Napa Quicksilver has not appeared this week at all, but \$5 1/2 is bid, \$6 asked.

Pine Tree, which broke from \$3 1/4@3 1/2 on Friday last, has since rallied to \$3, and that is now bid.

San Pedro has declined from \$3 1/2@3 1/4 just at the moment when every body said it should advance.

Sullivan is dull again, and has declined to \$3 1/4 asked.

At the Mining Exchange, the market was the dullest of the season early in the week, but has later assumed greater vigor, and in some cases the transactions have been unusually large. The feature has been Milton, which formerly declined from \$1.50@1.17 on Wednesday, this proving the lowest point. To-day, the market opened at \$1.19, and, with a steady and strong buying, the price rose gradually and persistently to \$1.34. At second Board, the price opened at \$1.35, but weakened later at \$1.31, closing at that bid. The demand on buyers' option was unusually strong, and over 10,000 shares changed hands in that way, selling as high as \$1.50, buyer 60. The sales for the day foot up 32,000 shares.

Empire has been somewhat neglected, and declined from 46@41c. on limited transactions for this stock.

Copperopolis has only advanced two points, but maintains its position at \$1.96. The exhibition of ore from the mine at the company's office is attracting much attention, and the managers feel confident they have a property which will in due time pay its way and speak for itself.

Dunkin declined from 62@57c, but since rallied to 58c. bid. There is a growing feeling here that the price of this stock has been unduly depressed and that the time is near at hand when better figures will be current for it.

Massachusetts & New Mexico has lost all vigor for the present, dropping from 60@55c., and dull at that.

Mendocino holds its own well at \$5 bid, and the stock fails to come out. The prospects of this property are understood to be very flattering, and the stock has held its position in the market better than any other yet placed on the Board.

Tremont silver has further declined from 80@65c., and dull at that.

3 P.M.—At the Boards this afternoon, there was a more vigorous movement in stocks generally, and prices as a rule were well sustained, but the general details are included in the summary above.

Coal Stocks.

NEW YORK, Friday Evening, July 29.

Until yesterday, these stocks, in common with the general market, were unsettled and weak, and under large sales declined heavily. Yesterday, however, there was a sharp recovery, with a rapid advance in prices, which has been maintained to-day. To-day's closing quotations are a few points higher than those of a week ago.

The bulk of the business has been absorbed by Delaware, Lackawanna & Western and New Jersey Central, the sales of the former amounting to 173,600 shares at \$120 1/2@118@123 1/2; and of the latter, 145,430 shares at \$94 1/2@89 1/2@96 1/2. Delaware & Hudson Canal has had a business of 16,567 shares at prices fluctuating between \$106 1/2@109 1/2. Reading in this market has sold to the extent of 17,600 shares at \$56 1/2@59 1/2.

There has been a fair business done in the stocks of the bituminous coal companies. Cameron sold down to \$37 1/2, but under large buyings yesterday advanced to \$44, and closes at \$43. Of Maryland, 200 shares have changed hands at \$27@26 1/2, and of New Central 900 shares at \$27@26 1/2. Consolidation records sales of 500 shares at \$39@38. Colorado Coal and Iron, 17,600 shares at \$55@45@54 1/2.

BULLION MARKET.

NEW YORK, Friday Evening, July 29.

The market has weakened a little since our previous report, but is without feature worthy of notice.

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

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

BULLION PRODUCTION FOR 1881.

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

Main table of bullion production with columns: MINES, States, For the week, Month of July, Year from Jan. 1st, 1881.

Total amount of shipments reported to date. \$16,906,261

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

CALIFORNIA.

Standard.—The superintendent reports for the week ending July 25th that 1208 tons of ore were shipped to the mill; average pulp-assay, \$26.82. Crude bullion received, 3600 ounces.

UTAH.

Salt Lake City.—For the week ending July 21st, the bullion shipments aggregated \$128,466.65.

MISCELLANEOUS.

Bullion Receipts from the Mines to New York.—The bullion received from the mines at the various offices in this city during the week ending with yesterday, as compiled from various sources, amounts to \$462,709.44, as against \$262,667.11, reported in our last.

San Francisco Mint Statistics.—The coinage at the San Francisco Mint for the first six months of 1881 compares with that in 1878, 1879, and 1880 as follows:

Table comparing coinage statistics for 1878, 1879, 1880, and 1881.

Totals. \$26,395,000 \$18,259,750 \$16,257,000 \$18,780,000

Table describing coinage for the six months of 1878, 1879, 1880, and 1881.

The amount of bullion withdrawn from the Bank of England on balance July 28th was £506,000, of which £406,000 was for shipment to Italy.

The U. S. Treasury Department on the 28th inst. purchased 510,000 ounces of fine silver for delivery at the Philadelphia, San Francisco, and New Orleans mints.

METALS.

NEW YORK, Friday Evening, July 29.

There is a very good business doing for this season of the year, and prices are firm or higher. The outlook for the metal trade is a very satisfactory one, with prospects of a good business as the result of a consumptive rather than a speculative demand.

Copper.—There has been a very fair business in this metal, the sales amounting to between 300,000 and 500,000 lbs. in outside lots, at 16½@16¾c. The leading mining companies are holding at 16¾c.

Our London advices include the 15th, from which we extract the following:

July 11th. The sales, including the 9th, aggregate 150 tons, at £58½@£58¾, g. o. bs. cash. A correspondent says:

Great diversity of opinion exists as to the actual state of the home consumption of copper, and the following figures certainly show a very great discrepancy between this and former years:

Table of apparent consumption for 1879, 1880, and 1881.

It will be seen from the above that, whereas, from July 30th, 1879, to June 30th, 1880, consumers took away 32,160 tons, they only absorbed 24,220 tons during the same period 1880-81, a decline of 25 cent; and it would be most interesting to learn which department of the trade has suffered so severely, the exports being maintained at their usual average.

July 12th. Sales of about 200 tons for cash at £58½@£58¾, according to brand.

July 13th. One warrant changed hands at £58½ cash for g. o. bs. The announcement of smaller charters brought out a business of about 100 tons at £58½ cash and short prompt. The charters consisted of 550 tons bars and ingots, 550 tons pure in ores and regulus, all for England.

CHARTERS.

Table of charters for 1881, 1880, 1879, and 1878.

SHIPMENTS.

Table of shipments for 1881, 1880, 1879, and 1878.

Price of bars at Valparaiso \$19.10, exchange 39¾ 1d., which, with steamer freight 60s., is equal to £58½ Liverpool, without commission.

July 14th. Only a small business in Chili Bars at £58½ for g. o. bs., £58¾ for favorite marks, and £59½ for best brands, all cash.

July 15th. The statistics published to-day show a reduction of about 4000 tons in stocks during the past twelve months, and a reduction of 25@30s. per ton in prices. There was but a small business done this day. G. o. bs. sold at £58½ cash, and £59½ forward delivery. Australian rules about £67@£68 for Wallaroo, and £65@£66 for Burra.

Tin.—Straits in London is a little higher, being quoted by cable at £90 10s. Singapore quotes at \$28.20. From Penang there is no quotation, although it is announced that in that market there are no sup-

plies. There has suddenly developed a very active business in this market, and for the week we announce sales of about 600 tons at 20½@20¾c. At the close, 21c. is asked, and as the purchases were mostly made by one house, stocks are now well concentrated. Much higher prices are predicted within next 60 days. L. & F. is quoted at 21c. Sales of 15 tons at 20¾c. are reported.

Our London advices include July 15th, from which we take the following:

July 11th. Only a moderate business, with cash sales at 89@89½s., according to prompt.

July 12th. Moderate sales at 89¼@89½s. sharp cash, and 89½@89¾s. usual 14 days.

July 13th. Quiet, with few sales at 89¼@89½s. sharp cash, 89½@89¾s. ordinary cash terms, and 90½s. three months.

July 14th. Sales of 10 tons at 89½s. sharp cash.

July 15th. Market quiet, with small transactions at 89½@89¾s. prompt cash.

Tin Plates.—The market is quiet, strong, and a shade higher. We quote, per box, as follows: Charcoal tins, Melyn grade, ¼ cross, \$6½@\$6¾; Alloway grade, \$5½. Charcoal Roofing, Dean grade, \$5.37½ for 14 x 20, and \$11½@\$11¾ for 20 x 28; Alloway grade, \$5.20@\$5½ for 14 x 20, and \$10¼@\$11 for 20 x 28. Coke Roofing, B. V. grade, \$5 for 14 x 20, and \$10½@\$10¾ for 20 x 28. Coke tins, B. V. grade, IC, \$5.10@\$5.12½; ICW, \$4½@\$4¾.

Messrs. Robert Crooks & Co., of Liverpool, under date of July 14th, say of tin and terne plates: The cheaper sellers, as they offer, are being quickly accepted, and as a whole we have to report a steady market. Makers are particularly indisposed to sell forward, and ask a substantial advance for delivery past the end of this month.

Lead.—The sales for the week are said to amount to 500 tons at 4¼@49c. for present and future delivery. Most of the sales taking place are made from second hands. At the close, the market was firm at 4¼ for common and 5c. for refined.

The shipments of lead over the St. Louis & San Francisco Railroad for the week ending July 21st were 196 tons.

Spelter and Zinc.—The former is firmer here and higher abroad. We quote at 5@5½c. Sheet Zinc is quiet at 6¾@7c.

Antimony is without any features worthy of notice. Cookson's is quoted at 14¼c. and Hallett's at 14½c.

Quicksilver.—The San Francisco Commercial Herald of July 21st says:

Leading producers are firm in demanding 38c., with a very small spot stock. London price, £8 10s. per bottle. The exports for the week, by sea, were as follows:

Table of quicksilver exports to San Blas per Granada, hence 20th inst.

Totals. 121 \$3,526. Previously since Jan. 1st, 1881. 23,448 678,929

Totals. 23,569 \$682,455. Totals same period 1880. 21,310 645,813

Increase in 1881. 2,259 \$36,642. Receipts since January 1st, 1881, 31,183 flasks. Overland shipments from January 1st to July 1st, 1881, 4804 flasks.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, July 29.

There is a very good business doing in all departments, and prices are without exception firmer, if not higher. The outlook favors a tremendous consumption and a large business. Prices are likely to advance all around. A more satisfactory demand could not be looked for, but higher prices are desirable in some instances.

American Pig.—This article has at last begun to show the long-looked-for improvement. Sales of 15,000 tons of Thomas iron are reported on the basis of \$24 for No. 1 Foundry. The Crane Iron Company is reported to have sold several hundred tons of No. 1 Foundry iron at \$25. All grades of good brands are getting a little scarce, while it is difficult to buy approved brands of English iron except at an advance. We quote No. 1 Foundry at \$24@25; No. 2 Foundry, \$22; and Forge, \$20@21.

Scotch Pig.—This class of iron is firm, with a tendency to advance, more on account of advancing reights than higher prices in Glasgow, where there is

The decrease in shipments of Cumberland Coal, over the Cumberland Branch and Cumberland & Pennsylvania railroads, amounts to 111,831 tons, as compared with the corresponding period in 1880.

The shipments of Cumberland Coal, over the George's Creek & Cumberland RR., by the Maryland and the American Coal companies, for the week ending July 23d, amounted to 6362 tons, making a total of 40,688 tons since the beginning of transportation.

The Production of Coke for the week ending July 23d, and year from Jan. 1st :

Table with columns: Tons of 2000 lbs., Week, Year. Rows: Penn. RR. (Alleghany Region), West Penn. RR., Southwest Penn. RR., Penn. & Westmoreland Region, Pa. RR., Pittsburg, Penn. RR., Snow Shoe (Clearfield Region).

Comparative statement of the production of anthracite coal for the week ending July 23d, and years from January 1st :

Table with columns: TONS OF 2240 LBS., 1881 (Week, Year), 1880 (Week, Year). Rows: Wyoming Region, D. & H. Canal Co., L. V. RR. Co., C. R. of N. J., Penna. Canal Co., Lehigh Region, Schuylkill Region, Shamokin & Lykens Val., Sullivan Region, St. Line & Sul. RR. Co., Total, Increase, Decrease.

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

Table with columns: Total same time in 1876, 1877, 1878, 1879. Rows: 1876 (8,123,134 tons), 1877 (11,136,021), 1878 (8,498,437), 1879 (13,898,662).

Horsford's Acid Phosphate A Nerve Food.

I do certainly consider that it not only acts as a tonic to the nervous system, but as a food. Springfield, Ill. R. S. MILLER, M. D.

OFFICE OF THE Chrysolite Silver Mining Co., 18 WALL STREET, NEW YORK.

July 25, 1881. The Board of Trustees of this Company have this day declared a dividend of one per cent on ten million dollars capital stock of the company, amounting to one hundred thousand dollars, or fifty cents per share, payable at the office of the company on the 10th day of August, prox. The transfer-books to close on the 30th of July, at 3 p.m., and reopen on the 11th day of August.

HENRY C. COOPER, Secretary.

THE BORVA COPPER MINING COMPANY.

Capital, \$1,000,000. 100,000 Shares.

Full-paid and Unassessable.

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Under the same management in Arizona and New York as the Old Dominion Copper Mining Company.

A limited amount of the Borva Company's stock is offered for subscription at \$3 per share until August 6th, after which date price will be advanced.

Subscriptions will be received at office of the Old Dominion Copper Mining Company, 72 Broadway, New York. GEORGE W. DUNN, President.

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FREIGHTS.

Coastwise Freights, Per ton of 2240 lbs.

Representing the latest actual charters to July 29th, 1881.

Table with columns: PORTS, From Philadelphia, From Baltimore, From Elizabethport, Port Johnston, South Amboy, Hoboken, and Weehawken. Rows: Alexandria, Annapolis, Albany, Baltimore, Bangor, Bath, Me., Beverly, Mass., Bristol, Bridgeport, Conn., Brooklyn, Cambridge, Mass., Cambridgeport, Charleston, Charlestown, Chelsea, City Point, Com. Pt. Mass., E. Boston, East Cambridge, E. Greenwich, R. I., Fall River, Galveston, Georgetown, D. C., Gloucester, Hartford, Hackensack, Hudson, Lynn, Marblehead, Medford, Millville, Milton, Newark, N. J., New Bedford, Newburyport, New Haven, New London, Newport, New York, Norfolk, Va., Norwich, Norwalk, Conn., Pawtucket, Philadelphia, Portland, Portsmouth, Va., Portsmouth, N.H., Providence, Quincy Point, Richmond, Va., Rockland, Rockport, Roxbury, Saco, Sag Harbor, Salem, Mass., Saugus, Savannah, Somerset, Staten Island, Trenton, Troy, Wareham, Washington, Weymouth, Williamsbz, N.Y., Wilmington, Del., Wilmington, N.C.

* And discharging. † And discharging and towing. ‡ 3c. per bridge extra. § Alongside. ¶ And towing up and down. ** Below bridge.

MAPS.

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

COLORADO.—Topographical and Township Map of the State. Compiled from U. S. Government Surveys and other authentic sources, by Louis Nell, Civil Engineer. By means of symbols, the following mass of facts is graphically shown: Railroads in operation; Railroads chartered or in progress; Wagon-roads; Wagon-roads proposed; Trails; Drainage dry during the greater part of the season; County-seats; Post-offices (July 1st, 1880); Villages; Townships subdivided; Townships surveyed in outlines; Contour-lines, with vertical intervals of 1000 feet; Altitudes in feet above sea-level, by barometer observations, and by spirit-levels; Private grants; Military reservations; Indian reservations ceded to the U. S. Government; Arable and, with irrigation. Scale, 1 inch: 10 1/2 miles. Size, 31 x 40 inches. Pocket form. \$1.50, on thick paper, varnished, on rollers, \$1.75.

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

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

SAN JUAN MINING DISTRICT (COLO.).—Kibbe's Map of the San Juan Mining District locates towns, camps, post-offices, reduction-works, mining districts, etc. It gives the new local names of towns, mountains, and gulches in all the mining camps, including Durango, Rico, and the new county of Dolores, the new railroad and railroad towns, and the proposed railroads, stage routes, wagon-roads, and trails; the elevation of mountains and towns above sea-level. It is colored by counties, 25x27 inches, linen paper, folded in cloth cover for pocket form, or printed on heavy paper for office use. Also, a complete GEOLOGICAL MAP of the same size. Either map, \$1.50.

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

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

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

MEXICO.—Map of Mexico. Showing Railroads, Broad Gauge and Narrow-Gauge, Constructed; and Railroads, Broad-Gauge and Narrow-Gauge, Proposed. This very large and finely-engraved Map, constructed originally by the government for official purposes, contains all the information obtainable by it, and shows minutely the towns and villages of the entire country. Scale: 25/6 Mexican Leagues to the degree, and 69/16 English Miles to the degree; also, Kilometrical Scale. 1881. Size, 53x41 inches. Printed in colors. Pocket form, \$5.

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WANTED \$10,000.—FOR AN IMPORTANT interest in a valuable mining claim in a popular district and adjoining very valuable mines. Money to be applied to developing mine. A rare "hard pan" opportunity. Address A. B. X., care of ENGINEERING AND MINING JOURNAL.

WANTED.—TWO PAIR HOUSINGS TO take in sheet roll for 16-inch journal, all complete; also, one pair of pinions to match; all second-hand. Two pair sheet rolls, about 22 in. long 18 in. diameter, neck 16 in. diameter, 12 in. long; second-hand or new. Address with full particulars, ROLLS, 75 Lexington Ave., New York.

A CIVIL ENGINEER, WITH SEVENTEEN years experience in the employment of a coal company, would like an engagement as Superintendent or Engineer. Is accustomed to plan and build all kinds of coal works, etc. Best of reference. Address, ENGINEER, Box 400, Scranton, Pa.

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A PARTY FROM NEW YORK, NOW VISITING Arizona, who has had large experience in Mines and Mining, both in the United States and South America, will attend to any business and visit and report on mines and mining operations, wherever required in that Territory, or in New Mexico, for the next sixty days. Refers, by permission, for particulars, to JOHN P. ADAMS, Esq., Counselor at Law, 194 Broadway.

DIVIDENDS.

ROBINSON CONSOLIDATED MINING CO. DIVIDEND NO. 4.

NEW YORK, July 2, 1881. The Board of Directors have this day declared a monthly dividend of Fifty Thousand Dollars, payable on and after July 15th, at the office of the company, 18 Wall Street. The transfer-books will be closed from 3 o'clock P.M. of the 9th until 10 o'clock A.M. of the 16th inst. FINANCIAL STATEMENT FOR JUNE, 1881. Surplus on hand as per last statement (May, 1881) \$35,950.54 Received from sales of ore and bullion during month of June 74,650.53 Bullion at Newark Smelting and Refining Works, and in transit thereto, estimated 45,000.00 Cash and bullion at mines as per report of Thomas Ewing, Manager 50,000.00 Received from sale of bullion in excess of estimated amount at and in transit to Newark Smelting and Refining Works, as per May statement 4,998.16 \$210,599.23 Deduct bullion on hand, as per May statement 55,000.00 Disbursements for month of June 29,639.73 Deduct dividend for July 15th 50,000.00 134,639.73 Surplus on hand July 1st \$75,959.50 JAS. K. SELLECK, Secretary.

OFFICE OF THE STARR-GROVE SILVER MINING COMPANY, No. 2 Nassau st., cor. Wall st. NEW YORK, June 15, 1881.

DIVIDEND NO. 8.

The Board of Trustees have this day declared the regular monthly dividend of ten cents a share, being one per cent on the capital stock of the company, payable on the 30th inst., at this office. The transfer-books will be closed from the 21st to the 30th inclusive. W.M. S. CLARK, President. JOHN R. BOWWELL, Secretary.

THE STANDARD CONSOLIDATED MINING COMPANY to-day declared its regular monthly dividend of

SEVENTY-FIVE CENTS PER SHARE, payable July 12th, 1881, at the Farmers' Loan and Trust Co., 26 Exchange Place, New York. Transfer-books close July 5th, and open on 13th inst. M. R. COOK, Vice President.

OFFICE OF COPPER QUEEN MINING COMPANY, 34 and 36 Thomas Street. NEW YORK, July 15, 1881.

The Board of Directors of this company have this day declared a monthly dividend (No. 2) of Twenty-five Thousand Dollars, being 10 cents on each share of the capital stock of the company, payable on and after August 1st, 1881, to stockholders of record, at the office of the company. Transfer-books close July 28th, and reopen August 3d. A. A. HAYES, Jr., President. L. ZECKENDORF, Secretary and Treasurer.

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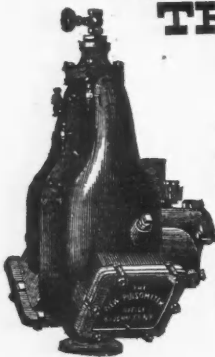
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GREENPORT, L. I. N. Y., May 6, 1881. In regard to the No. 3 New Pulsometer we purchased of you, we have to say that it gives us complete satisfaction, far beyond our expectations. It is used for pumping water into tanks for supplying steamboats. It stands 90 feet from well, raising the water 9 feet vertical and forcing it up 15 feet. We can cheerfully recommend it to any one in want of a pump for supplying water. Yours, etc., H. FORDHAM & SON.

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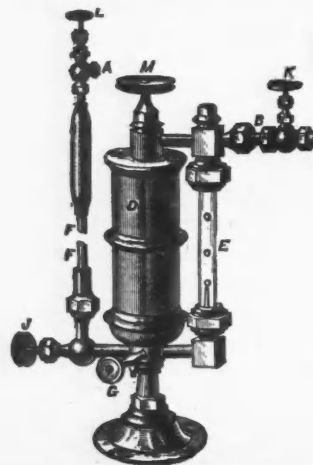


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