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By a dispatch to us from Connellsville, Pa., we are informed that a number of civil engineers or young graduates can find employment on the new Wabash road going out of Pittsburg. Applications, with testimonials as to qualifications, etc., may be addressed to Mr. E. K. HYNDMAN, who is, we suppose, at Connellsville.

VOL. II., No. 2, of *Papers read before the Pi Eta Scientific Society, Rensselaer Polytechnic Institute, Troy, N. Y.*, has the following table of contents: The Camber of Bridges, by THOMAS M. CLEEMANN, C.E.; the Inter-Oceanic Canal, by W. E. DAUCHY, C.E.; Bridge-Pins—their Sizes and Bearings, by J. A. L. WADDELL, C.E.; Rational Fractions, by ADOLFO E. BESOSA, C.E.; Note on Gordon's Formula for Long Columns, by WILLIAM H. BURR, C.E.; the Size of the Angle Block in a Howe-Truss Bridge, THOMAS M. CLEEMANN, C.E.; and Discussion of Paper on "Braced Iron Piers," by WILLIAM H. BURR, C.E. The typography and paper are excellent, and there are a number of folding-plates, including a map for the article on the Inter-Oceanic Canal.

We publish elsewhere an interesting article on the occurrence of apatite in Norway, by Messrs. W. C. BROEGGER and H. H. RENSCH, who in 1876 made a six weeks' tour at the expense of the government in order to study in detail some of the most important deposits. The article will be the more interesting to many of our readers in consequence of the similarity to the Canadian deposits of apatite, which are now attracting considerable attention. The authors of the article, in quoting Dr. T. STERRY HUNT's description of the Canadian deposits and his theory of their formation, state that he has assigned quite a different mode of formation to the apatite-bearing veins of Canada, which, according to the description, they affirm, must be exactly similar to theirs. We understand that the French government has lately sent out mining engineers expressly to report upon the Canadian apatite deposits, and important transfers of properties have lately been made to American and English purchasers. The trade is good, and high-grade phosphates realize from \$15 to \$16 per ton of 2240 pounds for 80 to 82 per cent of phosphate of lime, delivered on the riverbank. An important feature of the trade is, that a market has been

found for the "seconds" produced in culling the "firsts" to so high a grade. The seconds will give from 50 to 65 per cent of phosphate of lime, and large works have been erected in Chicago, to which they are shipped as a back freight at a low rate.

EDITORIAL CORRESPONDENCE.

SILVERTON, COLO., June 21, 1881.

The rapid extension of the narrow-gauge railway system in Colorado is making many places comparatively easy of access, which could formerly be reached by difficult and dangerous journeys only. This is particularly true of the Gunnison and San Juan regions; although it must be confessed that there still remains, and that there will remain, after the most sanguine dreams of railway-projectors shall have been realized, enough of fatigue and adventure, of climbing, sliding, wading, horse-riding, mule-riding, "burro"-riding, in these mountains to satisfy the most ambitious member of the Rocky Mountain Club.

Leaving South Arkansas station, in the Arkansas Valley, last week, our party traveled by the Gunnison branch of the Denver & Rio Grande road as far as that variable point known as "end of track." On the day of our trip, this point was a place called first Silver Creek, and afterward Shirley, consisting of the usual temporary huddle of tents and shanties, used as eating-houses, saloons, and stores, and patronized by the teamsters whose heavy wagons and processions of mules or oxen receive at this point the transmontane freight. Here also waited the coaches for such tourists and immigrants as would rather pay twenty cents a mile than walk. That one may have to walk, here and there, in particularly steep places, even after paying one's fare to ride, goes without saying, everywhere in the mountains. Only two days after we took the coach at Shirley, the railway-terminus for passengers was advanced fifteen miles, to the summit of the Marshall Pass in the great Saguache range—the main divide of the Rocky Mountains.

Obstructed as they are by construction-trains, and exposed to all sorts of accidents and delays, incident to the inchoate stage of business, it is surprising that these new railroads can accommodate the public as well as they do; and it would be unreasonable to complain of the irregularities which constantly occur. At present, the time-table on the Gunnison branch is a hollow mockery. The train at South Arkansas waits for the trains on the main line; then it waits for orders; then it waits for fun. On the day of our journey, a freight-train off the track below South Arkansas kept us at that place some ten hours—for most of which time we had the involuntary company of His Grace of Sutherland and party, whose special train was delayed by the accident, and who thus obtained an opportunity to see an unexpected phase of railway engineering. Probably they did not admire the facility with which our trains leave the track; but they must have recognized the energy and rapidity with which a new line was constructed in a few hours around the whole of the wreck. We made no further acquaintance with the party than to wonder idly which was the Juke, and to settle upon a distinguished-looking swell, who turned out to be a railway-official, in charge of the excursion.

At Poncha Springs, at the foot of the Saguache range on the east side, a branch starts westward to Maysville, seven miles distant. Six miles beyond Maysville is Garfield, around which are a number of active silver mines. Those on Columbus Mountain carry free-milling ore near the surface, but soon run into somewhat refractory sulphurets, which, however, it may still be possible to treat in moderately successful measure by a modified amalgamation. At present, the owners (the New York & Colorado Mining Syndicate) are erecting a very good ten-stamp mill.

The main line of the Gunnison division continues southeast from Poncha Springs to the aforesaid summit, 23 miles from South Arkansas, and 45 miles from Gunnison City. Owing to the delays I have mentioned, we did not reach Gunnison until four A.M.; and since we left at five, our glimpse of the town was brief. It has what is considered a good location, topographically—that is, a plateau big enough for a town to live and grow on, with streets sufficiently wide to permit the turning of a sixteen-mule train, if need be; also, a water-supply, and timber and fuel-wood near.

Speaking of timber, I must pause to express the indignation and sorrow with which every citizen must regard the awful destruction now going on among the forests of the Rocky Mountains. Of legitimate and illegitimate consumption of the timber on the public lands there is more than one could wish. The railroad, I believe, has the right to cut ties from any unoccupied land. Then the country is full of saw-mills; and I am told that after parties have taken up, according to law, a mill-site and a limited timber tract, they conveniently ignore the lines of the latter, and get their logs where they choose. Then the miners who locate claims on the hillsides are entitled to the use of the timber on their locations; and a good business may be done by locating claims of say 1500 by 300 feet, chopping down the trees before the end of the first year, and then abandoning the claim. And finally (but without exhausting the category of

possible methods of depredation) there is plenty of straightforward plundering without legal pretense of excuse.

But all these evils are temporary. As fast as the timber-supply becomes valuable, through scarcity or demand, individuals will take pains to acquire and defend valid proprietary rights in it; and the era of irresponsible slaughter will cease. Moreover, nobody cuts down trees for fun; and the lumber and fuel thus obtained, though they may be directly taken from the government, are indirectly used for its benefit in promoting the settlement and developing the resources of the country. Reprehensible as many of these practices are, they shrink to nothing, both as to the nature and as to the extent of their mischief, in comparison with the wanton, brutal carelessness, or worse, which permits the annual destruction by fire of many square miles of forest. Every body lays the blame upon somebody else. Last year, they said the Utes had fired the mountains, to prevent the white men from finding game there. The story is not credited by the most intelligent citizens with whom I have talked; and the prevalence of these fires at the present moment in districts from which the Utes have utterly retired, is a significant circumstance. I have seen at least a dozen within the last fortnight. A few days ago, Leadville itself had a second or third narrow escape from destruction by this cause. I am satisfied that the recklessness or malice of individuals—teamsters, prospectors, outlaws, etc.—is the principal cause. Neither the genuine old pioneers nor the industrious settlers would be guilty of such criminal folly. But the country is full of a new set, possessing the roughness without the skill and prudence of the old frontiersman; and among these there are plenty of desperate fools, for whom the better part of the community can not be blamed. The railroads have introduced a new element of danger—one, perhaps, which may be diminished by watchfulness on the part of their officials and engineers, particularly if they are held to strict responsibility for the damage they do to public as to private property. The powerful freight locomotives, tugging up grades of more than 200 feet to the mile, and burning the friable lignite of the region, throw out great quantities of cinders and sparks; and in the dry season can scarcely fail to kindle fires which, if not checked at once, may assume disastrous proportions. Two days ago, on the San Juan division of the Rio Grande road, I saw an entire mountain wrapped in smoke and flame, which had apparently proceeded from the railroad at its foot.

Whatever be the cause or whose the blame, the effects are sad enough, and sadder to-day than ever before. In all the vast complex of mountain peaks in Colorado, I think it would be hard to find one (at least within the region yet open to the whites) that is not scarred and seared. From every summit or pass one beholds great stretches of dead timber, and notes that there is no new growth of value coming to replace it. In many places here, as with us in the East, the worthless scrub-oak, with other underbrush, usurps the ground; and the pines and spruces do not reappear.

But I fear I am "lost in the timber;" and I must suspend my progress until I have again struck the trail.

MONTANA MINING NEWS.

Special Correspondence of the Engineering and Mining Journal.

This territory has received a great deal of attention from Eastern and English capitalists this spring. No immediate results are as yet visible; but those best posted seem to think that it is the omen of future greatness for the mining industry of the country. Many mines are incorporating here, under territorial laws, and the stock is being taken by home people—something which has not been done heretofore.

The Bell Silver and Copper Mining Company, at Butte, started with quite a boom; but its stock, which was put on the market at \$1 per share, has no sale now in Butte at any price. There seems to be some mistrust somewhere in regard to the company.

The Stevens Silver Mining Company is another home corporation, managed and owned by men of unquestioned ability and integrity. The capital stock is four millions, divided into 400,000 shares at \$10 each. Of this number, 150,000 shares were placed in the treasury of the company as working capital. The trustees recently sold 60,000 shares at 50 cents per share, at which price they were quickly taken. The property is situated within the town-site at Butte, and is developed by two shafts of 100 feet deep, and the vein opened a distance of 300 feet. The management is A. Wartenweiler, President; R. S. Jones, Vice-President; William Read, Secretary; Messrs. Marcus Daly, I. K. Clark, J. K. Pardee, and T. A. Bennett, Trustees. A reference to these names shows a large number connected with other successful properties. Mr. Daly had charge of the development of the Alice mine; and Mr. Pardee has successfully managed the Algonquin mine. The remaining 90,000 shares belonging to the company are to be sold at \$1 per share; and the proceeds placed in the erection of a 40-stamp mill, etc. I have enlarged upon this considerably, not only on account of the intrinsic value of the property, and the honesty and efficiency of its management, but also because I see in it a solution of the vexed problem as to how Montana's bonanzas can be best made to pay; and that is, by our own people—men whom we know and trust, to take hold of these properties, and develop them themselves, and not wait for the rush and speculation of outsiders, who care only for the money that is made in the manipulation of the stocks, and not in the production of the mine itself. We have had properties run on that principle in this territory in the past, and some now are run that way; and the end will surely come.

Messrs. Horst, A. J. Arnold, M. A. Meyendorff, et al., have sold the

Nellie Grant, Good Friday, and other mines in the Ten Mile District, for \$120,000, to some capitalists in the East and England, represented by John Longmaid and H. S. L. Sherard. The money, I understand, is to be paid in two weeks from date, and a sixty-stamp mill erected. Messrs. Longmaid and Sherard have been here all spring, and have bonded many properties.

L. C. Hill, Esq., has been here also. He represents some English people. He has bonded for them the Blue Bird and Cotter & Hickey mines of the Silver Creek District. Price not named. These properties appear very good, and, under competent and able management, can no doubt pay dividends. Mr. Hill, by his gentlemanly deportment and upright bearing, has won many friends in Montana.

Professor Maynard paid Helena a short visit the latter part of May, and examined the Belmont property. What his immediate object was, is not given out. This property still hammers out about \$8500 per month, and is economically managed.

The Gloster, under its new management, produces monthly about \$6000, with 10 stamps. They mean to add 40 more, and a corresponding increase in their bullion product may be expected.

Messrs. Tatem, Chadwick & Chumaseo have bought out their partner, D. H. Gilmour, in the Albion, but are not now working it. During the winter, this property produced about \$6000 monthly, and was ranked among the promising mines of the Silver Creek District.

The Little Giant Mining Company is still pounding away. It brought in on the first of this month about \$4000, and expects some \$12,000 or more on the 1st of September, as it has lots of good ore on the dump awaiting crushing.

All these mines named are within a radius of twenty-five miles of Helena, and are bound to improve. This city is in the center of as fine a mining district as I ever saw, and time will show the truth of this assertion. The famous Drum Lumond, owned by Thomas Cruse, is still pounding away with its little 5-stamp mill, and its product is about \$6000 per month. The mine is down 160 feet, and opened 125 feet on the vein, and the vein averages 60 feet in width, and the ore \$25 per ton. Mr. Cruse was offered a round million for his property, which was refused. A parallel location of the Drum Lumond (unpatented) has been jumped by some parties through a legal technicality, and much excitement is the consequence. As each party has plenty of money, a fat thing for the lawyers is expected. The merit of the case seems to lie with Mr. Cruse, who has the sympathies of the public.

In placers the work is briskly carried on, and the old Confederate, Last Chance, Alden, Basin, Highland, and many other gulches are producing their full share of "dust."

TUBEROSH.

THE MINES AND BULLION YIELD OF TOMBSTONE, ARIZONA.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Nearing the summer solstice, the calorific effect is great, although the thermometer at 100 degrees produces less evaporation than the humid atmosphere of the East at 15 or 20 degrees less. A noticeable thing is the absence of any cases of sunstroke.

That portion of Tombstone embraced within the limits of the Vizina Consolidated, Gilded Age, and others, unfortunately suffers from a dispute between the owners of the above mines and the Town Site Company, regarding the ownership of the land. A compromise would be beneficial to the permanent growth of the place; then perfect titles could be obtained and credit had thereon; but to build or borrow money on so insecure a right will not be done.

In a previous letter the largest producing mines were noticed. A brief account will now be given of most of the others that are producing. The Head Center, a triangular-shaped claim, is 1300 feet in length and about 500 feet across in its widest part, and situated northwest of the Contention, with a strike of the outcrop of the vein a little east of north. It has a double-compartment shaft, reaching 600 feet vertically, having linear developments on the various 100-foot levels, some being over 600 feet. The formation is chiefly porphyritic, but stratigraphically arranged to appear greatly contorted, so that a regular course of the ore-body is not maintained, yet having a westerly dip. The ore is principally a chloride of silver, with some free gold. Tests in some instances show over 40 per cent in value of gold, and \$90 per ton is not far from a general assay value. Large and valuable steam hoisting-works belong to this property, and substantial buildings for office, superintendent, and foreman are near by. A ten-stamp mill at Contention City, formerly owned by the Sunset Company, but purchased by the Head Center for nearly \$60,000, reduces from 25 to 28 tons per day. With good results for May, this mine should soon be among the dividend-paying properties. This is owned by a California corporation, with a capital stock of \$10,000,000, in 100,000 shares, and late quotation at \$1.50 per share.

The Flora Morrison is bounded on the east by the Contention and Grand Central, and south, the Sulphurets—all rich mines. Its favorable location induced extensive exploitations, and reports are that the company has been well rewarded for the time and money spent. From the *Epitaph* of the 17th, I extract the following: "A strike was made in a cross-cut or level that is being run, presumably east, from the lower level of the mine, where they have opened up what has the appearance of a large body of very high-grade ore, our informant having seen the returns from an assay that gave \$14,000 per ton. They have had good ore for a long time, and the stock has been quoted at Philadelphia for \$3.50 per share, and has been considered by local experts a cheap buy at that." They have a duplicate of the Contention new works well forward toward completion, which will put it on an equal footing for hoisting with any mine in the district. It is incorporated in Pennsylvania, with a capital of \$250,000, the shares at a par value of \$2.

The Vizina Consolidated I referred to as one of the properties that is contending with the Town Site Company for the surface rights that lie within the town limits. The northwest half enters the south side of Tombstone, and joins the Goodenough, one of the principal mines of the Tombstone Mill and Mining Company's group, on the southeast. It was originally owned by Messrs. Cook & Vizina, and passed, by bond and advances for the amount of \$41,500, to the present company, which is organized under the laws of New York, with a capital stock of \$5,000,-

000; but I see no quotations of the shares. The present main working-shaft is covered by a large steam hoisting plant, capable of going many hundred feet, which is at present about 350 feet deep. The metamorphosed stratification is dolomite and quartzite, with a belt of eruptive formation more or less mineralized, trending east and west, with an east by north dip. The workings follow the stratified formation. The ore compares favorably with the Tough Nut in quality. An average for April is given at \$116 per ton silver; and May's average pulp-assay, according to the *Epitaph*, is \$72, with bullion output of \$23,000, and wages and other expenses \$11,000. The Boston mill treats daily about 12 tons of first-class ore.

The Empire extends to the southern line of the town, and is situated near the base of Contention Hill. It is 1500 feet in length and 600 feet in width. It is a Boston company, with W. S. Pollard President, and D. R. Pierce Superintendent. Capitalized for \$5,000,000; the par value of the shares, \$25; the last quotations being \$1. A substantial steam hoister covers the 450-foot working-shaft. For a long time, the developments were not very encouraging; but recent workings have uncovered some valuable ore-bodies. On the 200 level, a winze is sinking on an increasing vein; while a 10-foot cross-cut, run from the 400-foot station, showed a defined vein, presumably the same on the 200 level. It trends northwest and southeast, and dips west, having a porphyritic talcose hanging-wall and a quartzite foot-wall. The ore is highly iron-stained, of good grade, containing both gold and silver, as a few assays show: Silver, \$124.44; gold, \$60.44; total, \$184.88. Silver, \$9.42; gold, \$452.19; total, \$461.61. In the upper levels, the grade was lower. None of the ore is worked at present. This strike extends the ore-ground 1500 feet north; and commencing at the Grand Central, and running through the Contention, Head Center, and Empire, makes a continuous ledge of 6000 feet.

The Sulphurets, a full claim, 600x1500 feet, runs northwest and southeast, and east of the Head Center. It was a Pennsylvania organization, with Hamilton Disston for President; but I am credibly informed that a Western syndicate now controls and manages it. It was located by Messrs. Parson & White, of the Contention. At a depth of 500 feet, a ledge pitching west was encountered, no doubt the same cut on the upper level. A little below 500 feet, a flow of water was tapped, and should development prove a strong enough body, may decide the erection of a mill here. Hoisting-works capable of reaching a depth of 1500 feet are erected over this the deepest shaft. The first and second drifts or levels show ore segregations. The grade and character of the ore differs but little from that noticed in the other surrounding mines.

The Girard, located and sold by the same parties as the Sulphurets, is north of the latter. It is only a partial claim. The exploitation has proved some good ore-ground. About forty men are employed.

Bradshaw, a mine in the southern portion of the district, is reported to be a valuable property. The stock has sold at the rate of \$3 per share. At that rate, the 225,000 shares would be worth \$675,000.

The bullion yield of last month aggregated \$482,106, contributed in the following amounts:

Contention (Western), 29 days.....	\$138,000
Grand Central, 30 days.....	130,000
Tombstone Mill and Mining Company, 30 days.....	108,000
Head Center.....	38,303
Vaina Consolidated.....	23,000
Bradshaw (estimated).....	20,000
Stonewall.....	14,925
Bob Ingersoll.....	9,878

Total production for May.....\$482,106
 " " " April.....430,000

Increase for May.....\$52,106

It is estimated that this month's yield will exceed a half-million, and would be more if the entire amount of ore mined were reduced. With such production, Tombstone has but few rivals. If with age her prosperity keeps apace, it will ere long rank first as a silver-producing district. Tombstone greatly needs a railroad. Both it and the road would be mutually benefited, and the traffic and travel must necessarily be large. The item of fuel alone would pay a road, since the numerous mills and steam hoisters must soon depend upon wood and coal brought from a distance. The Atchison, Topeka & Santa Fé Railroad should not lose the opportunity of seizing this large and growing trade, by building its road through here on its way to Guaymas.

J. M. G.
 TOMBSTONE, ARIZ., June 18.

DURANGO—THE NEW SAN JUAN METROPOLIS.

A correspondent of the *Denver Times* of June 18th gives a very full account of this important town. Although the entire article is interesting, we must confine ourselves to portions of special interest to our readers.

The immense mineral region in Southwestern Colorado, known as the San Juan country, has long been regarded as a vast but almost inaccessible storehouse of the precious metals, awaiting only the "open sesame" of railroad communication to constitute it one of the most productive mining districts in the Rocky Mountains. For the past ten years, it has been fashionable among mining speculators in Denver and at the East to support prospecting parties in the San Juan. The names only of the mining companies that have been organized to operate in the San Juan country would fill a pretty good-sized volume. The chunks of ore sent out as specimens of the various lodes, if collected and smelted, would doubtless yield many thousand dollars' worth of bullion. The way to San Juan, until the present summer, has been over a tedious wagon-road, at first more than 400 miles in length, from Denver or Pueblo, and even last summer from 150 to 200 miles, via Alamosa. Merchandise, provisions, machinery, and supplies all had to take this slow and costly route, and the ore and bullion from the mines found an outlet by the same road. To enhance the difficulty, nearly all the mines are located high up among steep and rugged mountains, where work could be formerly carried on only a few months of the year, owing to the great distance from the base of supplies, the severe winters and the heavy fall of snow. In many instances, the ore from the mines has to be transported for a considerable distance on the backs of burros before a wagon-road is reached. The mines when opened are not the easily worked deposits of Leadville, but true fissure-veins, virtually inex-

haustible, it is true, but incased in walls of igneous rocks, and demanding both time and capital for their development. In spite of all these disadvantages, this distant, rugged, and difficult region has during the past seven years attracted sufficient population and wealth to necessitate the foundation of five counties, namely, La Plata, San Juan, Hinsdale, Ouray, and Dolores. Numerous prosperous towns have sprung into existence, smelters and stamp-mills have been erected, and a constant flow of rich ore has sought the superior refining-works of Pueblo and Denver. Under the stimulus of the San Juan trade, the merchants of Alamosa grew rich and erected vast warehouses in which were stored stocks of goods of which no wholesale house in Denver would need to be ashamed.

In 1880, that wonderful builder of railroads, the Denver & Rio Grande Railroad Company, resolved to push a line into the San Juan country with all practicable expedition. Early in the summer, a large force of laborers was sent into the mountains west of Antonito, the last station in the San Luis Valley, 29 miles west of Alamosa. From Antonito to Durango, the distance is 171 miles. Early in September, regular trains were running to Boydville, 25 miles beyond Antonito, and the approach of the railroad to the San Juan began to assume practical importance in the plans of wholesale dealers at Alamosa, town-site speculators, and the restless legions ever ready to seize upon the upbuilding of new towns as an opportunity for gain. An article in the *Times* first called general attention to the unparalleled scenery along the route, and an editorial excursion was given by the railroad company, which resulted in the naming of Toltec Gorge, and a wide advertisement of its surpassing grandeur. The time now seemed ripe for preparing a western terminus for the line, and a site was selected on the Animas River two miles below the little village known as Animas City, 45 miles south of Silverton. In anticipation of the coming railroad, Animas City had already sprung into unwonted life, and when the town-site of Durango was surveyed, during the month of September, there were not a few waiting upon the ground to select locations and commence erecting buildings. The first traders and saloon-keepers opened business in tents, but frame buildings arose with marvelous rapidity. The new town derived its name from the city of the same name in Mexico. Through October, November, and December, building activity was incessant, and some of the principal merchants freighted in very heavy stocks of goods, on which they realized a handsome profit before spring. In January, the first important temporary terminus was reached, at Chama, on the Chama River, beyond the principal mountain range, 92 miles west of Alamosa, and 63 miles west of Antonito. Stages began running from Chama to Durango about the first of February, and freight-wagons plied incessantly between the two points during the remainder of a severe winter, although the snow was in places more than two feet deep. Early in May, the terminal station was advanced to Amargo, 23 miles farther west, and as I write this, June 14th, it is reported that another advance is being made to Arboles, 37 miles west of Amargo, and only 48 miles from Durango. Meantime Durango has grown to be a substantial town of over 3000 inhabitants, as estimated by the town officers, and anxiously awaits the coming of the railroad in July or August.

Durango owes its inception and present importance to the fact that it lies at the gateway of the richest portion of the San Juan mines, or in other words, at the converging point of the roads leading to the most important mining districts, making it the natural distributing point for a large area of mining territory. Of course, the growth of the town will correspond with the development of the mines. The greater part of the trade, as will be shown in my description of business firms, has moved on from Alamosa and Del Norte, to occupy the nearest available point to consumers. As this seems to be the natural trade center for the San Juan mines, it is also the natural location of smelters and other establishments for treating ores. This is doubly assured by the fact that an unlimited supply of good coking coal has been discovered within three miles of the town.

Before further examining the industrial and mercantile prospects of Durango, I will briefly describe its geographical location, and the character of the surrounding country. Durango lies in La Plata County, the southwestern county of Colorado, twenty miles north of the line of New Mexico, and about five miles north of the line of the Southern Ute reservation. It is some sixty-five miles from the corner of Colorado, New Mexico, Arizona, and Utah. It lies near the upper portion of the great mesa country south of the San Juan and La Plata mountains—a country composed of vast mesas (table-lands), generally much broken and furrowed by cañons and valleys, rising in some places into ridges from 2000 to 3000 feet above the adjacent streams, and timbered near the mountains with extensive forests of scattered pines. These pine forests extend from Durango to Chama, a distance of over one hundred miles, and have an average width of twenty miles or more. Although much less dense than the forests of Michigan and Wisconsin, and broken by numerous small parks—natural meadows of astonishing beauty—they will furnish vast quantities of good lumber, the cutting and marketing of which will prove an important item in bringing men and money to this region. Nearly all the capital and labor that are engaged in the lumber business can be relied upon to stay and be transferred to mining when the forests begin to fail. From the lumber woods in winter to the mines in summer will be a natural and easy transition from the first start.

It is hard to describe this mesa country so as to be comprehended by those not familiar with similar regions. At an altitude of from 6000 to 8000 feet above the sea-level, it embraces millions of acres of land having a rich soil, but the greater portion of it rendered useless for agricultural purposes partly on account of its altitude and partly by lack of water. Many of the lawn-like parks, surrounded by sloping hills covered with beautiful forests of pine, devoid of underbrush, far outstrip with their natural attractions the highest art of the landscape gardener, and seem at first glance to open a very Eden to the agriculturist. But his raptures are quickly dispelled by one short sentence. "No rain to speak of; no water for irrigation; and frost nearly every night in the year."

Through this mesa country from north to south flow numerous mountain streams, many of which have a flow of water equal or superior to the Platte at Denver—tributaries of the San Juan. Among these are the Blanco, Piedra, Los Pinos, Florida, Animas, La Plata, Mancos, and Montezuma. On all of these streams are narrow bottoms of extremely fertile and productive agricultural land, easily irrigated and highly valu-

able, owing to its proximity to the mines. I believe that La Plata County is destined to support an agricultural population of over 10,000 persons. The Montezuma Valley, fifty miles west of Durango, contains in the neighborhood of 100,000 acres of land that is susceptible of irrigation. This valley is developed by the Montezuma Ditch Company, which is at the present time actively at work. It numbers among its stockholders many of the leading citizens of Durango. In addition to the agricultural capabilities of the valleys, the entire country furnishes excellent grazing for cattle and sheep during the summer months. The stock interest is now very extensive, and supplies a factor of no mean importance in estimating the future growth of Durango. There is another item worthy of note in connection with this mesa country that may in time attract almost as many people as its agricultural, lumber, and grazing interests. It is one of the most healthful portions of the Rocky Mountains, and abounds in medicinal springs, of which the celebrated hot springs at Pagosa are the best known. But there are perhaps a score of others equally valuable, some of which, in the Animas Valley, above Durango, are directly on the line of the railroad.

It is from the mines, however, that Durango must expect to derive its principal support. An extended description of the mining regions tributary to Durango would transcend the limits of this article; but I will briefly enumerate the different localities, leaving the reader to learn further particulars from special descriptions in the *Times* and other Colorado dailies and the weekly bulletins of the mining journals. In the first place, the mines near Parrott City, some twenty miles west of Durango, have been worked for several years, and are regular producers of bullion. Up Lightner Creek, from twelve to eighteen miles above Durango, many promising lodes have been discovered in the La Plata Mountains, northwest of the town. These lodes carry galena, sulphurets, and telluride ores. Across to the east of these, on Junction Creek, other lodes have been discovered about the same distance from Durango, and the outlook is one of great promise. Another district that is attracting general attention is known as "the Needles," and lies in the Needles Mountains, at the source of the Florida and Los Pinos rivers, distant from 20 to 30 miles. The Lightner Creek, Junction Creek, and Needles districts are now full of prospectors, and news of rich strikes is almost daily received in Durango.

The rich mining district around Rico, 45 miles northwest, must always remain tributary to Durango; and the steady development of that section is now beyond doubt. Ophir, San Miguel, and the numerous camps within a radius of 20 miles from Rico, will likewise find in Durango their principal point of supply.

It seems certain that Silverton, itself destined to become an important town, together with Eureka, Howardsville, Animas Forks, and other camps around it, will look to Durango for most of their supplies. There are other ways to be mentioned further on, in which these mountain mining towns will help build up Durango. The distance by railroad to Silverton will be only forty-eight miles, and a large part of the grading is already done, so that the line will probably be completed before winter.

Durango also offers an available site for the construction of extensive smelting-works, like those at Denver and Pueblo. Such works are seldom located at the mines, it having been found more profitable to build them where they can draw their supplies of ore from an extended area, the best results being frequently derived from a mixture of ores, and a steadier and more permanent supply being thus insured. A start in this direction has already been made upon a large scale by the San Juan & New York Mining and Smelting Company, of which Mr. J. A. Porter, a gentleman of much experience in Eureka, Nevada, and California, is general manager. The company owns the Aspen group of mines on Hazelton Mountain, near Silverton, and other valuable mining property, its mines being among the best developed in San Juan country. It has one tunnel 1400 feet in length, and is extracting large quantities of ore, which it will have treated in Durango. It operated smelting-works at Silverton last summer, but concluded that it would be more profitable to erect superior works here. The directory of this extremely strong corporation includes three directors of the Denver & Rio Grande Railroad Company.

(TO BE CONTINUED.)

THE MONETARY CONFERENCE.

The Conference was to reassemble on the 30th of June, at Paris. The London *Daily Telegraph* of June 24th says that a memorial to Mr. Gladstone, receiving signatures at most of the London banks, urges the government to offer, as Germany has done, all such guarantees and practical aid as are in its power toward inducing and enabling the bi-metallic states concerned to rehabilitate silver. The *Pall Mall Gazette*, on the evening of the same day, says that it must not be supposed that the banks are canvassing for signatures, they being mostly indifferent on the subject. The *News* of the 25th says that it has "reason to believe that, as far as England is concerned, the conclusion of the Monetary Conference, which meets on Thursday, is practically arrived at. A pledge will be given on behalf of India not to support a single gold currency. No understanding will be given on behalf of England, though we understand that the Bank of England has prepared to make some slight concessions in favor of silver."

The London *Times* of June 28th, in its financial article, says:

The approach of the date for resuming the Monetary Conference suggests the expediency of a reconsideration by the government of their policy of sending delegates to it. It is not improbable that the Conference will meet only to adjourn; but although nothing may come of it directly, and there is no question in any case of this country agreeing to any thing which would affect our adherence to the single gold standard, it is yet to be feared that the presence of our delegates is not altogether the indifferent matter it was at first supposed to be. Until the Conference had actually met, it seemed only an act of courtesy to France and the United States to accept their invitation, provided we made it clear that we were not to be committed to the acceptance of bi-metalism. It seemed also reasonable for the sake of India that we should undertake on its behalf to co-operate in any proper measure for increasing the employment of silver, and so raising its price;

but now that the Conference has met, and we have had its proceedings before us, the question assumes a different aspect. None can read the account of these proceedings without being assured that the presence of the English delegates in the Congress is most unfortunate, and will act most injuriously on the reputation of the English government. Whatever France and the United States may say, the basis of the Conference is a fundamentally erroneous conception of the functions of government in regard to the metallic currency—a conception at any rate utterly opposed to the essential traditional principles of our own currency system. The English idea, which is also the orthodox economic idea, is, that a government in dealing with the metallic currency does nothing but make a declaration. It stamps a metal in a certain way, in order to guarantee its weight and fineness; but it follows the wishes of its subjects in the selection of the metal, and pretends to no sort of function in the way of regulating the supply of the metal itself so as to make money cheap or scarce. The heretical idea, on the contrary, is that government ought to take care to keep money abundant, or possessed of some such quality besides the essential qualities which make it useful as money; in other words, to do for its subjects what they will do best for themselves, and which it would probably not be able to prevent them from doing for themselves by all the regulations in the world, while its attempted interference would probably be mischievous. This heresy has been repeated *ad nauseam* at the Conference, with English delegates not only standing by, but with the most prominent of them, Sir Louis Mallet, in the name of India, rather encouraging the heresy, resulting in a position for England in the Conference which has been most humiliating. With a currency scheme of which the business world and our most distinguished economists are proud, we send delegates to a conference in which that system is assailed and vilified by second and third-rate economists, or by people who are not economists at all, and these delegates have not a word to say in disapproval. The subject is so important that we may suggest to those members of Parliament who have any regard for the principles of political economy and a sound currency the expediency of calling in question the conduct of the government in the matter. It may be said, perhaps, that Sir Louis Mallet represents specially the Indian views, but this is not so. The government of the British empire is one individual, and Sir Louis Mallet's language will certainly be interpreted abroad as in some way representative of English opinion, whereas it is in no way representative. It would be a great mistake to let the English delegates return to the Conference unless with very different instructions from what they seem to have had. If we are to co-operate with foreign governments at all in the restoration of silver, it might be in some other way. A petition in a sense contrary to what we are expressing is now lying for signature at some of the banks in the city, but the best city opinion is entirely opposed to the views of the petitioners. If it were thought that there was any real chance of a disturbance of our monetary standard, this opinion would quickly show itself.

ON THE OCCURRENCE OF APATITE IN NORWAY.

By W. C. Broegger and H. H. Rensch.

The following summary is from a paper in the *Zeitschrift der deutschen geologischen Gesellschaft*, Vol. 27, Part 3; translated and abridged in the *Canadian Naturalist and Quarterly Journal of Science*, Vol. VIII., No. 7. The Norwegian deposits having been but little studied up to the year 1874, a journey occupying six weeks was, during July and August, 1876, made at the expense of the government, by Messrs. Broegger and Rensch, in order to observe in detail some of the most important deposits. The commercial character of the product is briefly touched upon. The deposit at Oedegarden, Bamle District, the richest worked at that time, was discovered in March, 1872. Its richness gave rise to great speculation, by which the price of many deposits already known was enormously raised, and "a genuine apatite-fever" was developed in the districts where apatite was found. Up to the date of the visit, in July, 1874 [? 1876], the deposit had yielded over 3200 tons (of 2000 pounds), of the approximate value of \$112,500. The apatite was shipped chiefly to England and Germany, and later to France and Sweden, and sold for from £6 5s. to £6 6s. a ton. The Krageroe deposits, formerly the richest in Norway, yielded in 1854-58 about 2500 tons, valued at \$112,500, the price of apatite being then lower than at the time when the authors made their tour.

The "spotted gabbro," which constitutes in very many cases the country-rock which the veins intersect, is a rock, "medium to finely granular," consisting, in varying proportions, of brown lustrous hornblende (distinctly cleavable parallel to the planes of the hornblende prism) and white to grayish-white labradorite. In the "spotted gabbro," the labradorite is without cleavage planes, compact or granular, with a splintery fracture, luster vitreous to slightly fatty, and in splinters translucent. Its aspect recalls at the first glance quartz or moist snow. Before the blow-pipe, it fuses somewhat more readily than ordinary labradorite to a water-clear or milk-white glass. Hardness, 6, sometimes a little less. The specific gravity of the "spotted gabbro" varies somewhat, on account of its varying composition. A clear-colored, cleavable variety, the one analyzed, was 2.78; a darker, finely-granular variety, 2.89 (the common dark violet gabbro of Hiasen is 3.08). The authors, in their discussions, lay much stress on the peculiar relationship existing between the "spotted gabbro" and the apatite-bearing veins in several deposits. The ordinary dark violet gabbro also occurs at four points specified.

Up to the time of the tour of the authors, apatite had been found especially in veins in the Primary range of the southern coast between Langesundfjord and the town of Arendal, and also at a few points to the north of the old mining town of Kongsberg in the district of Snarum. In describing the several deposits visited, the authors have arranged them according to the nature of their respective rocks, in order to bring out more clearly "the remarkable connection that undoubtedly exists," in their opinion, "between the gabbro and the Norwegian deposits of apatite." Under the general division, *Deposits in the Gabbro*, the veins intersecting the gabbro are described. Under *Deposits that do not occur in the Gabbro* is given a description of those veins that traverse the crystalline schistose rocks of the Primary range, and partially the granite,

beginning with those that occur in the immediate neighborhood of the gabbro. More than twenty deposits are described. For a full description of the veins by districts, and a presentation of special facts of value to the student intent on a minute examination, we refer the reader to the pages of the *Naturalist* (425-85.) The following summary, however, gives the results of the expedition, an enumeration of the respective rocks, and the conclusions drawn by the authors. It is possible that Dr. T. Sterry Hunt may reply to the criticisms of the authors on his views of the formation of the apatite-bearing veins of Canada. If he should do so, our columns are at his disposal.

The authors say: *Our apatite deposits have all been formed in the same way.* The veins show in regard to their mineral contents conditions differing from one another. We shall, therefore, attempt to point out, especially on this point, connections and transitions.

There occur at Oedegarden [*Deposits in the Gabbro*] almost pure veins of mica, apatite-bearing veins of mica, mica-hornblende veins, and veins of hornblende, all under precisely similar conditions; in many small deposits of hornblende, and also in the great segregations of hornblende at Krageroe [*Deposits that do not occur in the Gabbro*], hornblende, and not mica, is the chief mineral. The veins of Ravnberg, which remind one very much of those of Oedegarden, form, with their vertical mica-hornblende segregation, a perfect transition to the segregations of Krageroe.

The apatite-bearing veins of hornblende often carry magnetic pyrites; transitions from one to the other may be observed, as it gradually increases in quantity. At Bamle, we saw small veins consisting exclusively of magnetic pyrites; in one and the same deposit also, the magnetic pyrites occur at one time merely as an accessory; at another, as almost the only mineral.

In the apatite-bearing veins of hornblende, feldspar or quartz, or both together, occur not unfrequently. Here also, through several deposits, it can be traced out how the feldspar or quartz increases in quantity until it predominates; which justifies the designations "apatite-bearing feldspar veins," or "quartz veins." When both minerals predominate and mica is also present, we have the so-called "apatite-bearing granite veins," which are hardly to be distinguished, except by the apatite, from the numerous ordinary granitic veins of the region.

Scapolite occurs sometimes merely as accessory, at others as a more important element, and in one deposit as almost the only mineral. The often-mentioned crystals of green enstatite recur in their characteristic shape and with the same chemical composition in the various deposits, and connect them together. Enstatite also sometimes occurs with the apatite as almost the only mineral, so that the deposits merit the name of "apatite-bearing enstatite veins."

An equally common and characteristic mineral is rutile. This also in rare cases predominates.

When one considers how very greatly the mineral contents and the external aspect generally of apatite-bearing veins vary, neither the deposits of Asidsdal, with their masses of calcspar, nor those of Oxiellen, with their predominating albite, can offer sufficient grounds for distinguishing these deposits from the other apatite-bearing deposits. For calcspar and apatite are also found in several other deposits; and in other respects, Asidsdal and Oxiellen are not abnormal.

Moreover, the circumstance that, in several deposits, one and the same vein sometimes exhibits in its various parts an entirely different mineral composition, affords another ground for regarding the veins as identical formations. The above instances prove that all grades of transition occur between those deposits where apatite occurs only sparsely and as an accessory, and others where it forms the chief mineral. This is shown also in one and the same deposit. And in other respects, namely, in the arrangement of the minerals, in the shape of the veins, etc., a similar transition series might be produced as proof of the identical nature of the veins.

Our apatite deposits are veins. The occurrence of apatite in beds, sometimes forming small strata in the sedimentary rocks, has been described in several countries. In Sweden, apatite has been described as a noxious admixture with the iron ores of the Graengesberg, which are said to be "beds" in gneiss. The apatite occurs in our veins in an entirely different manner. Our apatite-bearing veins occur without difference in the eruptive as well as in the stratified rocks of our Primary range. In the latter case, they are perfectly independent of the strike and dip of the strata, with one exception, namely, the kjerulfine deposit at Havredal; which, however, as it agrees in all particulars with the apatite-bearing veins, can not be separated from them. The veins traverse gabbro, granite, hornblende slates, and hornblende gneiss, mica-schists, and quartzite. This fact, that perfectly identical veins occur in different rocks (for example, the characteristic veins of hornblende with apatite and magnetic pyrites occur at Hiasen, etc., in gabbro, and at Hougen, etc., in hornblende slates), seems to us completely to contradict the idea of the veins being formed by separating out from the country-rock (which is the way in which Scheerer has explained the formation of our coarsely crystalline veins of granite). These granite veins, like many of our apatite-bearing veins, show sometimes a symmetrically banded arrangement of their ingredients; the feldspar occupying the sides and jutting out in coarse crystals toward the middle, which is filled with quartz.

Dr. T. Sterry Hunt has assigned* quite a different mode of formation to the apatite-bearing veins of Canada, which, according to the description, must be exactly similar to ours. He distinguishes three different varieties of veins as occurring in the Laurentian formation: 1. Lead-bearing veins, which are said to be much younger than the other two varieties; 2. Granitic veins, which would seem to be comparable to our ordinary coarsely crystalline veins, as Dr. Hunt has himself pointed out; 3. Calcareous veins, which are generally associated in their occurrence with the coozon limestones, which Dr. Hunt considers to be sedimentary. This third group of veins, which is common in Canada, and also sometimes occurs in the northern part of the United States, is usually rich in calcspar, and corresponds to our apatite-bearing veins. The similarity is surprising.

Dr. Hunt tries to explain the formation of the calcareous veins, as well as the granitic veins already mentioned, by hot solutions charged with the ingredients of the stratified rocks having deposited the dissolved mat-

ter in vein fissures; he terms veins formed in this way "endogenous." He seeks to establish his theory especially upon the fact that almost all the vein-minerals occur also in the stratified country-rock, as well as by the fact that calcareous veins occur especially in the limestone and the granitic veins, especially in the gneiss and micaceous schists. These conditions are not met with in our veins. We are not aware of apatite or any other mineral containing phosphoric acid having been found in the country-rock of the veins. This holds good not only of the phosphatic minerals, but also of rutile and many other minerals occurring in the apatite-bearing veins. And in no other respect, although our attention was especially turned to this point, could we observe any definite relation between the minerals of the veins and those of the country-rock. In a rock of such constant composition as gabbro, there occur large, almost pure veins of enstatite, veins of mica, segregations of hornblende and mica, veins of apatite, etc. The apatite-bearing veins and the numerous granitic veins occur also side by side in the same rock. On the other hand, it is capable of proof that veins of similar mineralogical composition may occur in entirely different kinds of rocks.*

Our apatite-bearing veins are of eruptive origin. We shall first discuss a point which would seem to oppose their eruptive origin. In many deposits, some of them being the principal ones, there occurs, as already mentioned, a symmetrical arrangement of the vein-minerals. Thus, for instance, in the Oedegarden veins, brown phlogopite and sometimes also crystals of green enstatite, in many hornblende-deposits hornblende, and in several apatite-bearing enstatite veins enstatite occupies the sides of the veins, while their center consists of apatite and very often also of other minerals. This banded arrangement might seem, perhaps, to indicate a regular gradual deposition of the minerals out of watery solutions. Frequent exceptions, however, occur, even in the most regular deposits wherein no such systematic arrangement is observed. Sometimes the vein-minerals throughout the entire extent of the veins are mixed with one another equally and without arrangement; at other times the veins do not contain the same minerals in their different portions. In veins that consist chiefly of a single mineral, apatite and other minerals are often distributed equally throughout the entire vein-mass. The symmetrical structure of our veins is, with regard to regularity, in no way to be compared with that which is so splendidly displayed in many metallic veins.

We explain the banded arrangement of the minerals in our apatite veins by the assumption that under favorable conditions the minerals that now occur on the sides of the veins (usually hornblende or mica) were first crystallized out of the magma under pressure.

The veins exhibit also the phenomena so often observed in eruptive veins, that the vein-minerals are fine-grained on the walls next the country-rock, while in the center of the veins they have formed larger crystals.

In the Oedegarden veins, moreover, the fine scales of mica near the walls are sprinkled with small grains of apatite. Both minerals must therefore have crystallized out together, before the large crystals of mica that project into the apatite, and finally the central apatite itself was formed out of the still liquid vein-stone. A vein at Krageroe exhibits still more distinctly a similar sequence of the crystallization of the minerals in the hornblende veins. The side portions consist of a mixture of finely granular hornblende with grains of apatite; from this rather sharply-defined zone, the large crystals described above project into the central vein-mass. We explain this arrangement in the following way, namely, that the zone of the finely granular mixture crystallized while the vein-mass was still in motion: on the cessation of its upheaval, there first solidified, along with apatite, the above-mentioned large crystals and the coarsely radiating hornblende that occurs in their continuation, along with rutile, and, finally, the rest of the coarsely-radiating hornblende and the apatite associated with it.

The coarsely crystalline hornblende in the middle of this Krageroe vein exhibits another phenomenon that seems irreconcilable with a gradual deposition of the minerals from solution, namely, large, spheroidally-arranged crystals of hornblende radiating from a center inside of the vein; the formation of these may be readily explained by the assumption that the crystallization of the liquid vein-mass took place, not only on the walls of the country-rock, but also about a center inside of the magma. We recollect, moreover, that in several of our deposits of apatite, fragments of rock occurred in the vein-mass, and surrounded by it. Joh. Dahll states that at a considerable depth in Lykkens mine at Krageroe, rock fragments occurred in such quantity that a genuine breccia was formed. But the most remarkable of these observations is the discovery of small (about two inches long), angular, sharply-defined fragments of rock, which were enclosed in the apatite of our Oedegardskjern vein. These fragments consist of granular quartz and some hornblende; the country rock here is a gabbro somewhat similar to the "spotted gabbro" of Oedegarden. Since neither the vein nor the surrounding rocks contain quartz, and the fragments are in no respect similar to the mineral aggregates that we have otherwise met with in the veins, but are similar to several of our ordinary quartzites, we can scarcely doubt that they are also true fragments of rock, which can not, on account of their character, be derived from the country-rock. We are inclined to regard them as fragments of rock that have been broken loose at a considerable depth and brought to the surface by the liquid vein-mass.

A phenomenon which also seems best explained by the assumption of the eruptive nature of the veins is seen in the twisted and bent crystals of various minerals that frequently occur in several deposits. In the Oedegarden veins, bent crystals of enstatite often occurred. Still more frequently are the large plates of mica in veins of apatite crumpled and twisted. At Roenholt, bent and twisted crystals of rutile occurred, embedded in the other minerals of the vein. A pair of bent and twisted crystals of apatite an inch long, which—to judge by other crystals found at the same place—must have been surrounded by a homogeneous mass of quartz, seemed very remarkable. The crystals of apatite, when first formed, while the mass of quartz was still plastic, may have obtained their present contorted shape from the pressure caused by the motion of the quartz.

* Limestone occurs very seldom as a rock, so far as we know, in the entire region where the apatite-bearing veins occur.

* Geology of Canada, 1866, pp. 186-233.

We must also mention the broken crystals of enstatite at Oedegarden that are cemented by apatite, and the fragments of crystals of hornblende that occur in magnetic pyrites on the *saalbaender* of many veins. Both occurrences make it probable that the entire vein-mass did not simultaneously solidify. This is also indicated by the banded arrangement of the veins. It is probable that the apatite and magnetic pyrites were still a plastic mass when the minerals of the *saalbaender* had already crystallized out. And when these latter, in consequence of the motion of the vein-mass, were broken, they were cemented by the apatite or magnetic pyrites.

We may here recall to mind the crystals embedded in magnetic pyrites, that were rounded and even fused on the edges and corners.

As already mentioned, where the apatite-bearing veins occur in strata, they are perfectly independent of their strike and dip; showing in this respect the usual behavior of eruptive veins.

We must mention still another point wherein these veins differ from ordinary metallic veins, namely, in the entire lack of empty spaces filled by crystals dividing them into two symmetrical halves. Even ordinary geodes are met with only as rare phenomena in the apatite-bearing veins.

Apatite has been long known as a mineral crystallizable out of a hot liquid mass. Forchhammer obtained small crystals out of a fused mixture of salt, chalk, and bones; small crystals of apatite are among the commonest associates of melaphyre. Therefore it can not be astonishing that apatite occurs in empty veins.

The apatite-bearing veins bear a certain relation to the gabbro. We must here recall to mind that the apatite-bearing veins occur in a region where gabbro frequently intersects the strata of primary rocks. All the important deposits of apatite occur either in gabbro or in its immediate vicinity. As the gabbro has suffered far more alteration by the eruption of apatite veins than the other rocks have, perhaps the assumption is justified that the gabbro may have been not perfectly solidified when the veins burst forth.

The eruption of the apatite-bearing veins occurred either simultaneously with or immediately after the outbreak of these gabbro masses. A number of observations would seem to suggest that the vein-masses when they burst out were hydrous, and accompanied by solutions and gases. We mentioned that the veinlets of Regardsheien and Ravneberg were sometimes surrounded by as broad a zone of the "spotted gabbro" as the larger veins themselves; and also that in some cases this zone is broader on one side of the vein than on the other; farther, that the direction of the small offshoots is continued by veinlets and stringers of a schistose gabbro inside of the granular "spotted" variety. Finally, we would recall to mind that in several deposits the "spotted gabbro" extends far from the veins. When these considerations are all borne in mind, it seems clear that the alteration of the gabbro is due only in small part to the heat of the molten veins, but rather to the steam accompanying the eruption, which could operate at some distance from the limits of the vein.

The practical result of our examination is, in brief, that one may reasonably expect to find the apatite in and in the neighborhood of the gabbro, especially where one or more of its characteristic associates, such as rutile and the frequently described crystals of green enstatite, are found. As regards the yield of our apatite deposits, it has been found, so far, that only the deposits in the neighborhood of the gabbro have yielded any considerable output.

METHOD FOR THE ESTIMATION OF MANGANESE IN SPIEGELS, IRONS, AND STEELS.*

By S. A. Ford, Edgar Thomson Steel-Works, Pittsburg, Pa.

A short and accurate method for the estimation of manganese in iron and steel is of great advantage to Bessemer works, and I think it may be of interest to some of the members of the Institute to give in detail the process in use in the laboratory of the Edgar Thomson Steel-Works. The process is based on the reaction first described by Beilstein and Jawein.† The steel, spiegel, or iron is dissolved in strong nitric acid, sp. gr. 1.4. Evaporation to dryness is not necessary, unless the amount of silicon be large, as in the case of certain pig-irons. Then, as a clogging of the filter in the subsequent filtrations is apt to follow, dissolve first in a dish of hydrochloric acid, quickly evaporate to dryness, redissolve in the strong nitric acid, boil, and while boiling throw in crystals of chlorate of potash from time to time. Violent action ensues, yellow fumes are given off, and binocide of manganese is precipitated, since it is insoluble in strong nitric acid. As soon as all of the manganese has been oxidized, the fumes will cease coming off with a slight explosion. After this has occurred, add a few more crystals of the chlorate of potash, boil for a minute or two, remove from the light and filter through asbestos. This I do by the aid of a filter-pump, employing a small, funnel-shaped tube, such as is usually used for filtering the carbon from a solution of iron in the double chloride of ammonium and copper. This tube is inserted in a doubly perforated cork, which fits a wide-mouthed flask, and, by means of the other perforation, is made the attachment to the pump.

Having fitted the cork thus arranged into the flask, put into the tube a plug of asbestos through which the nitric acid solution of the iron is filtered. The manganese will all remain upon the filter; I have never found a trace of manganese in the filtrate. Rinse then the dish or beaker in which the iron was dissolved with strong nitric acid, pour it upon the filter and wash with strong nitric acid until the washings come through colorless. The funnel-shaped tube is removed from the flask; the filter, with its contents, pushed back into the dish or beaker in which the solution was made, hydrochloric acid added and boiled until the binocide of manganese is dissolved as chloride. The asbestos is then filtered off. In doing this, it is best to resort to the pump and the same tube, filtering into another flask; wash with hot water; nearly neutralize with ammonia; add a very small quantity of acetate of soda, and boil; filter; wash slightly with hot water; redissolve the small quantity of oxide of iron in hydrochloric acid (as I always find it contains a small amount of manganese, no matter how thoroughly washed), and again nearly neutralize with ammonia, and add a small crystal of the acetate of soda,

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

† Berichte der deutschen chemischen Gesellschaft, vol. xii. p. 1528.

boil and filter. Add this filtrate to the first filtrate, heat to nearly boiling, and add an excess of microcosmic salt. Then make slightly ammoniacal and boil, stirring until the precipitate assumes the well-known silky appearance of the phosphate of ammonia and manganese. Allow to settle and filter; wash with hot water, dry, ignite, and weigh as pyrophosphate of manganese.

This process works exceedingly well on blast-furnace slags, which should be dissolved in hydrochloric acid and evaporated to dryness. The nitric acid is then added and the process continued the same as for steel or iron. To free it from the lime, however, a more thorough washing with the strong nitric acid is required.

The great advantage of this method is in its brevity and simplicity, a person with some little practice being able to complete three or four determinations in two hours. There is no large precipitate to wash, as in Mr. Pattinson's process, and the necessity of several standardized solutions is avoided. It gives results which vary but slightly the one from the other, the difference never being greater than one or two hundredths of one per cent, and the results accord very closely with those obtained by the long, tedious acetic process. In the iron solution filtered from the oxide of manganese, I have never found a trace of manganese, and in the solution filtered from the phosphate, neither bromine nor sulphide of ammonium gives the slightest precipitate of manganese. Evaporation to dryness in the case of steels or spiegel is not absolutely necessary, but they may be at once dissolved in the strong nitric acid, and chlorate of potash added. I never found a trace of silica in the phosphate of manganese obtained from a steel or spiegel treated in this way.

PROGRESS IN SCIENCE AND THE ARTS.

Electric Lighting in Coal Mines.—On Thursday and Friday, June 9th and 10th, the Royal Commissioners upon Accidents in Mines witnessed some very interesting experiments on the application of electric lighting to coal mines. The place selected for the experiment was the Pleasley Colliery, near Mansfield. The pits are about 1600 feet deep, and the workings are very extensive; but in the present instance, the light was applied to three workings only, situated at a distance of about one third of a mile from the bottom of the pits. The Swan system was employed. The lamps themselves were inclosed in lanterns of a very ingenious construction, designed and made by Messrs. R. E. Crompton & Co., which enabled the very fragile glass bulbs to be carried about without fear of accident. The number of lights employed in all was ninety-four, which were worked by the current of an ordinary Gramme machine, driven by a portable engine placed near the top of the upcast shaft. All the arrangements were carried out under the personal superintendence of Mr. Harold Thompson, of the firm of R. E. Crompton & Co. The commissioners, including Mr. Warrington Smyth, Professor Tyndall, Professor Abel, and others, spent two days in examining and testing in various ways the success of the experiment, and expressed themselves highly satisfied with the results obtained.

Atomic Weight of Platinum.—As the mean of thirty-nine results, all closely agreeing, Herr Seubert obtains the number 194.46. If this number is accepted, London *Engineer* remarks, the atomic weight of platinum is less than that of gold.

Automatic Methanometer, or Automatic Analyzer of Fire-Damp.—An apparatus, named as above, has been recently brought before the Geneva Physical Society by Professor Monnier. The fire-damp, in presence of air in excess, is decomposed in a glass vessel by a platinum wire rendered incandescent, and the condensation produced acts directly on a mercury manometer, having platinum wires inserted in its tube. The air of the mine is automatically forced by bellows, every hour and half-hour, into the burner. The receiving apparatus stands in the central office. The system includes several electro-magnets, two batteries, pendulums with escapement, an alarm-bell, etc. *Nature* says it is complex.

The Smallest Engine in the World.—Mr. W. G. Bagnall, of the Castle Engine-Works, Stafford, England, has just completed the tiny engine, the "Hampson." The cylinder is three inches; the wheel, thirteen and a half inches; and the maximum width only thirty-one and a half inches; three horse-power nominal; gauge, 18 inches. The engine has been tested, the *Ironmonger* says, with satisfactory results. It is destined for South America.

Native Steel.—London *Engineering* of June 17th has the following note, contributed by Prof. A. K. Huntington, of King's College: "While searching for some geographical information, I came on the following, in the *Manual of Modern Geography*, by the Rev. Alexander Mackay, LL.D., F.R.G.S. (author of *Facts and Dates*, etc.), page 266, second ed., 1871. It may add something to the knowledge of your readers, even in these days of school boards: 'Native steel, more valuable than that made by artificial means, is found in Styria, Carinthia, and Carniola.'"

The Values of the Ohm and "J."—London *Engineering* thinks that the British Association unit of resistance is probably slightly in error, and that it would be advisable to determine it. Various experiments have found a value for it disagreeing on both sides of unity. For example, Weber made it respectively 1.0021, 1.0016, 1.0025 earth-quadrants per second; Rowland made it 0.9911; Kohlrausch, 1.0196; and Lorenz, 0.9797; the British Association value of course being one earth-quadrant per second. From a consideration of these results and the ways they were obtained, Dr. C. R. Alder Wright estimates that the correct value of the unit or ohm most probably lies between 1 and 1.005, an error of not more than one half per cent. With regard to the error of J, or Joule's mechanical equivalent of heat, Dr. Wright says that 42 is probably the most correct value obtainable at present, and that Joule's water value is a little too small.

Underground Telegraph Wires.—Our article on the Philadelphia Mining Stock Market announces the fact that Philadelphia will be the first city in the United States to make a trial of the underground telegraph. The Common Council has granted to the National Underground Electric Company permission to lay its conduit for electric conductors under certain streets. The number of telegraph wires in all parts of the

city makes it absolutely necessary to adopt that measure. The enterprise is reported to be in the hands of those who are fully capable of making it a success; after which, the company will extend its operations to New York, Boston, and other large cities. Mr. Fawcett, the Postmaster-General, in replying to a question recently asked in the British House of Commons, has communicated some very interesting facts. London, in proportion to its size, has suffered more from the dangers of overhead wires than any of the large towns and cities of Great Britain. Some of the streets are literally cobwebbed with wires crossed and recrossed in every conceivable direction, the danger to pedestrians and others in high winds or during extremely low temperatures having become a very grave matter. Mr. Fawcett says that the post-office authorities are endeavoring to reduce the mileage under the old system as rapidly as possible. The progress made is shown by the facts that in 1877 there were 1720 miles within a radius of four miles of the general post-office, whereas now the mileage is only 500, and the underground wires have increased from 3350 miles to 4308 miles in the same time. The tube manufacturers, founders, and those engaged in kindred industries will be especially benefited by the general adoption of the system.

Artificial Minerals—M. Daubrée, having in his possession certain artificial products, obtained at the end of the last century by Mr. James Hall, requested H. Fouqué and M. Lévy to examine them. In the *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences*, these gentlemen give the results of their examinations, and conclude that Hall was the first who succeeded in reproducing artificially an eruptive crystalline rock.

Rail-Making at Bolckow, Vaughan & Co.'s, Middlesbrough.—We thought that Capt. William R. Jones, of the Edgar Thomson Steel-Works, would have something to say about the recent heavy output of steel rails at the works of Messrs. Bolckow, Vaughan & Co., recorded in this department in our issue of June 18th, page 417. Writing from Bessemer, Pa., June 20th, to the *Iron Age*, he thus good-naturedly but pointedly replies:

"Do our English cousins really expect the small plant of the Edgar Thomson Works to successfully compete with the immense plant of Bolckow, Vaughan & Co.? In order to more clearly understand the great odds in favor of the Eston Works, we will classify the relative capacity of the two works, omitting the immense advantages they possess in steam power, both in boilers and engines:

Plant of Works.	Eston Works.	Edgar Thomson Works.
Converters.....	4 (10-ton)	2 (7½-ton)
Converters.....	4 (15-ton)
Cogging mills.....	3	1
Heating furnaces (ingots).....	12	5
Heating furnaces (rails).....	10	4
Rail-mills.....	3	1
Gas-producer fires.....	88	28

"The output of the Eston Works is the best yet recorded. As a matter of interest as well as fairness to all concerned, I would ask your correspondent for a bill of particulars. How many converters, how many Siemens or other furnaces, how many gas-producer fires were used in producing the output? Also state number of rails rolled, weight of section, and what was the percentage of second-class rails produced. The output of a rail-mill in tons is a question of weight and form of section.

"I accept the good-natured badinage of your correspondent with the best of feeling; and as he asks me what I 'say to it,' I answer that the rail-mill of the Edgar Thomson Works has never been tested, as we can not supply it with our present two 7½-ton vessels; and if we are to be fairly beaten by a foreigner, I sincerely hope that foreigner may be Winslow [Windsor?] Richards, manager of the Eston Works. The man who has displayed most wonderful patience, pluck, and energy in developing the basic process is the man I would naturally select for this honor. The information in regard to the capacity of the Eston Works I derive from Mr. Joseph Newcomb, a late employé of the Eston Works. If the information is not correct, will your correspondent give us the true facts? I remain, very truly yours,
WILLIAM R. JONES."

PENNSYLVANIA MINE INSPECTORS' REPORT.—The Mine Inspectors' report, filed at Pottsville, June 22d, shows that in the three districts 44 collieries were examined last month. There were 49 accidents, resulting in four fatalities; 45 persons were injured. In the Pottsville District, 6823 persons were employed an average of 15 days, and shipped 127,792 tons of coal. In the Shenandoah District, 11,066 persons worked an average of 16½ days, and shipped 328,512 tons. In the Shamokin District, 11,740 men worked 18½ days, and produced 311,557 tons. The production in May exceeded that of April by 47,994.11 tons, while there were six more fatal accidents in April than in May.

GENERAL MINING NEWS.

ALASKA.

THE GOLD DIGGINGS IN ALASKA.

SAN FRANCISCO, June 21.—The steamer California has arrived at Victoria with the following news from Alaska: "The snow has entirely disappeared at the Takon mines. New quartz lodes have been discovered, and placer claims are vigorously worked." The California has on board 200 ounces of bullion for coinage at the mint. The placer claims are paying well, and the quartz shows better than ever. The California has also on board two tons of rich ore en route to San Francisco, to be worked. Most of the miners at Harrisburg seem to have faith in the richness of the new gold ledges, and town lots are increasing in value and are rapidly cleared. Twenty-two to twenty-eight ounces per week have been about the average yield from the Ready Bullion placer mine. The quartz ledges are in *statu quo*, waiting capital to develop them.

ARIZONA.

We quote from latest Arizona exchanges as follows:

GLOBE DISTRICT.

MINERAL CREEK.—The work is progressing rapidly. Some necessary machinery now on the way from San Francisco will soon be in place. The road from the mine to the mill has been finished, and a contract has been let to haul 1000 tons

of ore from the mine to the mill at reasonable figures. The body of ore is said to be two and a half feet wide.

TOMBSTONE DISTRICT.

ARIZONA QUEEN.—This mine lies west of the Flora Morrison, and is considered a fine location. The shaft is down 103 feet. There are two drifts, one 35 feet and the other 25. Next month, a large force of men will be put on the mine, and the shaft will be sunk as fast as possible.

CONTENTMENT.—Shaft down 230 feet, but no work doing at present, and further development will be suspended until the substantial steam hoisting-works in contemplation are erected.

FLORA MORRISON.—The north or old shaft, located in the gulch, is now down 300 feet. The south shaft, on the hill, near the Grand Central line, is 225 feet deep, while the main double-compartment shaft, over which the machinery is erecting, is down 175 feet. This shaft is 5 x 9 in the clear, and is timbering in a thoroughly workman-like manner. Good progress is making in the joint winze of the Morrison and Sulphuret from the 350-foot level of the former, and it is down 115 feet.

GIRARD.—The work of development continues to progress at a very rapid rate. The 350-foot level running toward the Empire is in 175 feet, and connection with the latter mine will soon be made. Some very fine ore is encountered in this level, but only about 12 tons per day are hoisted to the surface. The northeast drift, to connect with the Good Enough mine, is now in 130 feet, in fair working ground. The machinery and every thing about the mine is in good working order.

GRAND CENTRAL.—The three-compartment shaft has attained a depth of 150 feet, where a station will be put in to connect with the 100-foot level of the old works. The underground work is progressing favorably. The drift running south from the 200-foot level has been stopped on account of the bad air, which has greatly increased since warm weather set in. The main cross-cut running west from the 400-foot level is making good progress, although the ground is very hard. It is thought that 100 feet of drifting will be necessary before the ledge is reached.

TOMBSTONE MILL AND MINING COMPANY.—The stopes and ore-breasts are yielding their usual quantity of fine-grade ore, keeping the mill busy at work. The new whim on shaft No. 6 is at work, and connection from this point will soon be made.

TRANQUILLITY.—In about two weeks, connection will be made with the Sulphuret, when a more perfect ventilation of both mines will be had. Eventually the Flora Morrison will also be connected with the Sulphuret, when the system of natural ventilation will be almost perfect, and, in case of a fire or accident in either mine, the workmen will have a safe and sure egress provided.

VIZINA.—In the last week, the north drift has been advanced 26 feet. All the stopes and drifts are looking well. Doing considerable dead or prospecting-work. Shipping 22 tons of ore to the mill per day.

CALIFORNIA.

THE BODIE DISTRICT.

The *Bodie Free Press* of the 21st reviews the condition and prospects of the mines of this district as follows: The output of bullion from Bodie District has never averaged better than since the 1st of January in the present year, it having been about a quarter of a million per month. The mines milling ore at present are the Standard, 50 stamps; Syndicate, 20 stamps; Noonday, 20 stamps; Bechtel, 20 stamps; Bodie, 10 stamps; and Bodie Tunnel, 4 stamps. Total stamps employed, 124. Upon the result of the test of Bechtel ore now making at the North Noonday mill, depends the question whether or not a mill shall be erected for the Bechtel, or whether it will depend hereafter upon other companies to do its crushing. Reports upon this point have not been made public, but we have reason to believe that the ore is turning out very well. The Bodie Tunnel people are intending to put up a mill this season, but have not yet decided of what character it shall be. Two important cross-cuts are now running in Bulwer ground, either of which is likely to make a stir in that stock at an early day—one from the 500-foot level of the Standard shaft, and the other from the 1000. The Lent shaft is now 630 feet deep, and sinking has been recommenced. The cross-cut at the 700 will be looked forward to with great interest. The difficulty at the Red Cloud shaft has been exaggerated here and at San Francisco. There is and has been no trouble with the pump column above the 400-foot level, and the bursting has been in some of the pipe placed temporarily below that point. It will take less than a week after the new pipe arrives here before pumping will be resumed, and the pipe is now or soon will be on the road. A new level from the Red Cloud ought to show a great improvement in the Concordia ledge, which will require about 300 feet of cross-cut to reach. The Tioga reports an improvement this week in its 982-foot level.

BODIE CONSOLIDATED.—During the week ending the 18th, there were 134-75 tons of ore hoisted, of which 50-187 tons were from the stopes above the 432-foot level; 12-375 tons from those at the fifth incline level, 72-188 tons from the sixth level. The amount of ore sent to the mill was 125-35 tons. The mill crushed 113-99 tons. The average of the pulp-assays for the week was \$53.05, and of the tailings \$10.11 per ton. The shipment will be \$7251.38. At the 206 level, the east cross-cut referred to in last report as having just been started has been driven 7 feet. The south drift (No. 2) second incline level has been advanced 8 feet, or a total length of 14 feet. No change is to be noted in the character or quality of the vein. At the fifth incline level, north drift No. 2 is now 105 feet long, a gain of 7 feet since last report. The drift is in hard rock, but the vein continues to look well. Most of the ore from the stopes just opened above this drift is being sacked. North drift No. 3, sixth incline level, has been driven 8 feet farther, its total length being 44 feet. In this drift, the vein still carries good ore, as it does in all the latest workings.

BULWER CONSOLIDATED.—The west cross-cut from the Standard new shaft, 1000-foot level, is in very favorable rock. The uprise on the Stonewall ledge, 400-foot level, is up 113 feet, showing 2½ feet of ore.

TOGA CONSOLIDATED.—During the past week, the west cross-cut, 982-foot level, has been advanced 20 feet through rock of a favorable character. In this cross-cut, they have passed through several promising veins of quartz. They are small, but prospect well in gold. The face of the cross-cut is in very favorable formation. A strong flow of water is coming in at the face, which is considered a favorable indication for near proximity to the vein. The west cross-cut from the mouth of the lateral drift, same level, has been advanced six feet, with no change to note in the character of the rock passed through. They are handling the water quite easily. The amount hoisted per twenty-four hours is 455 tons.

COLORADO.

CLEAR CREEK COUNTY.

CONSOLIDATED PAY ROCK.—The Silver Plume Mining News says: Forty-three men are employed on the Pay Rock, at this place, either as lessees or by the company. The workings are reported in good condition and progressing finely, with the usual amount of rich mineral taken out daily.

PELICAN DIVES.—The *Courier* says that the main shaft of Pelican Dives lode has reached a depth of 690 feet from the surface, or 75 feet below the Diamond tunnel, and is going down at the rate of about 11 feet per week. At the bottom, a vein of galena and blende with quartz mixed with it, three feet in thickness, is exposed, which mills from 30 to 40 ounces of silver to the ton and from 35 to 53 per cent lead. The shaft is 7 x 14 feet in size, large enough for a skip, ladder-

way, and pump. Another level will be started when a depth of 100 feet below the Diamond tunnel is reached.

GUNNISON COUNTY.

FOREST QUEEN.—The Ruby Camp correspondent of the Colorado Springs Gazette says: In my last mention of the Forest Queen mine, they had left the vein to one side in sinking the main shaft, as it is important that a shaft be straight. Two days ago, they again came upon the vein, at a depth of 180 feet, and found the ore richer than at any point above. The ore is not only richer in silver, and contains less base metals, but is also rich in gold. Gold was found in nuggets from the size of peas down. Being in this coarse form, the value of the gold per ton of ore could not be determined by assay. The slight additional depth since gained shows still greater riches. Large chunks of ruby and native silver are taken out, these covered with gold, with the appearance of having had the gold thrown upon them in a molten state from a ladle. The ore-vein is four feet in thickness. Near the surface, assays and mill-runs showed from one half to three quarters of an ounce of gold to the ton of ore.

LAKE COUNTY.

CATALPA.—This mine is making regular shipments of about 15 tons of ore per day, the grade of which averages \$60 to the ton. It is reported that a large ore-body has been opened in the northeast workings from the east shaft.

CRESCENT.—The Leadville Democrat of the 22d ult. says that the long incline opening up this property has been placed in good working condition, and prospecting is prosecuted from the lower levels with success. On Monday last, in driving the south level, 560 feet from the entrance to the incline, a body of ore was struck which promises to be richer than any heretofore discovered in the mine. The ore is a lead carbonate, literally covered with chloride of silver, similar to that found in the Etna and Glass mines, and should the body prove extensive, it will admit of the Crescent making greatly increased shipments of much higher-grade ore. On last Monday morning, the sinking of a new shaft was also begun. The location selected is the extreme western end of the Crescent claim, where it is expected that the same body of ore which was struck by the Penderly and St. Mary's shafts will be encountered.

DUNKIN.—The Leadville Chronicle says of this mine: The ore-chute seems to have pursued the same course as that of the Little Pittsburg fourteen months ago. The carbonate of lead has practically disappeared, and the vein-matter contains hardly enough silver to pay the cost of smelting, hauling, and mining.

LITTLE PITTSBURG.—The manager has dismissed all but 30 miners. The fire in the Chrysolite workings prevents the working of the New Discovery claim, and all the ore raised by the company comes through the Nos. 2 and 6 shafts. This is about 15 tons per day, mostly low-grade and iron ore.

LEADVILLE CONSOLIDATED.—The Leadville Democrat of the 22d ult. says: The mines of the Leadville Consolidated Mining Company are again shipping quite largely. The retimbering of the Carbonate or main incline, for a distance of 100 feet, was completed on last Friday, and on Saturday morning the hoisting of ore was again resumed. The properties of this company, embracing the Carbonate, Shamrock, and Little Giant claims, are producing ten tons of 100-ounce ore, or about \$1000 per day. There is shipped to the smelting-works of Grant & Company. Work is also prosecuted from the south incline, located about 450 feet south of the main incline. Fine ore-bodies have been opened in different parts of the territory, and the manager feels sanguine of developing some large and rich resources. At present, ore-extraction is carried on in four or five different places. North of the main incline and east of the second level, is a large tract of undeveloped ground, which is promising well. The lime here makes quite a sag, leaving a thick body of contact matter. Between the contact and lime, very fine ore has been developed, and the indications are most favorable for a large yield from this block. The face of the main incline in the Little Giant claim is also opening up well, and exploration-drifts have disclosed a four-foot body of ore. The south incline has opened a body of fine mineral, and the indications now are, that another trend of ore will be found to the east of the one which has already produced such large quantities of rich ore. The course of this newly-discovered chute of ore is apparently parallel with the former one, being northeast and southwest.

MORNING STAR.—The Leadville Herald says that the developments in the Morning Star have opened up wonderful ore-reserves. From the main working-shaft to the southwest, and along the Evening Star line, an immense ore-body is exposed. A drift is now running north to show up the extent of this body. Down the main incline, to the east, ore is exposed the entire distance of five hundred feet, and five levels each way reveal ore. The No. 5 north level extends to the new shaft, and from this level another incline extends east, also showing ore. To the north, through the Waterloo ground, the principal developments are now directed. From the shaft also, the No. 1 level north is driving, and is now in Waterloo ground. Besides these developments driven from the Morning Star workings, two shafts are worked to the north in the territory of the Waterloo. The product of ore at present is but from forty to fifty tons daily.

NEVADA.

THE COMSTOCK LODE.

In summarizing the operations on the Comstock for the week ending June 22d, the Gold Hill News says: There is but little new in the mining operations along the lode to report this week. Much the same work is carried on as was reported in these columns a week ago. The cross-cuts in Sierra Nevada are driven along with usual progress; and while No. 1 is in close proximity to where it was expected to find the ledge, the report is, "No material change in formation passed through." The Ophir-Mexican winze holds out some encouragement to holders of shares in those mines, though there is really nothing actually shown in it of merit as yet. The Gould & Curry and Best & Belcher, the Forman shaft and the Alta are each sinking steadily and making about $4\frac{1}{2}$ feet per day. The Yellow Jacket mine is drained and the necessary repairing will be completed in a week's time, when it is expected to again commence active prospecting. The Crown Point and Belcher mines each extract in the neighborhood of 35 tons of ore daily, the assays averaging about \$14. Sierra Nevada extracts 50 tons per day which assays \$30 to the ton. There is a prospect of a resumption of work in the Justice on the 1st of July, but Superintendent Canavan is not positive that arrangements to that end will be effected. The Kentuck will shortly have its hoisting-works completed and a force of men put to work extracting ore. Bullion, too, will not much longer remain idle. Its surface work will be finished about the 1st proximo.

CALIFORNIA.—The north drift from the winze on the 2000 level was carried forward 18 feet the past week, and the uprise from the drift extended 13 feet. On the 2500 level, the joint Consolidated Virginia east cross-cut has been advanced 19 feet, and the California and Ophir winze sunk 13 feet since last report. The work of excavating for a winze joint with Consolidated Virginia on the 2500 level makes good progress.

CONSOLIDATED VIRGINIA.—The south drift on the 2300 level is being cleaned out preparatory to resuming operations at that point. South drift No. 2 on the 2500 level was extended 13 feet the past week. The joint work is reported under the California heading.

CROWN POINT AND BELCHER JOINT SHAFT.—The repairs to the shaft have been carried to the 2500 level. It appears that there has been a cave in the connecting drift with the Yellow Jacket on the 2700 level of the Crown Point, as the water now stands six feet deep on the 2700 level of that mine, and the air passing down the Crown Point incline over this water and coming up the joint shaft makes it almost impossible to carry on the repairs in the latter. Arrangements are making to remove this body of water at once.

G. & C. AND B. & B. SHAFT.—The shaft has reached a depth of 2005 feet, and is driven steadily downward. It is in a formation at present of rather interesting vein-material, which gives promise of something better than barren quartz.

HALE & NORCROSS.—The three-compartment winze from the 2400 level has been sunk and timbered a total distance of 27 feet. The pump is kept steadily running. Some repairs are needed in the perpendicular shaft, but can not be made until the Combination hydraulic pump is started, so that the Hale & Norcross pump can be stopped. No work can be done in the shaft while the pump is running.

MEXICAN.—The winzes joint with the Union Consolidated and Ophir from the 2500 level are reported as making the usual progress the past week. The cross-cut east joint with Ophir was extended 19 feet. No change in material passed through.

SIERRA NEVADA.—The winze joint with the Union made its usual progress the past week. Of the cross-cuts, No. 1 progressed 31 feet, and No. 2, 36 feet the past week, and both are rapidly nearing the interesting points. Ore to the amount of 360 tons, assaying over \$30 per ton, was extracted the past week.

UNION CONSOLIDATED.—The tank station on the 2500 level has been completed and the tank put in position. The winzes from the same level joint with Mexican and Sierra Nevada were driven nine and eleven feet respectively the past week through the same formation as heretofore reported. The east drift on the 2700 level, which is running joint with Sierra Nevada, has been advanced 20 feet since last report.

THE PITTSBURG DISTRICT.

MORNING STAR.—This mine, situated in the above district, Lander County, is the property of the Dahlgren Mining Company of this city. It is a full claim, 1500 x 600 feet, and is developed principally by a shaft sunk on the vein and by a tunnel 150 feet in length. The superintendent reports that developments thus far show the vein widening from $2\frac{1}{2}$ to 5 feet, and carrying ore assaying high in gold and silver, principally gold. The mine is in close proximity to the Lewis District, and about $1\frac{1}{2}$ miles from the railroad connecting the Starr-Grove mine and mills.

NORTH CAROLINA.

GOLD HILL MINES.—A dispatch from Salisbury, dated June 24th, says: On Wednesday, the sale of the Gold Hill property, Rowan County, N. C., for \$125,000, was confirmed to an English company, incorporated under the name of the Gold Hill Mines, Limited. The first cash payment of \$25,000 has been made. William Treloar, Superintendent, has been ordered to begin work. There are 500 acres in the tract. A shaft is down 750 feet, and it is estimated that it will cost \$30,000 to drain the mine.

UTAH.

Our Utah exchanges contain the following:

CRISMON-MAMMOTH.—The prospects at this mine are very favorable. In the winze at the 200-foot level, north drift, is a vein of base ore assaying high in gold and silver. The south drift is run in lime for eighty feet, but looks very promising for ore. The east drift has some very good base ore. At the 50-foot level, south drift, the ore is not so base, and it contains mostly gold. On the main tunnel level, about 450 feet from the mouth, and just west from Simpson's slope, is a body of ore about ten or twelve feet wide, base and milling ore mixed. The Gulf and upper north drift turns out most of the ore that goes to the mill. There is a large body of good base ore between the upper and lower levels that is not taken out, as there is no way to work it up.

NORTH HORN-SILVER.—Work is vigorously pushed. The shaft is going down satisfactorily. The rock penetrated is considered cap-rock, but it assays from two ounces up to 23 ounces silver. The north end of the property, over 2000 feet from the point last named, is opening by a tunnel on the course of the vein.

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:

Construction of the Iron Superstructure of a Railroad Bridge over the Savannah River on the Charleston & Savannah Railroad; also Completing the Foundation of the same Bridge. For further information, apply at the office of the Company at Charleston, S. C.; C. S. Gadsden, Supt.	
Construction of the Railroads from Bage to Cacequy, and from Cacequy to Uruguayana, in the Province of S. Pedro do Rio Grande do Sul. Particulars can be had by application to the Brazilian Consulate-General, No. 71 Broadway, Room No. 62, New York City.	July 4, 1881.
Construction of the Iron Superstructure of a Railroad Bridge over the Savannah River, on the Charleston & Savannah Railroad, near Savannah, Ga.; also, for Completing the Foundations (now in an unfinished condition) of the same Bridge. The Bridge will be about 1000 feet in length, including a Draw-Span. For further information, apply at the Office of the Company, at Charleston, S. C.	" 4, "
Dredging the East River, foot of Division avenue; Dredging the Slip in the East River, foot of Gold street, and the Slip at the foot of North Fifth street, Brooklyn; Department of City Works, Municipal Department Building, Brooklyn.	" 7, "
Constructing and Erecting Pumping Machinery, having a capacity sufficient to deliver 60,000 cubic feet of water per minute 8 feet high, from the South Branch of the Chicago River into the Illinois & Michigan Canal; Carter H. Harrison, Acting Commissioner Department of Public Works, Chicago, Ill.	" 8, "
Dredging in Mobile Harbor, Ala., in Tampa Bay, Fla., at the mouth of the Suwanee River, Fla., Escambia River, Fla. and Ala., in Apalachicola Bay, Fla., in Pensacola Harbor, Fla.; and for construction of Jetty at Pensacola Harbor, Fla.; A. N. Damrell, Captain of Engineers, U. S. A., U. S. Engineer's Office, Mobile, Ala.	" 9, "
Delivering on Board the Cars at the Rock Island Arsenal, Ill., before January 1st, 1882, 15, 12, 9, 7, and 4 in. Wrought-Iron Beams and other Shapes of Wrought-Iron; D. W. Flagler, Major of Ordnance Commanding, Rock Island Arsenal, Ill.	" 13, "
Dredging in the North Branch of the Susquehanna River, between Wilkes-Barre and Monoclonock Island; J. N. Maccomb, Col. of Engineers, U. S. A., U. S. Engineer's Office, 1125 Girard street, Philadelphia, Pa.	" 15, "
Elasting 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.	Aug. 6, "

New Capitol at Albany.—At a meeting of the New Capitol Commissioners, held at Albany, June 25th, the contract for iron work on the east front of the building was awarded to Sullivan & Rice, of Albany, for \$47,867.89. The contract for furnishing the roof tiles of the east pavilion was awarded to Merrill & Ewerts, of Akron, Ohio, for \$3 per hundred. The contract for laying the tile on the east pavilion was awarded to Wasson & Martin for \$17.50 per square.

Northern Railroad of Long Island.—The directors of this railroad have awarded the contract for building the road from Astoria to Huntington to J. W. Lane, of New York, for \$2,000,000, and the work is to be begun in July.

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 (June 25, June 27, June 28, June 29, June 30, July 1), 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, 340,040.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, July 1.

With a general inclination to get out of town and away from business, and the approach of the national holiday, it is not strange that the transactions in mining stocks for the past week have been small and prices weak. The sales only aggregate 743,630 shares. There is said to be quite a large short interest in the market, and an early recovery under the improved outlook at many of the mines is looked for by those best informed on the market.

The Comstock shares have had a very fair business, but have been carried down with the load of assessments. California has declined to 96c., under sales of 6305 shares. Consolidated Virginia, with a business of 16,950 shares, has declined to \$2.55. Ophir declined from \$9 3/4 to \$5. Sierra Nevada declined to \$10 1/2. Union declined to \$9 1/2, but recovered to \$11. Sutro Tunnel, under a moderate business, has been very weak, declining to \$1 1/2.

The Tuscarora stocks have been quiet and weak. The Bodie stocks have been well represented in the dealings, at generally weaker prices. Bodie declined to \$6 1/2, but afterward recovered to \$7. Standard declined from \$24 1/2 to \$22 1/2, and recovered to \$23 3/4. Noonday sold down to 90c.

Chrysolite has been quite active and irregular, but much stronger than last week. This strength was caused by the resumption of shipments at the mines. The sales aggregate 10,400 shares at \$6 3/4 to \$5 to \$6. Dunkin, under a moderate business, dropped from 70 to 50c. recovering to 70c. Great Eastern was active and steady. Hibernia has been very active and a shade weak, with a steady inclination at the close. Horn-Silver, under a moderate business, has been a

little weak, declining to \$15. Iron Silver has been active and weak, the sales amounting to 21,200 shares at \$2.10 to \$1.95. Robinson Consolidated has been active and strong at \$10 to \$11. Alta-Montana has been worked up to \$2.20. Bull-Domingo still continues in the downward course, having reached \$1.80. Mineral Creek has been active and very weak. Silver Cliff has been active and very weak, touching \$5, but reacting to \$5 1/2 to-day. Oriental and Miller has been very active and irregular, but in the end holds the same prices as a week ago. The State Line mines have been active and irregular, but at the close show but little change from the prices a week ago. Three prominent operators have visited these mines, and now comes a report over the wires that they also indorse every body else; but still we do not get specific opinions. The Graphic says:

"As near as I can get at it," said a prominent mining stock broker to-day, "the Roberts party obtained the State Line and Oriental and Miller stock, amounting in all to 1,200,000 shares, for about 16 1/2 cents per share. This stock, after proper puffing and button-holing by a gang of blowers who are professionals in their business, and after expert reports had been plentifully distributed, was bulled up to a high figure. So extremely tempting was this bait, and so faithfully did the blowers do their work, that to-day the public is crammed full of the stock at high prices. People are now desiring to realize. The mines, said to be full of valuable matter, are returning little if any thing, therefore stock purchasers are scarce. Then there is a water-pipe; that is a thing which manipulators in mining as well as railroad securities can use, and its usefulness in the State Line operations is by many anticipated. It is a thing that constantly breaks and causes delay, with a consequent rise and fall in the price of stock. So, every thing considered, there appears to be a dull outlook for the glittering fanciers. Look at Oriental and Miller. A week or so ago, it sold for \$1.70; now it is worthless than \$1 a share, and it is the same with the other stocks in proportion. Now, I call this thing downright robbery, and already it has knocked business at both mining exchanges flatter than a pancake, and all the brokers are getting as weak as kittens, because they have lots of the stock on margins. No, sir; this kind of

business won't do; and a few more setbacks of this kind will lay half the brokers in the board on their backs.

Mr. S. V. White is very enthusiastic in his praise of the Robinson Consolidated mine.

The mining exchanges close to-day, and will resume business on Tuesday.

Just at this time, when almost daily reports are received of the new strikes of ore in the mineral districts of the West, we are impressed with the attention given to and the corresponding good results from the workings of low-grade ores. Hardly a district of any prominence in the West but in its palmy days has thrown thousands of tons of such on its waste-dump or left it standing in the mines, while the more promising ores were sought for. Greater attention is now attracted to the working of this character of ores than at any period in the past. The movement is in the right direction, and must be followed by good results. That the working of such ores can be done with profit to the owners, there can be no doubt. It has been illustrated over and over again. Among the latest evidences of it are the operations of the Green Mountain Gold Mining Company, of California. We are in receipt of the second annual report of the company, and it well illustrates what success can be achieved with ores of low grade when the mine management is practical, economical, and conservative.

The report shows the condition of the mine to May 1st, 1881, and the company claims its value is now established beyond contingency. The property is in first-class condition, thoroughly developed, and fully equipped. To its other extensive facilities, the company has added a new 60-stamp mill, thoroughly complete and including every thing that practical skill can suggest.

Franklin declined from \$11¼@10¼, but closes \$11 bid.
Fewabic also receded from \$12@10, now \$10¼ bid.
Quincy not a sale since June 20th, at \$37. At one time, it was offered at \$34; but now that figure is bid, and the next sales will be higher.
Osceola felt the depression, and touched \$30, but later came up to \$32.
Huron has declined to \$3¼, only ¼ over the assessment.

Atlantic holds steady at \$12, with only one sale and bid.
Allouez has dropped to \$2, but that is still bid. These are all the copper stocks in which any dealings have been quoted.

The silver stocks caught the infection of depression, and for a time were badly slaughtered. Bonanza Development held its own best, dropping off to \$5¼, but quickly rallied to \$5½, and closes \$5 13-16 bid, ex quarterly dividend, 15c.

Catalpa fell from \$2@1¼, and later back to \$2, closing \$1¼ bid.

Crescent went a sixteenth under \$1, but rallied to \$1¼, and bid.
Harshaw is very dull, with small sales at \$8, which is bid.

Silver Islet opened at \$44, went up to \$45, off to \$43½, and again \$45, closing \$44 bid.
San Pedro (copper and silver) declined from \$4¼@3¾, and closes \$3¾.

Duncan dull at \$2@2¼.
Sullivan advanced to \$4½, then declined to \$3¾, and closes at that bid. It is generally believed that this stock will go higher.

At the Boston Mining Exchange, the market has been unusually active and strong in opposition to the general tone of the market elsewhere. The volume of business is steadily increasing, and the daily transactions are about five times as many as the business in money shares at the old board. The leading stocks this week have been Empire, Milton, and Duncan, while several others have come into prominence. Empire was crowded down to 50c. last Saturday, but has quickly rallied to 71c. under a very spirited buying demand. Late reports from the mine by parties not in the management, who have been on the ground, are to the effect that there is no longer a doubt that the mine is to become a paying property in due time. The sales have been by the tens of thousands daily.

Milton has even gone ahead of Empire this week, and with immense sales rallied up from \$1 to \$1.50 per share. The bulls now talk \$2 or even higher, and seem to have it all their own way, while the "shorts" are seeking cover as best they can.

Dunkin was further hammered to 54c., at which point the market turned and has since advanced steadily to 63c. this afternoon, but higher would have been paid had the stock been for sale. It is generally believed that there is a large short interest in this stock, estimated by some as high as 50,000 shares; and now that the outside public are coming in freely, we may see lively times in it. Boston parties who have recently been on the ground do not hesitate the opinion that there is nothing in the mine to prevent the resuming and payment of dividends for a long time to come. Copperopolis continues to advance, now up to \$1.78 and firm. Massachusetts & New Mexico dull at 49 @50c. Mendocino firm at \$4¾, sales and bid. Simpson broke from 12@4c., and rallied to 8c., other stocks little change.

3 P. M.—At the second sessions of both Boards, there was a decidedly better feeling and higher prices, but the highest quotations are included in the above summary.

Boston.

The following is a synopsis of the transactions in mining stocks at the Boston Stock Exchange, and at the Boston Mining Stock Exchange, for the week ending June 29th.

NAME OF COMPANY.	Opening June 23.		Highest during the week.		Lowest during the week.		Closing June 29.		Total shares sold.
	Open.	Close.	High.	Low.	High.	Low.	Open.	Close.	
Allouez, C.	2 1-16	2 1-16	2 1-16	2 1-16	2 1-16	2 1-16	2 1-16	2 1-16	1,000
Arizona & Mass.	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	300
Atlantic, C.	12 00	12 00	12 00	12 00	12 00	12 00	12 00	12 00	125
Blue Hill, C.	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	800
B'n'za D'v'l'mt	5 3-16	6 00	5 3/4	5 3/4	5 3/4	5 3/4	5 3/4	5 3/4	8,610
Breece Iron	1 05	1 05	1 05	1 05	1 05	1 05	1 05	1 05	100
Bridal Veil	.55	.55	.55	.55	.55	.55	.55	.55	900
Cal. & Hecla, C.	2 30 1/4	2 30 1/4	2 30 1/4	2 30 1/4	2 30 1/4	2 30 1/4	2 30 1/4	2 30 1/4	261
Catalpa	2 1-16	1 87 1/2	2 1-16	2 1-16	2 1-16	2 1-16	2 1-16	2 1-16	12,855
Col. Dia. Tunnel	3 83	3 83	3 83	3 83	3 83	3 83	3 83	3 83	400
Copper Falls, C.	6 00	6 00	6 00	6 00	6 00	6 00	6 00	6 00	450
Copperopolis, C.	1 70	1 83	1 69	1 83	1 69	1 83	1 83	1 83	8,225
Crescent	1 00	1 34	1 15-16	1 34	1 15-16	1 34	1 34	1 34	5,750
Douglas	2 00	2 00	2 00	2 00	2 00	2 00	2 00	2 00	200
Duncan, S.	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	145
Dunkin	.80	.82 1/2	.54	.64	.54	.64	.64	.64	11,200
Empire	.64	.70	.48	.69	.48	.69	.69	.69	67,550
Franklin, C.	1 1 1/4	1 1 1/4	1 0 1/2	1 0 1/2	1 0 1/2	1 0 1/2	1 0 1/2	1 0 1/2	710
Gold Stripe	2 7 1/2	2 7 1/2	2 7 1/2	2 7 1/2	2 7 1/2	2 7 1/2	2 7 1/2	2 7 1/2	100
Goldsboro	.75	.75	.75	.75	.75	.75	.75	.75	100
Granzer	.50	.54	.48	.50	.48	.50	.50	.50	1,450
Harshaw	8 1/4	8 1/4	8 00	8 00	8 00	8 00	8 00	8 00	145
Huron	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	60
Income	.40	.40	.40	.40	.40	.40	.40	.40	100
Kokomo	.50	.52	.50	.50	.50	.50	.50	.50	400
Mass. & N. Mex.	.51	.51	.47	.49	.47	.49	.49	.49	1,200
Mendocino	4 75	4 87 1/2	4 75	4 87 1/2	4 75	4 87 1/2	4 87 1/2	4 87 1/2	1,600
Milton	.82	1 25	.73	1 25	.73	1 25	1 25	1 25	91,910
Osceola, C.	30	32	30	32	30	32	32	32	174
Pewabic, C.	12	12	10	10	10	10	10	10	407
Pine Tree	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1,000
Ridge, C.	3 00	3 00	3 00	3 00	3 00	3 00	3 00	3 00	50
San Pedro	4 7-16	4 00	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	2,250
Silver Islet, S.	44	45	43 1/2	44 1/2	43 1/2	44 1/2	44 1/2	44 1/2	535
Silver Lake	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50	100
Simpson Gold	13	13	.04	.07	.04	.07	.07	.07	27,800
Sullivan	4 00	4 1/2	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	1,593
Sycamore	1 25	1 38	1 10	1 10	1 10	1 10	1 10	1 10	1,625
Tremont Silver	.85	1 05	.85	1 00	.85	1 00	1 00	1 00	1,900
Twin Lead	.95	.95	.80	.80	.80	.80	.80	.80	400
U'n L'd & Min'g	1 1/2	1 50	1 50	1 50	1 50	1 50	1 50	1 50	200
War Eagle	.75	1 15	.75	1 00	.75	1 00	1 00	1 00	2,450

c. Copper. a. Silver.

Coal Stocks.

NEW YORK, Friday Evening, July 1.

The past has been an extremely dull week for this class of stocks, the combined sales in this market and in Philadelphia amounting to only 211,740 shares as against 368,015 shares for the previous week. Prices have fluctuated lightly, now and then showing symptoms of weakness, but to-day there has been a marked advance and the market closes very strong. The bulk of the dealings have been in Delaware, Lackawana & Western, the sales amounting to 75,950 shares at \$122¼@125, the latter price being ex dividend. Delaware & Hudson Canal closes at \$110, as against \$108 Tuesday, these being the extreme prices; the sales amount to 7900 shares. The sales of New Jersey Central amount to 39,462 shares at \$99¼@102½. Reading has had sales in this market of 9600 shares at \$58@61.

The Board of Managers of the Philadelphia & Reading Railroad Company held a meeting, June 29th, in Philadelphia, with the President, Major Bond, in the chair. The main topic considered during the two hours' sitting was the question of making provision for the floating debt by devising means for the release of the outstanding collateral. It was deemed expedient to accept the proposition of the receivers to issue receivers' certificates bearing interest at 4 per cent, to accomplish the purpose. The form of these certificates is to be left to the judgment of counsel; and after they have been prepared, the United States Circuit Court will be asked to approve the plan.

Gas Stocks.

NEW YORK, Friday Evening, July 1.

These stocks continue to advance, and are quite strong in spite of the many electric lighting projects agitated at present. No sales are reported.

BULLION MARKET.

NEW YORK, Friday Evening, July 1.

There has been an unexpected demand for silver abroad, with an advance in rates as noted in our table. As far as can be learned here, this is in consequence of a demand from Russia and Hayti, for coinage purposes, rather than as a result of any thing the Monetary Congress has agreed to do.

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

DATE.	London		N. Y.	
	Pence.	Cents.	Pence.	Cents.
June 25	51 1/4	111 1/2	51 1/2	111 1/2
June 27	51 5-16	111 1/2	51 3/4	111 1/2
June 28	51 5-16	111 1/2	51 1/2	112 1/4

ARIZONA.

Copper Queen.—Officially reported by the secretary: The production from January 1st, 1881, to July 1st, 1881, (estimating on our average output for the last days of June), will be two million pounds of copper bullion.

Empire.—Reports state that this company is making the necessary arrangements to raise and ship to the Boston Mill, on the San Pedro, at Emory City, 800 tons of first-class ore, that averages \$200 to the ton, car sample assays.

Head Center.—In an official report from the secretary, he says that the mill has produced \$61,070.35 since it has been started up.

CALIFORNIA.

Beveridge.—The Inyo Independent says that a clean-up of the arrastras at this place, after a three weeks' run, ending June 4th, produced \$13,000 in gold bullion; for the month to come, the numerous arrastras will continue to run as heretofore.

COLORADO.

Big Pittsburg.—Officially reported by the secretary: Net amount of smelter's settlements from January 1st, 1881, to June 1st, 1881, \$57,948.70.

Bobtail Consolidated.—It is stated that this mine has produced \$85,000 during the first four months of the present year.

Chrysolite.—The secretary has kindly furnished us with the following statement of the production of this mine for the following months:

Month	Tons of ore.	Value.
January	510	\$52,529
February	498	53,131
March	1,071	109,568
April	251	15,481
May	882	73,406

The shipping of ore was resumed on the 28th of June. The machinery on the Roberts shaft has all been reset, and is running.

Crescent.—It is stated that this mine is shipping about five tons of ore per day, netting \$50 a ton.

Dunderberg.—The superintendent reports, June 22d, that he has settled for 71 tons of dry ore, realizing \$6000, and has 52 tons on hand, worth \$8000.

Fanny Barrett.—Contracts for the smelters have been signed, and it is stated that they will be running within six days.

Little Pittsburg.—The superintendent reports, for the week ending June 23d, that he shipped 147 tons of ore to the mills. The ore unsettled for amounts to 313 tons.

Morning Star.—A report states that one lot of twenty-five tons of ore netted \$83.21 per ton; another of seventy-two tons netted \$60 a ton; and a third, a mixed lot of fifty-three tons, yielded \$15 a ton.

Taylor & Brunton Mill.—On the 22d of June, a silver bar,

BULLION PRODUCTION FOR 1881.

We give below a statement showing the latest bullion shipments. These are officially obtained from the companies, where that is possible; and where official statements can not be procured, we take the latest shipments published in those papers nearest to the mines reported. The table gives the amount shipped for the week up to the date given, as well as the aggregate shipments to such date, from the first of January, 1881. The shipments of silver bullion are valued at \$1.29-29 per ounce, Troy; gold at the standard \$20.67 per ounce, Troy. The actual value of the silver in the following table is therefore subject to a discount, depending on the market price of silver. The price of silver being now about \$1.12 per ounce, the following figures, where they relate to silver bullion, should be diminished by about 13½ per cent to arrive at actual value:

MINES.	States.	For the week.	Month of June.	Year from
				Jan. 1st, 1881.
*Alice, C. S.	Mont.		\$50,672	\$510,008
*Barbee & Walker, S.	Utah			81,155
*Belle Isle, C. S.	Colo.			12,060
*Big Pittsburg, S.	Cal.	7,600	26,700	57,949
*Bodie, C.	Cal.			187,028
*Bos. & Colo. S. Wks.	Colo.			665,000
*California, G. S.	Nev.			107,164
*Caribou, S.	Colo.	8,000	8,000	79,238
*Christy, S.	Utah	3,594	21,689	202,525
*Chrysolite, S.	Colo.			304,118
*Concordia, G.	Cal.			2,234
*Connor, S.	Utah			46,575
*Contention, S.	Ariz.	22,850	101,840	966,348
*Con. Virginia, G. S.	Nev.			146,560
*Copper Queen Co.	Ariz.			340,000
*Crismon-Mammoth, G.	Utah	4,425	8,951	35,541
*Custer, C. S.	Idaho.			330,312
*Deadwood-Terra, G.	Dak.			340,372
*Derbec, Blue Grav., G.	Nev.			53,022
*Eureka Con., G. S. L.	Cal.	35,160	133,110	811,383
*Exchange Silver.	"			44,400
*Fresno Enterprise, G.	Cal.			9,600
*Frisco M. and S. Co.	Utah	15,334	51,036	230,159
*Germani Smelt. Wks.	Utah	17,700	38,385	162,184
*Grand Central Mill.	Ariz.		40,000	290,854
*Grand Prize, S.	Nev.			51,658
*Hale & Norcross, G. S.	Ariz.			33,080
*Harshaw, S.	Ariz.		13,171	267,636
*Head Center	Utah			80,231
*Homestake, G.	Dak.			48,030
*Horn Silver, S. L.	Utah	20,000	100,500	490,868
*Idaho, G.	Cal.			157,000
*Independence, S.	Nev.			17,108
*Indian Queen, S.	"		4,360	83,773
*Iron Silver	Colo.			264,331
*Jocusta, S.	Mex.			156,888
*Little Chief, S. L.	Colo.			131,602
*Mack Morris	Ariz.		5,220	106,731
*Mingo Smelt. Wks.	Utah			4,554
*Modock	Cal.			34,704
*Morgan Smelt'g Wks.	Utah			24,179
*Morning Star	Colo.			15,200
*Mount Potosi	Nev.			59,830
*Navajo	"		14,723	128,124
*Nooday, G.	Cal.	14,600	31,660	197,343
*Northern Belle, S.	Nev.	24,460	94,920	666,445
*Oneida, G.	Cal.			8,684
*Ontario, S.	Utah	87,662	173,001	1,133,908
*Ophir, G. S.	Nev.			5,170
*Pascoe, S.	Utah		3,150	18,320
*Rebellion	"			10,512
*Richmond, S. L.	Nev.		24,622	626,955
*Robinson Con., S.	Colo.			107,000
*Sierra Nevada, G. S.	Nev.			179,001
*Silver Bow	Mont.			73,442
*Silver Cliff	Colo.		7,600	22,775
*Silver King, S.	Ariz.		25,400	304,348</

during the past week. The weekly statement of the Bank of France shows a gain of 4,595,000 francs gold, and 1,356,000 francs silver.

METALS.

NEW YORK, Friday Evening, July 1.

As is usual about the time of the national holiday, the metal business is exceedingly quiet, and is likely to remain so, for a short time, at least. It is found, however, that during the past month a very large quantity of metals has gone into consumption, and that there are indications of a very large fall business to come.

Copper.—This article has had a moderate business, the transactions amounting to perhaps 500,000 lbs. at 16½@16¾c. on spot and to arrive during summer months.

Our London advices include June 17th, from which we take the following:

June 15th. Sales about 500 tons at £59¼@£59½, usual 14 days, and £60@£60¼ forward deliveries.
June 16th. Chili Charters were advised this morning as 1500 tons pure, of which 700 tons Bars and Ingots, 300 tons pure in Ores and Regulus for England, 500 tons Bars for orders here or France.

CHARTERS.

	1881.	1880.	1879.	1878.
	Tons.	Tons.	Tons.	Tons.
January 1st to May 31st.....	14,620	19,409	20,766	18,452
June 1st to 15th.....	1,500	2,007	1,335	1,785

SHIPMENTS.

	1881.	1880.	1879.	1878.
	Tons.	Tons.	Tons.	Tons.
January 1st to May 31st.....	14,100	20,896	20,306	19,368
May only.....	3,900	3,195	4,670	3,261

Price of Bars at Valparaiso is advised at \$20, exchange 28¾d., which, with a steamer freight of 60s., is equal to £59½ Liverpool, without commission to merchants either side.

About 300 tons Bars reported to-day; from £59½ short fixed prompt to £60 usual 14 days, and £60@£60½ extended deliveries. The closing quotations for cash were £59¼@£60, with buyers at the lowest.

June 17th. Sales of about 1200 tons; a cargo of Lota at £60; ordinary and good named brands, £59¼@£60 cash; and g. o. bs. forward delivery at \$60 net and £60½ customary conditions. Wallaroo was quoted at £70; Burra Cake, £65½@£66; English Tough, £63½@£65; Select Ingot, £65@£66½.

Tin.—There has been no large business done. We quote at 20¾c. in a small way, while in a large way it is not salable at 20¾c. L & F is quoted at 21c., nominal. Straits in London is £88 15s. on spot and £89 10s. to arrive. Singapore quotes at \$27¼, with exchange at 9s. 9½d. The shipments from the Straits to the United States for the last half of the month were large, amounting to 375 tons by steam and 50 tons by sail, making totals for the month of 575 tons by steam and 225 tons by sail; in all, 800 tons. The arrivals in London during June were 825 tons, and deliveries 1050 tons. The deliveries in Holland were 750 tons. The shipments of Straits to London were 510 tons, and of Australian, 800 tons.

Our advices include June 17th, from which we take the following:

June 15th. Sales about 100 tons.
June 16th. Sales of 200 tons at 91½@91s. cash, and 91¼@92s. forward prompts.
June 17th. Firm and quiet. Sales of 50 tons at 90¾@91s. prompt cash.

Tin Plates.—There has been a very fair business in these. Prices are unchanged. We quote, per box, as follows: Charcoal tins, Melyn grade, ½ cross, \$6½; Allaway grade, \$5½. Charcoal Roofing, Dean grade, \$5½ for 14x20, and \$11¼ for 20x28; Allaway grade, \$5¼ for 14x20, and \$10¼ for 20x28. Coke Roofing, B. V. grade, \$4½@£5 for 14x20, and \$10@£10¼ for 20x28. Coke tins, A. B. grade, IC, \$5½@£5½; B. V. grade, at \$5; ICW, \$4½ for 14x20.

Messrs. Robert Crooks & Co., of Liverpool, under date of June 16th, say:

There has been further buying of B. V. grade Coke Tin and the better brands of Steel Tin Plates, and both these descriptions are now scarce at the lowest points touched. Other sorts are, if anything, a shade lower, but there is considerable inquiry for Terns.

Lead.—There have been sales of about 400 tons of common during the week at 4¾c. A strike at the Newark refining-works has for the time an unsettling effect. Holders are now asking 4¾c., but there have been no sales at that price.

The receipts of lead at St. Louis, via the St. Louis & San Francisco Railroad, for the week ending June 21st, were 237 tons.

The San Francisco Commercial Herald of June 23d

says: The Eliza McNeil, for New York, carried of pig-lead 623 tons, valued at \$59,185.

Spelter and Zinc.—Both are quiet. Spelter is quoted at 4¼@5c., and sheet zinc at 6¾@7c.

Antimony.—There is a fair business at 14¼@14½c.

Quicksilver.—The San Francisco Commercial Herald of June 23d says:

The spot stock is exceedingly light, and one leading producer persists in refusing to sell under 38c., but other receivers feed the market to the extent of every-day receipts at 37¼@37½c., although 37½c. is the general asking price. If the schooner Eustace, that sailed June 2d, proves to have been lost with her 1300 flasks quicksilver on board, that quantity will have to be duplicated, and may add strength momentarily to the market. There are at present very few small orders here from New York. The steamer City of Peking carries to Yokohama 100 flasks, valued at \$3000, shipped by Donaldson & Co. The exports for the week, by sea, were as follows:

	Flasks.	Value.
To San Blas per Colima, hence 21st inst.:		
Cabrera, Roma & Co.....	6	\$171
Previously since January 1st, 1881.....	20,281	585,296
Totals.....	20,287	\$585,467
Totals same period 1880.....	17,580	540,010
Increase in 1881.....	2,707	\$45,457
Receipts since January 1st, 1881, 25,760 flasks.		
Overland shipments from January 1st to June 1st, 1881, 3,354 flasks.		

IRON MARKET REVIEW.

NEW YORK, Friday Evening, July 1.

The first half of July has been almost every year a very quiet period for the iron trade, and this year is not likely to prove an exception. During this period, accounts are closed, repairs taken, etc., preparatory to doing the regular fall business. Many buyers who are in need of supplies are holding off until they can judge what their requirements will be. It would not surprise us to see very liberal purchases during the next thirty days. The markets, at the present time, are, as a rule, very sensitive, and the frequent pushing of a few important speculative lots for sale continues to have a demoralizing effect. It is the general belief that about the worst condition of affairs for some months to come has been seen, and that an improvement is the next order of affairs.

American Pig.—There is a certain amount of business going on all the time in a small way, but no important transactions have been reported. The makers continue to make very liberal deliveries, showing that, although the sales at the present time are small, the consumption is large and uninterrupted. A lot of No. 1 Allentown iron, in second hands, is having a very demoralizing effect on buyers, but does not appear to disturb makers, who are as firm as they have been for a considerable time. We learn of one or two furnaces going into blast, and hear nothing more of any going out. We quote No. 1 Foundry at \$24; No. 2 Foundry, \$21½; and Forge, \$20.

Scotch Pig.—The arrivals during the week have been small and all sold from ship. The demand is only in a small way. The Glasgow prices are unchanged. Freights continue at 10s. We quote Eglington at \$20½@£21; Coltness, \$23½; Glengarnock, \$22½@£23; and Gartsherrie, \$23. We note a sale of 100 tons of No. 3 English iron at \$18, and quote at \$18@£18½. Sales of 10,000 tons of Bessemer iron are said to have been made at \$24, and that it can not be imported now at less than \$25.

Messrs. John E. Swan & Brothers, of Glasgow, under date of June 17th, report 120 furnaces in blast, as against 116 at the same time last year. The quantity of iron in Connal & Co.'s stores was 563,732 tons, an increase of 1648 tons for the week. The shipments show a decrease since Christmas of 112,058 tons, as compared with the shipments to the same date in 1880. The imports of Middlesbrough pig-iron for the same period show an increase of 27,771 tons. The following were the quotations of the leading brands of No. 1 pig-iron: Gartsherrie, 54s.; Coltness, 55s.; Langloan, 55s.; Summerlee, 54s.; Carnbroe, 51s. 6d.; Glengarnock, 51s.; Eglington, 47s. Middlesbrough pig-iron was quoted as follows, f. o. b.: No. 1 Foundry, 40s. 6d.; No. 2, 39s.; No. 3, 37s.; No. 4, 36s. 6d.; No. 4 Forge, 36s.

Messrs. J. Berger Spence & Co., of Manchester, England, under date of June 18th, say: "Since the publication of our last, there have really been very few changes in the position of the pig-iron markets, and while values have not materially altered, the slight fluctuations tending toward firmness have had very little influence on the dimensions of business.

The prospect is by no means bright, nor can any substantial improvement be reasonably looked for until the American and continental markets have cleared some of the superabundant stocks lying at most of the outports. These drawbacks, and the large decrease in the exports, will, of necessity, force the consideration of the reduction of production on makers—a consideration, the sooner it is decided in the affirmative, the better for the trade. A limited business was done on Tuesday in Middlesbrough, the prevailing price for No. 3 being 36s. 6d., the nominal market price being about 36s. 9d. Several sellers refused to accept the above figure, however, preferring to wait the course of events during the rest of the week. For forward delivery, buyers were scarce at any advance on prices for current. No. 1 ruled at 40s., and No. 4 at 36s. Glasgow Warrants have fluctuated between 46s. 4½d. @46s. 9d. Hematites are about unchanged."

Rails.—A sale of 25,000 tons of steel rails to the New York Central Railroad, for delivery next year, at about \$55 on cars at the works, is reported. Outside of this, there has been some business in a small way. It is estimated that the steel rails sold during the first half of this year for delivery in 1882 will aggregate 150,000 to 200,000 tons, and that there is still a very large inquiry. The advance of \$2 per ton on Bessemer pig-iron will probably tend to stiffen the views of makers of rails. Spot rails are held at \$62 @£62½ here. English rails for 1882 delivery are quoted at \$60 here. Domestic rails for 1882 delivery are quoted at \$55@£56 at works. We learn of no transactions in iron rails, although there is a good inquiry. We quote at \$45@£46½ here.

Old Rails.—There has been a business of about 4000 tons of Ts. at \$25@£25½, and there is still considerable inquiry, with \$26 asked at the close. There is reported to have been a sale of 5000 tons of D.Hs. at Baltimore at \$28½. We quote here at \$27½.

Wrought Scrap.—There have been some small lots sold. We quote \$26 from ship and \$27½@£28 from store.

We publish the following letters from our regular correspondents:

Baltimore. June 27.

[Specially reported by R. C. HOFFMAN & Co.]
The iron market is without any material change; the demand is fair for the season, and prices range about as follows:

Balt. Char.	\$35.00@36.00	Mot. and Wh.	\$18.00@19.00
Va. " " " " " "	35.00@36.00	Cl. C. B. Bl'om	60.00@65.00
Anth. No. 1 " " "	24.00@25.00	" " Billets " " "	" " "
" " " " " "	22.00@23.00	Refined Bl'm	50.00@55.00
" " " " " "	20.00@22.00		

Cincinnati. June 28.

[Specially reported by JACOB TRADER & Co.]
There is no notable change to report in our market. The demand for pig-iron is confined to small lots, and we quote:

	FOUR MOS.
No. 1 Hanging Rock Charcoal Pig-Iron.....	\$27.00@27.50
No. 2 " " " " " " " " " " " "	26.00@26.50
No. 1 Tennessee " " " " " " " " " "	26.00@26.50
No. 2 " " " " " " " " " " " "	25.00@25.50
No. 1 Hanging Rock Coke " " " " " " " " " "	23.00@24.00
No. 2 " " " " " " " " " " " "	22.00@22.50
No. 1 Jackson Co. Stone Coal " " " " " " " " " "	20.00@23.00
H. R. C. B. Car-Wheels, all Nos.....	40.00@41.00
Southern C. B. Car-Wheels, all Nos.....	38.00@39.00
Virginia " " " " " " " " " " " "	39.00@40.00

Louisville. June 28.

[Specially reported by GEORGE H. HULL & Co.]
The market continues quiet. No sales of importance are being made. Prices remain unchanged, there being no disposition on the part of producers to make concessions. We quote for cash:

FOUNDRY IRONS.

	No. 1.	No. 2.
Hanging Rock Charcoal.....	\$28.00@29.00	\$26.00@27.00
Southern Charcoal.....	23.50@24.00	22.50@23.00
H'n g Rock, Stc'l & Coke.....	23.50@24.00	22.00@23.00
Southern Stonecoal & Coke.....	23.50@24.00	22.00@23.00
"Amer. Scotch" \$22¼@£23¼		Silver Gray \$20.00@£22.00
Scotch Iron.....	24 @ 25	

MILL IRONS.

No. 1 Charcoal, cold-short and neutral.....	\$21.00@22.00
No. 1 Stc'l & Coke, cold-short and neutral.....	20.50@21.00
No. 2 Stc'l & Coke, cold-short and neutral.....	19.50@20.00
No. 1 Missouri and Indiana, red-short.....	25.00@27.00
White & Mottled, cold-short and neutral.....	18.00@19.00

CAR-WHEEL AND MALLEABLE IRONS.

Hanging Rock, cold blast.....	\$35.00@41.00
Alabama and Georgia, cold blast.....	35.00@40.00
Kentucky, cold blast.....	35.00@40.00
Hanging Rock W. B. " " " " " "	30.00@35.00

Milwaukee. June 25.

[Specially reported by R. P. ELMORE & Co.]
The pig-iron market here partakes of the weakness as exhibited in the East, and in consequence change of quotations, as below.
Improved prices are looked for during the coming month, for Lake Superior irons and good standard brands of Foundry Irons.

Pittsburg. June 28.

[Specially reported by A. H. CHILDS.]

During the past week, there has been a noticeable improvement in the volume of business. Some large sales of pig-iron have been effected, and several lots of metal which have been on the market for some time have been disposed of. While there has been no advance in prices, there is a decidedly stronger feeling, and full market rates are insisted upon by holders.

No. 1 F dry	4 mos.	\$24.00@25.00	M. & White	4 mos.	\$19.00@20.00
No. 2	23.00@24.00	Hot Blast Ch.	24.00@28.00		
Gray Forge	21.00@23.00	Cold Blast W.	33.00@38.00		

Richmond. June 27.

[Specially reported by ASA SNYDER.]

The tone of the iron market is improving and now indicates steady prices during the summer. No excess of iron upon the market, and, for some brands, considerable difficulty exists in filling orders. Quotations unchanged.

St. Louis. June 25.

[Specially reported by HOFFER, PLUMB & Co.]

There is considerable inquiry for pig-iron, and some trade. Ordinary brands are offered somewhat lower; but the quantity of business done, and the fact that we are between seasons, do not warrant any change in quotations, which for the most part may be considered nominal. We therefore quote:

HOT BLAST CHARCOAL.		Missouri	\$27.00@28.00
		Southern	25.00@26.00
		Hanging Rock	28.00@29.00
COKE AND COAL.		Missouri	\$26.00@27.00
		Southern	24.00@25.00
		Ohio	23.50@25.00
MILL IRONS.		Cold short	\$21.00@23.00
		Red short	25.00@26.00
CAR-WHEEL AND MALLEABLE IRONS.		Missouri	\$28.00@30.00
		Southern	35.00@38.00
		Ohio	35.00@42.00

Philadelphia, Pa. July 1.

The season of semi-annual settlements and mill repairing, which usually destroys business and labor for a week, has deprived this market of its usual activity. Prices are steady at the decline forced by heavy imports and withdrawals from bond. Offers have been made for three to six months' supplies at these figures for good grades, but makers are not as yet disposed to sell for more than four weeks' stock at prices which barely cover cost of production. Quotations are \$18.50@19.50 for Gray Forge at furnace; \$21.50@22.50 for No. 2; \$23.50@24.50 for No. 1 Foundry; \$17.50 for Middleborough, No. 4; \$18 for No. 3; \$22@24 asked for Bessemer pig, \$22@23 offered, and few sales. Charcoal iron moderately active, and supplies ample. Muck bars \$38.50, active; some departments dropping off for head. Blooms in active demand at \$63@65. Merchant bars 2'35c. at mill to 2'40c., store 2'4c. Mills increasing in orders. Bridge building contracts are of a frequency and magnitude to employ the full capacity of the mills represented here. Prices are steady and favorable to buyers. Steel rail orders for winter delivery have been placed at \$55 this week, and on this basis it is probable a larger volume of work will be booked the last half than the first half of the year. The iron rail-mills are filling up with fall work at \$46. Old rails are inactive at \$23, because of excess of supplies, and buyers' wants met for two months.

COAL TRADE REVIEW.

New York, Friday Evening, July 1.

Anthracite.

There is a fair business doing, and although prices continue to range as a rule below circular rates, they are not lower than they were. For the amount of coal that is being produced and the time of the year, the coal trade may be pronounced to be in very good shape.

The fears of a strike are growing, although the miners have not yet organized a movement.

The managers are discussing plans for the regulation of the trade during this month; but so far, nothing has been decided upon. The arrangement agreed to previously provides for a curtailment next week, at which time something will probably be decided upon. The present appearances indicate that a further curtailment will be ordered, and the announcement of an advance of 25c. per ton on stove coal on August 1st, and a smaller advance on some other sizes.

Freights are high and vessels scarce. It is evident that both higher freights and prices for coal will prevail before the end of sixty days, and we unhesitatingly advise our readers to purchase immediately.

There are not large stocks of coal in any portion of the country, and there are evidences of an early strong demand from both the East and West.

The production of anthracite coal last week was 475,058 tons, as compared with 627,453 tons the previous week, and 391,764 tons the corresponding week of 1880. The total production from January 1st to June 25th was 11,921,724 tons, as against 9,914,544 for the like period of last year, showing an increase this year of 2,007,180 tons.

Bituminous.

The shippers of this class of coal are competing with each other at a rate that is having a serious effect on

prices. Very low prices are named here, in Boston, and elsewhere. There is but very little business doing. A scarcity of cars keeps down the shipments of Cumberland coal to Philadelphia.

We publish the following letters from our regular correspondents:

Baltimore. June 30.

[Specially reported.]

Trade at this point has been only moderately active during the past month. Although better than the corresponding month of last year, there is yet a holding off both by the dealer and the consumer; the former believes that prices will not be higher in July, and the latter hopes they may be lower. Stocks are fair, and even now we hear complaints of scarcity of cars and orders not shipped promptly. If cars are getting really short in June, what may we expect in July, August, or September? We have just received advices that July prices will be the same as for June. When consumers settle down for business, after the Fourth, we expect a good trade for the rest of the season. Prices are firm, the tone of the market very fair, and stocks on hand at this time are good.

Wholesale prices per 2240 lbs.

ANTHRACITE COAL.		In cars at N. C. R.R. depot	
<i>Hard White Ash, Free Burning, and Shamokin.</i>			
Lump and Steamboat			\$5.15
Broken			4.26
Egg			4.35
Stove			4.50
Chestnut			4.20
<i>Lykens Valley Red Ash.</i>			
Broken			\$5.30
Egg			5.30
Stove			5.30
Chestnut			5.00

Afloat, per cargo, 15c. less than car rates; to trade in yard or wharf, 75c. additional.

Bituminous.

George's Creek, or Cumberland, f. o. b. Locust Point \$3.60@3.75

Buffalo. June 29.

[Specially reported by LEE & LOOMIS.]

Our trade here at the commencement of the month was very dull, and rates were shaded considerably, both wholesale and retail, in order to make sales. Anticipating an advance on 1st July, trade became more active, for local trade, but rates were not much firmer.

In the West, so far as we can hear, on line of the railroads hardly any pretense of maintaining circular was made. Notwithstanding this, the "powers that be" have concluded to advance on an average 15c. per ton, thinking no doubt the "cut" would be no more from a high than from a low circular. If, however, rail freights advance *pro rata* with circular, the additional freight taken would be about 9c. per ton; so, if the cutting keeps on, it is hard to see what material advantage the advance in circular will bring to the coal companies.

In bituminous coals, there has been a decline in freights from the Alleghany River mines (cat-fish) and a corresponding decline in prices here. Steam coals are certainly low—lower than profit to the miners will warrant. At present rates, it is merely swapping one dollar for another (and hardly that) in mining coal on the line of the A. V. RR. and the B. N. Y. & P. RR. In freights from here West, there has been a sharp decline, and shipments have been more free in consequence of the reduction. Dealers evidently remember the troubles that they had last fall from postponing till the last moment procuring supplies, and are taking advantage of present low rates to the upper lakes.

LEHIGH, LACKAWANNA, AND SHAMOKIN COAL.

Size.	Lackawanna and Shamokin.	Lehigh.
	Cars and afloat.	F. O. B. Cars and afloat.
Lump	\$4.24	\$6.07
Grate (or broken)	4.24	4.51
Egg	4.24	4.51
Stove	4.46	4.73
Chestnut	4.46	4.73

Per ton of 2000 lbs., delivered at Buffalo:

	Lump.	Run of mine.	Nut.	Slack.
Connellsville Coke	\$5.50			
Brookfield Coal	4.00			
Briar Hill	3.85			
Youghiogheny	3.60			
Monterey	2.75	\$2.65	\$2.60	\$2.25
Catfish	2.75	2.65	2.60	2.25
Stoneboro'	2.75	2.65	2.60	2.25
Sterling Cannel	5.00			

[Specially reported by C. M. UNDERHILL.]

On and after this date, until further notice, the prices of the coals of the Anthracite Coal Association will be as follows, subject to the usual conditions of shipment and sale:

ANTHRACITE COAL.

	Per gross ton 2240 lbs.		Per net ton 2000 lbs.	
	F. O. B. at Buffalo.	To Dealers on cars at Buffalo and bridges.	F. O. B. at Buffalo.	To Dealers on cars at Buffalo and bridges.
Lump				Retail delivered.
Grate	\$5.20	\$4.90	\$4.64	\$4.37
Egg	5.20	4.90	4.64	4.37
Stove	5.55	5.25	4.95	4.69
No. 4		5.75		5.13
Chestnut	5.35	5.05	4.78	4.51
Pea		4.05		3.61
Blossburg			3.50	3.25

Chicago. June 27.

[Specially reported by RENO & LITTLE.]

The receipts of anthracite by both lake and rail in June have been light, and the stock on the docks is about two thirds of what it was last year at this time. The retail prices are \$7.50 for stove and nut, and \$7.25 for egg and broken. It is hardly necessary to say that sales, when made, are somewhat under these rates; in fact, there is no regular price. Some dealers are anxious to sell, and they cut prices in order to work off their coal. The public seems to be waiting for lower prices before laying in coal for the winter.

The demand for bituminous coal is good, and prices well sustained; receipts moderate. We quote:

Anthracite, all sizes	\$7.25@7.50
Briar Hill and Erie	7.00@7.50
Illinois and Indiana	4.50@

Cleveland. June 27.

[Specially reported by F. A. BATES.]

Have no change to note in prices since last report. The demand is good, but shipments very light, owing to scarcity of vessels. Docks are covered with coal, and coal traffic almost blocked. Miners have resumed work in the Straitsville and Hocking Valley coal-fields at the reduction offered by the operators, namely, 10c. per ton. Digging in that section is at least 20c. per ton above what it should be, compared with other fields. It is quite probable that coal in that section will soon be mined on a lower basis. The operators have for years been controlled by the miners, and have been working for years for the miners, for the privilege of getting a big hole in the ground and paying a good round sum for the hole. The late scoop of the Hocking Valley R.R. by Cleveland capitalists owning the bulk of the coal lands in the Straitsville and Monday Creek coal-field, will result in a combination that will no doubt place the control of all the operations under one head, so that local jealousy of the operators will not operate as heretofore, and the miners will then work on a fair basis. If the labor is controlled as it should be, the miners can have easy work, good pay, and the operators the most profitable coal-field in the State.

Hamilton, Ont. June 28.

[Specially reported by H. BARNARD.]

Trade is quiet and coal is not coming in very freely, on account of the higher rates of freight from Lake Ontario shipping ports; 40@45c. is being asked against 25c. for last season, and this has the effect of keeping prices firm. If this continues until later in the season, when the demand for coal springs up, there is every reason to believe that a good and satisfactory trade will be done here.

Retail prices delivered per ton of 2000 lbs.

Grate	\$5.80	Reynoldsville Steam	\$5.00
Egg	5.80	Lehigh Lump	7.00
Stove	6.00	Blossburg	5.50
Chestnut	6.00	Pea	5.50
Briar Hill	6.00		

Indianapolis. June 27.

[Specially reported by COBB & BARNHAM.]

We have no change to make in prices given June 1st.

RETAIL PRICES.

Block coal	15c.	per bushel.
Pittsburg coal	\$5.50	ton.
Raymond City coal	5.00	" "
Piedmont coal	6.50	" "
Blossburg coal	6.50	" "
Anthracite coal	8.00	" "
Highland coal	14c.	bushel.
Coke	15c.	" "
Crushed coke	17c.	" "
Oven coke	15c.	" "
Connellsville coke	17c.	" "

Milwaukee. June 25.

[Specially reported by R. P. ELMORE & Co.]

Supplies coming forward freely by lakes, and demand commencing for the season at above prices. Lower prices are looked for, however, by consumers, which is not joined in by dealers.

Below please find prices of coal for present delivery:

Blossburg	\$5.00	Briar Hill	\$7.00
Cumberland	5.50	Straitsville (Steam)	5.50
Lehigh lump	8.75	Illinois	3.50
Prepared (all sizes)	7.50		

Per ton net. Terms cash.

Montreal. June 27.

[Specially reported by ROBERT C. ADAMS & Co.]

The strike at the Acadia mines, Picton, has enhanced the value of Picton coal, the miners working in that district finding themselves unable to fill all the orders sent them. The prospect for the remainder of the season is very promising, and, from present appearances, it seems probable that all the coal likely to come here while navigation is open will meet with a ready sale at remunerative figures.

A larger quantity than usual of all kinds of coal has been sold this season, and a good demand, principally for the retail trade, continues at hardening prices.

We quote:

Per gross ton, ex ship.	
Scotch Steam	\$5.00@
Cape Breton	3.50@3.75
Picton	4.25@4.50
Welsh	5.00@
Per net ton, delivered.	
Am. Anthracite, Lump	
" " Stove	\$6.00
" " Egg	5.75
" " Grate	5.75
" " Chestnut	5.75

Richmond. June 28.

[Specially reported by S. H. HAWES.]

No change in quotations. Trade exceedingly dull. High price of anthracite coal and high vessel freights are keeping back shipments of this coal to this port. Dealers are holding off, hoping for drop in coal and freights. West Virginia coal shippers are holding off their ship-

ments from this port until the Chesapeake & Ohio Railroad extension is completed at Newport News, when their steam coals will prove formidable competitors with Cumberland and Clearfield. A few months more and West Virginia coals will be at salt water.

Toledo. June 27.
[Specially reported by GOSLINE & BARBOUR.]

The coal trade here is fairly active. Lake freights rule high and vessels are scarce. The majority of dealers in the interior are holding off about buying their stocks of anthracite, saying that their customers will not buy now for fear the prices will go lower. The more substantial class of dealers, however, are putting in stocks.

St. Louis. June 28.
[Specially reported by JOHN T. HESSER & Co.]

The demand for coal has somewhat improved since our last writing. Dealers here anticipate a healthy condition of trade during the coming season. Those who do most in hard coal will stock up early to their full capacity, and avoid, if possible, the usual mid-winter scarcity.

We inclose prices, which are same as last reported. We quote you present prices on coke and coal, per ton of 2000 lbs., on cars at Union Depot, St. Louis:

Anthracite Coal.

Chestnut.....	\$7.25
Stove.....	7.25
Egg.....	7.00
Grate.....	7.00

Bituminous Coals.

Equality (Ill.).....	\$2.50
Bellville ".....	2.25
Indiana Block.....	3.25
Big Muddy.....	3.50
Blossburg (Cumberland).....	5.25

Coke.

Equality (Ill.).....	\$5.00
Cannelville.....	7.75
West Virginia.....	6.75

San Francisco. June 23.

Pacific coal mines are being developed quite rapidly yet not to the extent of our increased consumption. We require annually upward of 600,000 tons, and perhaps 700,000 tons in 1881. The quantity now afloat and en route to this coast is much larger than ever before, which is estimated at 250,000 tons, the most of which, it is expected, will arrive here before the close of the current year. These heavy imports will for the moment affect seriously the price and value of Pacific coast coals and mines. The gas company, railroad and steamship companies, have made large forward contracts for foreign coals at lower prices than ever before. It seems strange that with all these heavy imports of foreign coals, the prices to local consumers are kept up to \$10 @ \$12.50 per ton. All this is the result of a coal-dealers' combination, and steps ought to be taken by those most interested to break it up, and this they can do by concert of action. Imports for the week include 1950 tons Seattle per Enoch Talbot; Two Brothers, 2375 tons same; 1700 tons English Steam per Hallgerda from Newcastle, Eng.; and also 742 tons same per Glenhantly. We quote trade prices from yard to dealers: Coos Bay, \$6.50 @ \$7.50 per ton; Seattle, \$7.50; Wellington, \$10; Scotch Splint, \$9; West Hartley, \$9.50; Carbon Hill, \$9; Nanaimo, \$10; Cumberland, bulk, \$12; do. cks, \$13.50; do. cks, \$13; Lehigh, \$16 @ \$17.50; West Hartley, \$8.50; Black Diamond, \$6.75; do. screenings, \$4.75, and to this all consumers who buy by the ton delivered have to pay \$2.50 per ton additional. It is proper for us to add that the large number of cargoes of Australian, English, and Welsh, sold to arrive, range in price from \$5.75 @ \$6.50 per ton.—*Commercial Herald.*

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ending June 25th, and years from January 1st:

Tons of 2240 lbs.	1881.		1880.	
	Week.	Year.	Week.	Year.
<i>Wyoming Region.</i>				
D. & H. Canal Co.	50,885	1,567,255	47,814	1,389,844
D. L. & W. RR. Co.	70,616	1,864,641	58,782	1,556,728
Penn. Coal Co.	19,904	550,469	22,043	449,758
L. V. RR. Co.	6,067	510,109	12,751	458,187
P. & N. Y. RR. Co.	1,198	36,256	627	13,286
C. R. R. of N. J.	48,445	1,068,803	31,362	692,799
Penna. Coal Co.	12,695	148,517	12,699	140,589
	209,813	5,746,049	186,178	4,701,071
<i>Lehigh Region.</i>				
L. V. RR. Co.	57,312	1,924,258	60,207	1,407,306
C. R. R. of N. J.	42,876	903,523	37,478	895,705
S. H. & W. B. RR.		1,224		6,331
	100,188	2,829,005	97,685	2,309,342
<i>Schuylkill Region.</i>				
P. & R. RR. Co.	155,517	2,871,345	98,189	2,558,837
Shamokin & Lykens Val.	* 8,436	445,883	8,807	325,661
	163,953	3,317,228	107,086	2,884,498
<i>Sullivan Region.</i>				
St Line & Sul. RR. Co.	1,104	29,442	815	19,633
	1,104	29,442	815	19,633
Total	475,058	11,921,724	391,764	9,914,544
Increase	83,294	2,007,180		
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.

Total same time in 1876..... 6,988,199 tons.
" " " " 1877..... 9,571,115 " "
" " " " 1878..... 7,058,738 " "
" " " " 1879..... 11,514,593 " "

* This report is not full.
The shipments of Cumberland coal over the George's Creek & Cumberland RR. by the Maryland and the American Coal companies for the week ending June 25th amounted to 4219 tons, making a total of 18,678 tons since the beginning of transportation.

The decrease in shipments of Cumberland Coal over the

Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 119,198 tons, as compared with the corresponding period in 1880.

Belvidere-Delaware Railroad Report for the week ending June 25th:

	Week.	Year. 1881.	Year. 1880.
Coal for shipment at Coal Port (Trenton).....	1,219	21,132	13,601
Coal for shipment at South Amboy.....	8,727	307,579	185,680
Coal for distribution.....	10,818	332,292	223,827
Coal for company's use.....	1,829	49,532	47,603

The Production of Bituminous Coal for the week ending June 25th was as follows:

Tons of 2000 lbs., unless otherwise designated.	Week.	Year. Tons.
<i>Cumberland Region, Md.</i>		
Tons of 2240 lbs.....	47,522	902,446
<i>Barclay Region, Pa.</i>		
Barclay RR., tons of 2240 lbs.....	7,684	205,439
<i>Broad Top Region, Pa.</i>		
Huntingdon & Broad Top RR.....	3,324	107,392
East Broad Top.....	1,520	34,081
<i>Clearfield Region, Pa.</i>		
Snow Shoe.....	2,082	47,510
Tyrone and Clearfield.....	49,617	1,125,669
<i>Alleghany Region, Pa.</i>		
Pennsylvania RR.....	5,524	132,611
<i>Pittsburg Region Pa.</i>		
West Penn RR.....	5,079	153,635
Southwest Penn. RR.....	829	14,708
<i>Penn & Westmoreland gas-coal, Pa.</i>		
RR.....	19,303	410,770
Pennsylvania RR.....	11,622	294,135

The Production of Coke for the week ending June 25th, and year from Jan. 1st:

Tons of 2000 lbs.	Week.	Year.
Penn. RR. (Alleghany Region).....	1,821	48,668
West Penn. RR.....	1,306	58,158
Southwest Penn. RR.....	16,328	685,254
Penn. & Westmoreland Region, Pa. RR.....	4,132	92,049
Pittsburg, Penn. RR.....	7,556	307,403
Snow Shoe (Clearfield Region).....	245	3,940
Total	31,388	1,193,472

Horsford's Acid Phosphate, Consumption.

I have prescribed Horsford's Acid Phosphate in several cases of Phthisis (consumption) with good results; among others, that of seeming to aid the action of other remedies. TAUNTON, MASS. E. W. JONES, M.D.

PIPE TAPS AND REAMERS

1/4 to 4 inches diameter.
SCREW PLATES, HAND AND POWER BOLT CUTTERS AND DRILLING MACHINES, RENSHAW RATCHET DRILLS, COMBINATION LATHE CHUCKS, LATHES, PLANERS, SHAPING MACHINES, FORGING AND FINISHING MACHINERY FOR GUN AND SEWING MACHINE MANUFACTURE AND SPECIAL PURPOSES.

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THE NEW PULSOMETER. CHEAP, ECONOMICAL, EFFICIENT.

OFFICE OF JOSEPH FIRMENICH, Steam Syrup Refinery, 1 to 25 Mortimer Street, and 384 to 412 Jefferson Street, BUFFALO, N. Y., May 16, 1881.
PULSOMETER STEAM PUMP Co.: Yours of 14th received and noted. The No. 4 New Pulsometer (ball valves) is used for elevating thick solution of meal and water. The suction is six feet vertical, and it forces it through fifty feet of pipe at an elevation of thirty feet. It seems to work very satisfactorily so far. We shall want more of them in our works. Yours truly, J. FIRMENICH.
PULSOMETER STEAM PUMP Co.: 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 30 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.

PULSOMETER STEAM PUMP CO., 83 JOHN STREET, NEW YORK.
BRANCH OFFICES: } Chicago, 193 Lake Street, H. F. CASWELL.
} Boston, 73 Kilby Street, S. B. EVERETT.

FREIGHTS. Coastwise Freights. Per ton of 2240 lbs. Representing the latest actual charters to June 30th, 1881.

PORTS.	From Philadelphia.	From Baltimore.	From Elizabethport, Port Johnston, South Amboy, Hoboken, and Weehawken.
Alexandria.....			
Annapolis.....			
Albany.....			
Baltimore.....	.60		
Bangor.....			1.25
Bath, Me.....			1.15
Beverly.....			1.25
Boston, Mass.....	1.45 @ 1.53		1.25
Bristol.....			.60
Bridgeport, Conn.....			
Brooklyn.....			
Cambridge, Mass.....			
Cambridgeport.....			
Charleston.....	.80 @ .90		1.25
Charlestown.....			1.15
Chelsea.....			
City Point.....			
Com. Pt., Mass.....			1.25
E. Boston.....			
East Cambridge.....			
E. Greenwich, R. I.....			.80
Fall River.....			
Galveston.....			
Georgetown, D. C.....			
Gloucester.....			
Hartford.....			
Hackensack.....			.90
Hudson.....			
Lynn.....	1.65 @ 1.70		
Marblehead.....			
Medford.....			
Millville.....			
Milton.....			
Newark, N. J.....			
New Bedford.....	1.40 @ 1.37 1/2		.85
Newburyport.....			1.35
New Haven.....			.60
New London.....			.75
Newbern.....			.75
Newport.....			.80
New York.....	.85		
Norfolk, Va.....	.65		
Norwich.....			
Norwalk, Conn.....			.60
Pawtucket.....			
Philadelphia.....			
Portland.....	1.45		
Portsmouth, Va.....			1.10
Portsmouth, N. H.....	1.55		1.30
Providence.....	1.35		.80
Quincy Point.....			1.30
Richmond, Va.....	.90		
Rockland.....			
Roxbury.....			
Saco.....	1.50		
Sag Harbor.....			
Salem, Mass.....			
Saugus.....			1.15
Savannah.....	1.00		
Somerset.....			.80
Staten Island.....			
Trenton.....			
Troy.....			
Wareham.....			
Washington.....	.85 @ .90		
Weymouth.....			
Williamsbur, 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.

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Best and most efficient Non-Conductor Covering for Boilers, Steam Pipes, Hot-Air Pipes, etc.
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FOSSIL MEAL COMPANY.
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DIVIDENDS.

OFFICE EXCHANGE SILVER MINING COMPANY, 45 Broad street, Room 8, June 28th, 1881.

DIVIDEND NO. 1.

The Board of Directors have this day declared a dividend of **THREE CENTS PER SHARE**

on the capital stock of the company, payable July 20th, 1881, at the office of the company.

Books close July 15th and reopen on 22d inst.

H. W. HOWELL, Treasurer.

OFFICE OF THE TOMBSTONE MILL AND MINING COMPANY, 432 Walnut Street.

SIXTEENTH DIVIDEND.

PHILADELPHIA, June 30, 1881.

The Executive Committee of the Board of Directors of this Company have this day declared the regular monthly

DIVIDEND OF FIFTY THOUSAND DOLLARS,

being ten cents on each share of the capital stock of the company, payable on and after July 15th at this office.

Transfer-books closed from 10th to 16th inclusive.

GEORGE BURNHAM, President.

W. J. CHEYNEY, Secretary.

OFFICE OF COPPER QUEEN MINING COMPANY.

Nos. 34 AND 36 THOMAS STREET, NEW YORK, June 11, 1881.

The Board of Directors of this Company have this day declared a monthly dividend of twenty-five thousand dollars, being ten cents on each share of the capital stock of the Company, payable on and after July 1, 1881, to stockholders of record, at the office of the Company. Transfer-books close June 28th and reopen July 2d.

L. ZECKENDORF, Secretary and Treasurer.

A. A. HAYES, JR., President.

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. WM. S. CLARK, President.

JOHN R. BOTHWELL, Secretary.

THE

ROBINSON CONSOLIDATED MINING CO.

NEW YORK, June 1, 1881.

DIVIDEND No. 3.—The Board of Directors have this day declared a monthly dividend of \$50,000 payable on and after June 15th, at the office of the Company, 18 Wall Street. The transfer-books will be closed from the 10th to the 15th inst., inclusive.

FINANCIAL STATEMENT FOR MAY, 1881:

Amount in bank and deposited during the month.....	\$128,736.54
Bullion at Newark Smelting and Refining Works, and in transit to said works, less advances and freights.....	55,000.00
	\$183,736.54

May 9. Purchase of smelters at mines.....	\$87,500.00
Thomas Ewing's drafts and bills paid during the month.....	10,286.00
Dividends for June 15th.....	50,000.00
Surplus on hand.....	35,950.54

Attest: **JAMES K. SELLECK,** Secretary. **BRAYTON IVES,** President.

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

SEVENTY-FIVE CENTS PER SHARE,

payable on 13th inst., at the Farmers' Loan and Trust Co., 26 Exchange Place, New York.

Transfer-books close June 4th, and open on 14th inst.

M. R. COOK, Vice President.

The New York office of this company is now with the Farmers' Loan and Trust Co., where the superintendent's reports and the monthly financial statements are on file, open to the stockholders.

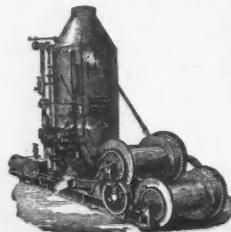
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Especially adapted for Bridge-Building, Dock-Building, Pile-Driving, Coal-Hoisting, Quarries, Mines, etc.

STAMP MILLS of any size for mines.

J. S. MUNDY,
22 & 24 PROSPECT ST.,
NEWARK, N. J.



SPECIAL NOTICES.

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.

FOR SALE.—A NEW AND COMPLETE "BRADFORD JIG CONCENTRATOR," suitable for Silver, Lead, or Copper Ore, and especially Gold Sulphurets, capacity one ton per hour, 30 to 80 mesh, with four (4) H.P. steam; having been taken to close an account, will be sold for half-price. Address **J. M. DALTON,** 2547 N. 7th street, Philadelphia, Pa.

R. LONGMAN'S SONS, ASSAYERS OF ORES, and Gold and Silver Refiners, 9 John Street, New York. Established 1832. Works, 27 to 29 Portland Avenue, Brooklyn.

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CIVIL, MECHANICAL, AND MINING ENGINEERING at the Rensselaer Polytechnic Institute, Troy, N. Y.—The oldest engineering school in America. Next term begins September 15th. The Register for 1880-81 contains a list of the graduates for the past 54 years, with their positions; also, course of study, requirements, expenses, etc. Address **DAVID M. GREENE,** Director.

W. H. ADAMS, Chemist and Metallurgist,

is at present engaged in Mexico. Parties contemplating opening up mining properties or erection of metallurgical works in that country can secure the services of competent men, with knowledge of the language, etc., by addressing him, **Cedral Mines, Villa de Musquiz, Coahuila, Mexico,** via Eagle Pass, Texas.

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.**

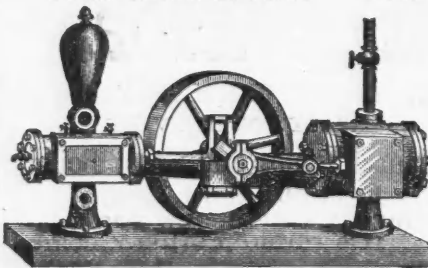


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Stock Full Paid and Unassessable.

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ALLAN W. MASTERTON, Secretary and Treasurer.

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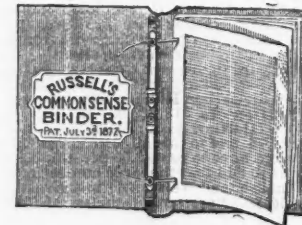
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HENRY ROSSITER WORTHINGTON.

Born, December 17, 1817. Died, December 17, 1880.

[See Engineering and Mining Journal, December 25, 1880, page 409; and July 9, 1881.]