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WANTED—BACK NUMBERS OF THE ENGINEERING AND MINING JOURNAL.

A liberal price will be paid, in cash or subscriptions, for the following numbers of the ENGINEERING AND MINING JOURNAL :

Year.	Vol.	Numbers Wanted.	Year.	Vol.	Numbers Wanted.
1872	XIV.	1 to 18 inclusive.	1875	XIX.	14, 15.
1874	XVIII.	4, 11.	1875	XX.	7, 12, 22, 23.

Address this office.

We are informed, unofficially, that the idea of holding the next meeting of the Institute of Mining Engineers in the Lake Superior Mining Region has been abandoned. From numerous expressions of opinion which have come to us, we feel satisfied that this decision will meet with general approval. The trip, if announced in season, would have been very popular, and would no doubt have drawn a very large and influential attendance, but at the present time such of the engineers as would have made this their summer vacation have now made other arrangements and would be unable to go, so that the delay in making the arrangement would, itself, have been fatal to the success of the meeting. There is a very general desire among members that a meeting of the Institute should be held in this interesting mineral region, and it is to be hoped that arrangements may be effected at an early day, enabling the Council to announce that next summer this desire will be gratified.

IMPORTANT TO ADVERTISERS.

We shall, next week, print a large extra edition for general circulation in the mining regions of the West. The JOURNAL will contain beautifully engraved plans and views of the mines in the Caribou District in Colorado, and copies of the paper will be circulated in every mining camp in the West, and also throughout the South and East wherever mines are being worked. The advantages which this large special circulation offers to manufacturers of machinery and mine supplies of every kind are such as are rarely offered, and are being taken advantage of by "live" business men.

Advertisements to go in this number should be sent in not later than Thursday evening, the 9th.

THE LABOR WAR AND ITS CAUSES.

The labor war, so far as the railroads are concerned, may be considered as at an end. The miners in the Lackawanna and Wilkes-Barre districts are still threatening, and have in some few instances stopped the pumps at the mines. There is always a very turbulent and unruly element in the mining districts, that is ready whenever opportunity offers to commit violent acts; but the better informed of the workmen appreciate the fact that they have all to lose and nothing to gain by the commission of acts which at once deprive them of work and of the sympathy of the public. The most strenuous efforts have been and are still being made by the Lackawanna men to induce the Lehigh and Schuylkill miners to strike, but without avail. Indeed, many of the latter have declared their willingness to oppose *vi et armis* any incursion of the northern horde of Goths and Vandals into the pleasant valleys of the Schuylkill region. It seems at present very improbable that either the Schuylkill or Lehigh miners will go out, and if this be the case, the Lackawanna strike will be of short duration.

A few important lessons have resulted from the riots. The citizens have been awakened to the danger of allowing such infractions of the law to go unpunished, and have combined to put down these disorders. The honest laborers have also

seen where these agitators would lead them had they the power. The result of this will be that the men will be more careful how they follow the counsel of their more violent companions, whose course they have seen leads to their utter destruction.

THE CAUSES OF THE STRIKE.

Though the strike may be considered as ended, the causes which endangered the entire industry of the country still exist, and it behooves prudent, thoughtful men to investigate them.

What are these causes? Doubtless they are numerous and have many separate sources, but there is one that in its prominence, universality, and the immensity which it has from public reprobation overshadows all others. This hideous source of our misfortunes is dishonesty. Political, corporate, and individual dishonesty has long filled the country with a deathly shadow, which presaged just such storms as that through which we have now passed. Riches easily and suddenly acquired are always demoralizing, and, no doubt, much of our dishonesty is the outgrowth of the civil war, when the countless wealth, expended by the Government, was considered as a kind of public plunder which it was no disgrace to acquire by means that, if exercised in transactions between individuals, would have been looked upon as dishonorable in the highest degree.

In politics universal suffrage has undoubtedly been, and must always continue to be, a most fruitful field for dishonesty. The votes of ignorant men who have no substantial interest in the country, will always be a purchasable commodity, and one easily carried away by the tricks of dishonest demagogues. Through this door our Legislatures have been filled with corrupt men, and the great wealth of the country has for many years formed a bonanza which these legislators and their friends have exploited with such vigor that not only the whole country, as represented by the general Government, but every State, county, city, borough, township, and village in the land, is loaded down with debt, incurred in great part to pay the dishonest transactions of the "rings." To such an extent has this gone that the industry of our people and the marvelous natural resources of our country no longer suffice to pay the load of taxes and extravagant expenditures imposed upon us.

Even under the regime of honesty the earnings of a people but little more than supply the modest means of living. Yet our people were deluded into the belief that the abundance of the borrower was permanent prosperity, while, in fact, we were merely spending lavishly the money raised by discounting at ruinous rates the future products of our labor.

The whole country was seized with the borrowing mania, and when money could be acquired so easily, not to say dishonestly, by simply issuing bonds, there was little attention paid to its honest and economical expenditure. Corruption and dishonesty entered into every department. The general Government had its whiskey rings, custom-house, Indian, naval, and countless other rings, which prospered, and whose dishonest members stood in the highest places, and were the highly esteemed in the land. The States were governed by rings. Our counties, cities, and townships were managed in the interests of rings. The members of these were honored and esteemed in proportion to the amount of their ill-gotten gains. The public, and with it the private standard of integrity, was lowered, and dishonesty was encouraged by the favor it met with. The political rings kept themselves in power by controlling elections with the very money extracted from the people who endeavored to displace them. No one, at this late day, denies the transparent fact that the general taxes of the country are many times what they should and would be had our public expenditures, whether of the nation, State, county, or city, been controlled and managed with honesty. The whole business of the country has been stagnated by taxation. The earning power of our people has been devoted for years to paying the interest on the countless bonds and other forms of indebtedness which we so gaily incurred in the "good times" when every one was spending the earnings of posterity.

CORPORATE DISHONESTY.

With corrupt legislatures and the fruits of dishonesty highly esteemed, it is scarcely to be wondered at that corporations, railroad, mining, coal, gas, iron, and doubtless all other kinds of companies should have been exploited in every conceivable way as a fruitful placer by "able financiers" and "smart managers." Companies were organized on a capitalization many times the value of their properties. Bonds were issued with the most profuse liberality, and the ability of "financiers" readily compensated for the absence of economy in every department. Such was and is still the case. Rings within rings revolve in nearly all our corporations. If any particular department of the company's business is very profitable, it is at once "switched off" into a separate concern, owned by some of the officers of the parent company, and usually run with means taken from the same source. Thus it is to-day that fast freight lines, oil lines, machine shops, car and machine patents, patents relating to nearly every thing used by the companies, are controlled or partially owned by officers of the companies from which they get their business. And it has come to be notorious that it is impossible to do business with a large majority of our railroad, mining, and other companies without paying certain of their officers commissions or gratuities in some form. It may not always take the form of a house at Long Branch, or a gift of stock in a mining or manufacturing company, but it invariably takes a form that ultimately absorbs the stockholders' money, and generally enriches a number of the officers and their servants.

Is it surprising, then, that workmen should become dissatisfied at reductions in wages which bring them to the verge of absolute want, when at the same time they see officers of their companies spending annually many times the amounts of their salaries, and growing rich by exacting special tribute on various sources of the company's income?

While the stockholders allow the profits on their business to be absorbed by these parasites on industry, can any one be surprised that the poorly paid employes object to having their scanty earnings cut down?

It is corruption and dishonesty that is principally, if not wholly, responsible for the present industrial prostration of the country, and for the violent measures adopted by some of the workingmen.

The cost of living and of manufacturing is increased, and our markets curtailed by these taxes and loads put upon our industries; and while on the one hand the honest capitalist is unable to obtain a remunerative investment for his money, on the other hand the working classes are suffering from the insufficiency of their wages. What the country needs is "Vigilantes" to stop the spoliation of the rings, which are much more injurious than those of the mobs. Stockholders in companies of every description should put a stop to the dishonest or demoralizing practices that have grown into such enormous proportions. The officers of the corporations should confine their attention solely to the duties which the stockholders pay them for attending to, and furnish full and honest information with regard to the management of the trusts committed to their charge.

It is the general belief—and who can say it is not well founded?—existing among the employes; and generally among the working classes; that the necessity for a reduction in their wages is largely due to the tax which dishonest officials have placed upon industry. Having no better knowledge, they seek to help themselves by means which, though morally scarcely more culpable than those of many employers, must alienate from them the sympathies of the public at large.

It is unfortunate that the protest against the rings should take this form or come from this source. Strikes and riots are no less disastrous to those who engage in them than to those against whom they are directed. But it is the duty of stockholders to see that these abuses cease in their respective companies, and it is the duty of the press to elevate the public standard of morality and to make these rings of every description odious, by showing their true character and the disastrous consequences that must inevitably result to the country at large, and to the poorest workingman in it, by their continuance.

CONVENIENCES IN MINES.

Staff Correspondence of the Engineering and Mining Journal.

Were more attention given by mining companies to what may be termed the legitimate luxuries of the business, we think several worthy and good ends would be subserved. The reign of the "practical miner" has been too puritanical in its nature of late. While we urge economy and care for every mining enterprise which is working for success, it is not necessary that every appliance and invention not absolutely necessary for the production of dollars and cents should be disregarded. In other lines of business, the comfort of operatives, and even their convenience, is consulted with advantage. Attention is given, also, to appearances. Care is taken to impress visitors and customers with the fact that the firm or company is in good and easy circumstances, and provision made in advance for unforeseen and unexpected occurrences. It is difficult to see why as much should not be done for mines. The industry is at best an unattractive one (that is, the actual working part), and needs all the aids ingenuity can devise to relieve its hard coloring.

One of the clumsiest and most unreliable of mine apparatus is the sounding gong, by which directions for the engineer in hoisting or lowering are conveyed from the different stations of the mine. For this rude device should be substituted, in all mines deep enough to require any signaling, the electric bells and annunciators. These may be put up at a comparatively small expense, and, if placed in charge of a man of even moderate intelligence, are reliable and serviceable. When signals are required to be carried to great distances, they are absolutely necessary, and being put up with ease, extended conveniently, and kept in repair without difficulty, no opposition will be made by miners to their use. The system should be so arranged that it is possible to signal both ways, and so that every drift in the mine can be reached by the engineer above. It will at once be seen how advantageous this will be. And in case of danger by fire, caving, or flooding, assistance can promptly be brought to the injured, or warning sent to those in danger.

Speaking tubes are in general use in the Pennsylvania coal mines, and give good service, and it is probable that the telephone will soon find an application of great value in the mines. By it conversation could be carried on between the surface and any part of the mine.

Very few mines have any arrangements either on the surface or below for the comfort of the miners. The men come from their houses, work, and when the shift is over go, and are promptly paid at the right time. Beyond this few companies advance. It will be found profitable, however, to do more. On the surface there should be washing and clothing rooms, well warmed in winter, and provided with tables and benches for the men to use in eating their lunch. If the mine is deep and the means of egress nothing but ladders, so that the men do not care to come to the surface at noon even for a warm lunch, the

mouth of each level can easily be enlarged into a chamber of moderate dimensions and made a comfortable eating room. The waste steam from the pumps below can be easily and cheaply utilized for warming purposes. It will surprise most mine superintendents to see how great a difference in the work will be made by locking after the comfort of the men. No working man can long stand the exposure of eating his midday meal in a cold, damp drift, where, after working hard for hours, he sits down in the wet or draft for his rest. It is always best if the men can be brought to the surface for lunch, but that is seldom possible. But there are dollars to be made in guarding the health of the workers. Besides, mines that are comfortable will have less difficulty in securing workers when strikes are in progress, and a much better chance to hold the good will of their employes under any circumstances.

Where there are no cages and no man engine, a good ladder way is imperative. The work of climbing up and down a long badly arranged and poorly fitted ladder is equal in its effects to an hour's work. There is economy, therefore, in looking after this item. By making each section separate, and not over 50 feet in length, an easy inclination can be given, so that the entire weight of the body will not come on the arms. We have seen mines where the ladder was nailed to the side of the shaft perpendicularly, and had not a single rest or station from the top to the bottom. One hundred feet of such climbing is exceedingly exhausting; and not only exhausting but dangerous.

It is to be hoped that the mining candle will in time go out of fashion, and be succeeded by the lamp. The latter is already exclusively used in the East, and in the coal mines of the West. Its introduction into metal mines has just begun. If superintendents will give the lamp a fair trial, they will find it fully as good for lighting purposes, and vastly more economical. None but the best miners' oil should be used, however, and there is also some choice in the style of lamp.

Another point worth looking after by the small and large operators is the quality of their tram roads. As much muscle and money is expended in transportation as in any work of the mine. The quality and form of the rail, the style of car, and ease with which it is dumped, are important. Strap rails are almost as poor as wooden ones, which are but slightly better than none at all. Lightness, combined with strength, is required in the car, and for that reason, the iron self-dumping cars now made by so many manufacturers of mining machinery are far ahead of the old wooden box, and will carry fully as much per day, if not per trip.

TRAMWAYS IN MINING DISTRICTS.

Staff Correspondence of the Engineering and Mining Journal.

Transportation is one of the great needs of the West. We have mines enough, mills enough, and processes in ample abundance. There is a need, however, of means to convey the ore from mine to reduction works, and there is a field in this line for the profitable investment of many millions of capital. Nearly all the prominent districts in the West are located in places where there are many difficulties in the way of building roads of light grade, and still greater obstacles to the maintenance of these highways. Here is just where a tramway system would be of advantage. In gold mining districts of the size of Central, Colo., and Grass Valley, Cal., the item of ore transportation is one that will be found on examination to range in cost from \$400 to \$1,000 per day. In silver districts like Georgetown, Austin, Eureka, Silver City, and others of equal size and growth the actual and incidental cost of transportation is nearly double, because of the necessity of taking more care with the mineral. In either case the cost is greater than it should be, for at half these figures tramway companies can pay handsome dividends on their investment. The idea is by no means a new or untried one. In Utah the two principal cañons of the Territory are supplied with narrow gauge roads reaching up to the very head of the gulch, and tapping the principal mines on the slopes of the cañon. In Bingham most of the mines could not be worked but for this road.

In the majority of our Western towns the reduction works are located at water level, or on the nearest stream capable of supplying power. The mines, of course, are far away on the hillside, and between the two are the rough and rugged quartz roads, which are invariably miry in the spring, rough, dusty, and horrible in summer and fall, and waist deep in snow and sidling in the winter. Every mining camp has from ten to twenty-five miles of such property, and by long odds it is the most unproductive and unsatisfactory property imaginable. Never in order, never even comfortable, and always abounding in grades that make the life of draught horses and mules a misery to contemplate.

In most cases fifteen miles of two-foot tramways would reach nine-tenths of all the important mines in a fairly developed district. The grade can be a very heavy one, from 300 to 500 feet to the mile. Grading, tying, and ironing can be done almost anywhere for \$5,000 a mile, and from that down to \$3,000. Rolling stock should consist of light iron box cars, holding from one to two tons each, made to be drawn up hill by a mule, and with a brake, so that a dozen could be coupled in a train and come down hill in charge of the driver. Such a road, with switches and stock sufficient to transport from 500 to 1,000 tons per day, would be found of immense advantage. The total cost for a 15 mile track would not be over \$90,000 in any case, and would generally be less. The ore transportation of a mining town of the size of Central will at present figures repay this investment in a single year, and at a reduction of 50 per cent. on current rates yield a very handsome dividend.

This is a class of improvements that will ultimately become a necessity in

mining districts so rugged as are most of those in the West. As investments these mountain tramways will bear close examination, and if the work is not taken hold of by companies organized for that especial purpose, the richer mines will shortly begin the work, either individually or jointly. The day of the "burro," or Mexican Jack, is past in most places, we hope, and in time, in all permanent districts, the quartz wagon, with its highly profane driver, will, it is hoped, also give place to a more convenient and economical method of transportation.

SUMMER TRIPS AMONG THE MINES.—No. 3.

Staff Correspondence of the Engineering and Mining Journal.

Georgetown is a dusty and withal a warm little spot in summer, though it is 8,300 feet above the level of the sea. Hemmed in on all sides by towering hills and deprived by mountain fires of the protection it once derived from its magnificent reaches of fir and spruce, it has now but few attractions, except for one who comes to look into its great silver mines and study the interesting system of ore reduction and concentration practiced in the Pelican, Taylor, Silver Queen, and Silver Plume mills. On these points, however, it is one of the most interesting towns imaginable, as well for the visitor as for the student, and when it is stated that the hotel accommodations are of unusual excellence, most travelers will be satisfied to pay it a visit. The Barlow House has, in fact, established a first-class reputation, and one may be as certain of being comfortable in the "Silver Queen"—as the citizens fondly dub their town—as if in Denver or at the East.

Excepting in the San Juan mines, Georgetown and vicinity is the only district in Colorado where the Mexican Jack or "burro" is still used for the transportation of ores. Traveling around on the steep mountain slopes, one comes frequently upon trains of these little creatures, each loaded with from 200 to 250 pounds of ore in sacks, and followed by a driver, who, if he be a descendent of the lordly Castilian (in other words, a greaser), adjures his "Jacks" with a continuous stream of weak Mexican oaths, compounded mainly of ejaculations in the name of the various saints and saintesses so abundant in the category of Mexican *notabilia*; or, if he be a Saxon, expends his energy in an occasional outburst of vigorous and intellectual profanity, materially assisted by such rocks and portable boulders as convenience throws in his way. I am convinced that the Jack does not understand Mexican, for a saint's name, no matter how great its length, is music to his ears, and does not stir his sluggishness in the least. Or it may be that he is acquainted with them all, and knows that their names are even less potent than the will of their lazy driver.

In time the Jack will disappear from Georgetown. Already the most important mountains, where the mines have reached a considerable stage of development, are cut by roads passable by quartz teams, and each season witnesses the building of new side roads, leading from new mines into the main highway.

At present the greatest activity in the camp is concentrated on Leavenworth and Democrat mountains, and on the steep ridge known as Brown, Sherman, and Republican mountains, which lies above Silver Plume. On the latter are the well known Dives, Pelican, Coldstream, Brown, Mammoth, Terrible, and Silver Ore. On Democrat are the Polar Star, Rogers, and Emma. The great mine of Leavenworth is at present the Tilden, but there are many others of equal note.

In wandering around over the hills, one is actually burdened by the mass of items forced before the notice of the reporter. The utmost activity prevails everywhere. The number of mines at work is very large, and a considerable proportion have been developed to a fair depth. One is also impressed with the amount of dead work going on in the shape of cross-cut tunnels, prospecting drifts, etc. It is evident that the mining men of the camp have abundant faith in the resources of their district, and have patience to work and wait with comparatively small remuneration at present, until the rugged mountains can be entered and undermined. From a rough calculation I judge that in operations conducted upon a moderate scale in this camp, the cost of mining transportation and marketing mineral aggregates 75 per cent. of the value of the ore. In time this figure will be greatly reduced for all, as it is already for those individual enterprises that have put their properties into good shape.

From the mass of data picked up in my trip, I condense the following: Neither the Pelican nor Dives is in the best of pay at present, though the former is taking out some good mineral. The lower levels of the Coldstream are under water, but some good ore is coming out above. The Phoenix is at present in better pay than its old enemy. The Mammoth, where cut by the M. & G. tunnel, is producing some very handsome galena, carrying about 50 ounces of silver and 50 per cent. of lead. The East Terrible is showing magnificently, and on the English Terrible there is also a good showing, though the whole mine is scarcely yet under work.

On Leavenworth the Equator Company is refitting its old shaft for a bucket-way, and it is thought the whole mine will be under work in a couple of months hence. The Tilden, which has during its short history been a remarkable produce, is still yielding well and a very high grade of ore. There are a number of other properties on the hill doing well.

Democrat Mountain is noted at present as the home of the Emma Mine. This mine has produced \$5,200 from the single drift which has been driven upon it for 100 feet, and still shows an elegant body of mineral in the breasts at both ends.

GEORGETOWN, COLO., July 16, 1877.

NEW PUBLICATIONS.

COAL MINES OF THE WESTERN COAST OF THE UNITED STATES. By W. A. GOODYEAR. San Francisco: A. L. Bancroft & Co. 1877. 12mo., pp. 153. Price \$2.50.

Mr. GOODYEAR is already favorably known as the translator of BODEMAN & KERL's *Assaying*, but during the ten years and more since this appeared he has, in the course of his practice as a mining engineer and geologist, been very much occupied with the study of the cretaceous and tertiary coals of the western coast of the United States. He discusses them under the light of an extensive personal experience and critical study of the position, disturbance, and economical working of the various beds of these series. In California the Mt. Diablo coal field forms much the larger portion of the first chapter, which also considers the Corral Hollow coal field, the Livermore Mine, and other coal localities. In Oregon the Coos Bay mines, the Eastport, the Newport and New mines are considered, while in Washington Territory the author describes the Bellingham Bay, Talbot, Renton, and Seattle mines, with the Puyallup caking coal.

It appears that between 1861, when Mt. Diablo coal first appeared in the market, up to the present year, the total output of these coals has been but 1,875,962 gross tons, the maximum production being in 1874 (215,352 tons), since which date the yield of these mines has seriously declined. Mr. GOODYEAR gives valuable data respecting the economic value of the various coals of the mines cited. Taking the Mt. Diablo coal as unity, and stating the values of the others in units and decimals, he obtains the following values: Mt. Diablo, 4.000; Seattle coal, 1.171; Sydney, New South Wales, 1.502; Welsh coal, 1.472; Bellingham Bay, 1.148; Nanaimo coal, 1.277; anthracite, 1.546. It clearly appears that the future supply of coals from the Pacific Coast must be largely drawn from the beds in Washington Territory, especially about Seattle. Mr. GOODYEAR'S well known accuracy and carefulness of statement give additional value to his volume.

B. S.

REPORT UPON THE PHYSICS AND HYDRAULICS OF THE MISSISSIPPI RIVER; UPON THE PROTECTION OF THE ALLUVIAL REGION; AND UPON THE DEEPENING OF THE MOUTHS. Prepared by Captain A. A. HUMPHREYS and Lieut. H. L. ABBOT, Corps of Topographical Engineers, U. S. Army. (Reprinted with additions.) Washington: Government Printing Office. 1876. 4to., pp. xxiv., 691, and 25 plates.

This report, undoubtedly one of the most important contributions to science ever issued by the United States Government, was published at Philadelphia in 1861, but has now for some time been out of print and difficult to obtain. Even abroad the demand for it was such that a German translation appeared in 1867. The present reprint will be hailed with delight by the many hydraulic engineers and students who at present are only able to consult the report in libraries.

The number of criticisms, discussions, and investigations called forth by this elaborate book has been immense. Containing the records of surveys and experiments extending over many years, a new theory of the flow of water in rivers derived from those experiments, plans for the protection of the banks, and for the deepening of the mouths based upon these new theories, it excited in every quarter the deepest interest. Since the time of DUBUAT no work has given such a stimulus to the advance of hydraulic science as this of HUMPHREYS and ABBOT.

The additions in the reprint consist of Appendices H, I, K, L, and M, and five plates of maps. Appendix H is an extract from the report of the Chief of Engineers for 1870, relating to the Geological age of the Mississippi channel. Appendix I is an extract from that report for 1869, concerning a new system of diking for levees. K is also an extract from that report for 1875, in which Prof. FORSHEY officially corrects the statement made in the first edition concerning the size of the cord connecting the velocity floats. L, consisting of only one page, offers some remarks on the cause of the shoaling at the head of the delta passes, and M contains merely extracts from the Reports of the Chief Engineers for 1875 and 1876, concerning the impracticability of the jetty system as applied to the Mississippi passes. The five new maps relate to Appendices L and M.

In hastily glancing over the new edition we have noticed but one addition or correction to the text of the old. This is the substitution of "one-tenth of an inch" for "two-tenths of an inch" in the statement of the diameter of the now historic cord. Even the typographical errors of the first edition have been reproduced uncorrected in the reprint. We mention those we have noticed, not in a spirit of cavil, but in order that they may be remedied in the next edition:

Page 250, line 7 from top, for *proportionally to*, read *inversely as*.

Page 254, line 2 from bottom, for *The parameter*, read *The reciprocal of the parameter*.

Page 262, line 3 from bottom, the quantity in () should have the exponent 2.

Page 334, in the column of the table headed $\sin^2 a$, strike out the word *Feet*.

Page 337, in the first column of table, for *observations*, read *observation*.

The pages here given are those of the reprint, and we wish to remark that the change made in the paging—seemingly without reason or excuse—will cause considerable inconvenience to those who have to use the book, as all the references to it in hydraulic literature give, of course, the pages of the first edition. The width of the page is the same in both editions, but the length is less by one line in the new one. If P represent any page in the old edition (excluding the appendices), the corresponding page in the new edition is:

$$P + \frac{1}{9}P - 16,$$

but even this rule is liable in certain cases to an error of one or two pages. Our assertion that this deviation in paging will cause inconvenience to readers may, indeed, be substantiated by a reference to the reprint itself, where, near the foot of page 238, we read, "The list on pages 200, 201, and 202." These are the pages of the old edition, and it should read, "The list on pages 206 and 207." Again, near the top of page 248, the number 233 should be 243; and these are probably not the only cases of the kind in the book.

Although the reprint bears the date 1876, and was undoubtedly in press during that year, the actual date of publication is 1877.

M.

THE VALLEY OF THE COLORADO RIVER, AND ITS GEOLOGY.—I.

We commence herewith a series of beautifully illustrated articles descriptive of that wonderful country, the Valley of the great Colorado River of the West. We take both the descriptive text and the illustrations from the government report by Major Powell of explorations made between 1869 and 1872. As we proceed with our extracts from this report, we shall have many interesting geological questions discussed and graphically explained in a manner that will be readily comprehended by the non-scientific, and at the same time will throw new light on many of the points which still divide the ranks of geologists. The journal of the expedition was kept, and this portion of the report was written, by Professor A. H. Thompson.

The Colorado River is formed by the junction of the Grand and Green. The Grand River has its source in the Rocky Mountains, five or six miles west of Long's Peak, in latitude $40^{\circ} 17'$ and longitude $105^{\circ} 43'$ approximately. A group of little alpine lakes, that receive their waters directly from perpetual snowbanks, discharge into a common reservoir, known as Grand Lake, a beautiful sheet of water. Its quiet surface reflects towering cliffs and crags of granite on its eastern shore, and stately pines and firs stand on its western margin.

The Green River heads near Fremont's Peak in the Wind River Mountains, in latitude $43^{\circ} 15'$ and longitude $109^{\circ} 45'$ approximately. This river, like the last, has its sources in alpine lakes, fed by everlasting snows. Thousands of these little lakes, with deep, cold, emerald waters, are embosomed among the crags of the Rocky Mountains. These streams, born in the cold, gloomy solitudes of the upper mountain region, have a strange, eventful history as they pass down through gorges, tumbling in cascades and cataracts, until they reach the hot arid plains of the Lower Colorado, where the waters that were so clear above empty as turbid floods into the Gulf of California.

The mouth of the Colorado is in latitude $31^{\circ} 53'$ and longitude 115° . The Green River is larger than the Grand, and is the upper continuation of the Colorado. Including this river, the whole length of the stream is about 2,000 miles.

The region of country drained by the Colorado and its tributaries is about eight hundred miles in length, and varies from three hundred to five hundred in width, containing about three hundred thousand square miles, an area larger than all the New England and Middle States, with Maryland and Virginia added, or as large as Minnesota, Wisconsin, Iowa, Illinois, and Missouri.

There are two distinct portions of the basin of the Colorado. The lower third is but little above the level of the sea, though here and there ranges of mountains rise to an altitude of from two to six thousand feet. This part of the valley is bounded on the north by a line of cliffs, which present a bold, often vertical step, hundreds or thousands of feet to the table-lands above.

The upper two-thirds of the basin rises from four to eight thousand feet above the level of the sea. This high region on the east, north, and west is set with ranges of snow clad mountains, attaining an altitude above the sea varying from eight to fourteen thousand feet. All winter long, on its mountain-crested rim, snow falls, filling the gorges, half burying the forests, and covering the crags and peaks with a mantle woven by the winds from the waves of the sea—a mantle of snow. When the summer sun comes, the snow melts and tumbles down the mountain-sides in millions of cascades. Ten million cascade brooks unite to form ten thousand torrent creeks; ten thousand torrent creeks unite to form a hundred rivers beset with cataracts; a hundred roaring rivers unite to form the Colorado, which rolls, a mad, turbid stream, into the Gulf of California.

Consider the action of one of these streams: its source in the mountains, where the snows fall; its course through the arid plains. Now, if at the river's flood, storms were falling on the plains, its channel would be cut but little faster than the adjacent country would be washed, and the general level would thus be preserved; but under the conditions here mentioned, the river deepens its bed, as there is much through corrosion and but little lateral degradation.

So all the streams cut deeper and still deeper, until their banks are towering cliffs of solid rock. These deep, narrow gorges are called cañons.

For more than a thousand miles along its course the Colorado has cut for itself such a cañon; but at some few points, where lateral streams join it, the cañon is broken, and narrow, traverse valleys divide it properly into a series of cañons.

The Virgen, Kanab, Paria, Escalante, Dirty Devil, San Rafael, Price, and Uinta on the west, the Grand, Yampa, San Juan, and Colorado Chiquito on the east, have also cut for themselves such narrow, winding gorges or deep canons. Every river entering these has cut another cañon; every lateral creek has cut a cañon; every brook runs in a cañon; every rill born of a shower, and born again of a shower, and living only during these showers, has cut for itself a cañon; so that the whole upper portion of the basin of the Colorado is traversed by a labyrinth of these deep gorges.

Owing to a great variety of geological conditions, these cañons differ much in general aspect. The Rio Virgen, between Long Valley and the Mormon town of Schunesburg, runs through Pa-ru-nu-weap Cañon, often not more than twenty or thirty feet in width, and from six hundred to one thousand five hundred feet deep.

The longest cañon through which the Colorado runs is that between the mouth of the Colorado Chiquito and the Great Wash, a distance of two hundred and seventeen and one-half miles. But this is separated from another above, sixty-five and a half miles in length, only by the narrow cañon valley of the Colorado Chiquito.

All the scenic features of this cañon land are on a giant scale, strange and weird. The streams run at depths almost inaccessible; lashing the rocks which beset their channels; rolling in rapids and plunging in falls, and making a wild music which but adds to the gloom of the solitude.

The little valleys nestling along the streams are diversified by bordering willows, clumps of box-elder, and small groves of cottonwood. Low mesas, dry and treeless, stretch back from the brink of the canon, often showing smooth surfaces of naked, solid rock. In some places, the country rock being composed of marls, the surface is a bed of loose, disintegrated material, and you walk through it as in a bed of ashes.

Often these marls are richly colored and variegated. In other places, the country rock is a loose sandstone, the disintegration of which has left broad stretches of drifting sand, white, golden, and vermilion.

Where this sandstone is a conglomerate, a paving of pebbles has been left, a mosaic of many colors, polished by the drifting sands and glistening in the sunlight.

After the canons the most remarkable feature of the country are the long lines of cliffs. They are bold escarpments, often hundreds or thousands of feet in altitude, great geographic steps, scores or hundreds of miles in length, presenting steep faces of rock, often quite vertical.

Having climbed one of these steps, you may descend by a gentle, sometimes imperceptible, slope to the foot of another. They will thus present a series of terraces, the steps of which are well defined escarpments of rock. The lateral extension of such a line of cliffs is usually very irregular; sharp salients are projected on the plains below, and deep recesses are cut into the terraces above.

Intermittent streams coming down the cliffs have cut many canons or canon valleys, by which the traveler may pass from the plain below to the terrace above. By these gigantic stairways you may ascend to high plateaus, covered with forests of pine and fir.

The region is further diversified by short ranges of eruptive mountains. A vast system of fissures—huge cracks in the rocks to the depths below—extends across the country. From these crevices, floods of lava have poured, covering mesas and table-lands with sheets of black basalt. The expiring energies of these volcanic agencies have piled up huge cinder-cones, that stand along the fissures red, brown, and black, naked of vegetation, and conspicuous landmarks, set, as they are, in contrast to the bright, variegated rocks of sedimentary origin.

These canon gorges, obstructing cliffs, and desert wastes have prevented the traveler from penetrating the country, so that, until the Colorado River Exploring Expedition was organized, it was almost unknown. Yet enough had been seen to foment rumor, and many wonderful stories have been told in the hunter's cabin and prospector's camp. Stories were related of parties entering the gorge in boats, and being carried down with fearful velocity into whirlpools, where all were overwhelmed in the abyss of waters; others of underground passages for the great river, into which boats had passed never to be seen again.

It was currently believed that the river was lost under the rocks for several hundred miles. There were other accounts of great falls, whose roaring music could be heard on the distant mountain-summits. There were many stories current of parties wandering on the brink of the canon, vainly endeavoring to reach the waters below, and perishing with thirst at last in sight of the river, which was roaring its mockery into dying ears.

The Indians, too, have woven the mysteries of the canons into the myths of their religion. Long ago, there was a great and wise chief, who mourned the death of his wife, and would not be comforted until Ta-vwoats, one of the Indian gods, came to him and told him she was in a happier land, and offered to take him there that he might see for himself, if upon his return he would cease to mourn. The great chief promised. Then Ta-vwoats made a trail through the mountains that intervene between that beautiful land, the balmy region in the great West, and this, the desert home of the poor Nu-ma.

This trail was the canon gorge of the great Colorado. Through it he led him, and, when they had returned, the deity exacted from the chief a promise that he would tell no one of the joys of that land, lest, through discontent with the circumstances of this world, they should desire to go to heaven. Then he rolled a



FIG. 1.—GATE OF LABORE.

river into the gorge, a mad, raging stream, that should engulf any that might attempt to enter thereby.

More than once I have been warned by the Indians not to enter this canon. They considered it disobedience to the gods and contempt for their authority, and believed that it would surely bring upon me their wrath.

For two years previous to the exploration, I had been making some geological studies among the heads of the canons leading to the Colorado, and a desire to explore the Grand Canon itself grew upon me. Early in the spring of 1869, a small party was organized for this purpose. Boats were built in Chicago, and transported by rail to the point where the Union Pacific Railroad crosses the Green River. With these we were to descend the Green into the Colorado, and the Colorado down to the foot of the Grand Canon.

To show the manner in which the hardy explorers traveled, we quote extracts from the report of the first day's run :

On June 8 we commence our journey and enter the canon of Lodore, and, until noon, find a succession of rapids, over which our boats have to be taken.

Here I must explain our method of proceeding at such places : The *Emma Dean* goes in advance ; the other boats follow in obedience to signals. When we approach a rapid, or what, in other rivers, would often be called a fall, I stand on deck to examine it, while the oarsmen back water, and we drift on as slowly as possible. If I can see a clear chute between the rocks, away we go ; but if the channel is beset entirely across, we signal the other boats, pull to land, and I walk along the shore for closer examination. If this reveals no clear channel, hard work begins. We drop the boats to the very head of the dangerous place, and let them over by lines, or make a portage, frequently carrying both boats and cargoes over the rocks, or, perhaps, only the cargoes, if it is safe to let the boats down.

The waves caused by such falls in a river differ much from the waves of the sea. The water of an ocean wave merely rises and falls ; the form only passes on, and form chases form unceasingly. A body floating on such waves merely rises and sinks—does not progress unless impelled by wind or some other power. But here, the water of a wave passes on, while the form remains. The waters plunge down twenty or thirty feet to the foot of a fall, spring up again in a great wave, then down and up in a series of billows that gradually disappear in the more quiet waters below. But these waves are always there, and you can stand above and count them. A boat riding such leaps and plunges along with great velocity. Now, the difficulty in riding over these falls, when the rocks are out of the way, is in the first wave at the foot. This will sometimes gather for a moment, heaping up higher and higher, until it breaks back. If the boat strikes it the instant after it breaks, she cuts through, and the mad breaker dashes its spray over the boat, and would wash us overboard did we not cling tight. If the boat, in going over the falls, chances to get caught in some side current, and is turned from its course, so as to strike the wave "broadside on," and the wave breaks at the same instant, the boat is capsized. Still, we must cling to her, for, the watertight compartments acting as buoys, she cannot sink ; and so we go, dragged through the waves, until still waters are reached. We then right the boat and climb aboard. We have had several such experiences to-day.

In succeeding numbers we will take up the geological as well as the topographical and scenic features.

TO BE CONTINUED.

THE MINERAL RESOURCES OF UTAH.

By C. F. Allen, M. E.

(Concluded from page 48.)

BEAVER DISTRICT.

In the neighboring district of Beaver Lake, now nearly abandoned, is a number of good-looking copper claims. A few men who have adhered to the district have opened up a number of lodges from one to six feet in width, carrying from 10 to 25 per cent. copper (mostly as oxides and carbonates), and a little gold and silver. These lodges lie at the base of the mountain, and are easily traced along the surface for hundreds of feet. Near by immense deposits of sulphuret and oxide are reported, averaging over 40 per cent. of the pure metal. Copper stain is frequently visible on the hillsides, and there is every probability that many lodges would be discovered were proper search made, and that this section of Beaver County will become an important one for copper smelting. The great distance from railroad and market has hitherto prevented much attention being paid to the district, but the field appears a good one for future operations. For

various reasons, as scarcity of water, etc., little exploration has been done. Twelve miles west of Beaver City several veins of bismuth ore have been found. These lie near together in a magnesian limestone of silurian age, and vary from 1 to 9 feet in thickness.

The gangue is of a serpentinous character, and carries lime-garnets, iron oxide, tremolite, and other minerals. The ore, a sulphide and oxide, free from arsenic and antimony, varies from 1 to 6 per cent. of the total vein matter, but is easily concentrated. In the concentrated product, which gave 39 per cent. of bismuth, molybdenum was found, which, in view of the high price of that metal and its general use, may prove an important discovery.

Several shafts sunk upon these properties show strong and well-defined veins, and, on account of the high price of bismuth and the rarity of its being found thus free from arsenic and antimony (a fact that has been amply proved), they bid fair to become of much value. In the same county are veins of graphite and deposits of sulphur, which will, at no distant day, be utilized. Indeed, few places offer such inducements to capital or have such a prospect of a golden future as does this Beaver County.

COAL.

At Coalville, six miles south of Echo, on the Union Pacific road, is a number of seams of coal from one to seven feet in thickness. From these are produced large quantities of coal, used on the Union Pacific road. A short narrow gauge railroad leads from the place to Echo. Experiments go to show that it is of a non-coking character, and hence of little use in connection with the smelting in the Territory. To the east, in Wyoming, are still further deposits of a similar lignitic character. South, along the Wahsatch, coal has been found in various places and of varying character, but, owing to distance from railroad, in few places has much of anything been done. Eighty to ninety miles southeast of this city, in and near the San Pete Valley, a number of seams, from six inches to six and a half feet in thickness, of excellent bituminous coal has been

found ; while a little further to the east among the mountains, others as wide as ten or eleven feet are being worked. These beds lie from thirty to fifty miles from railroad, and nearly along the line of the proposed Denver Pacific. Already a narrow gauge road is being pushed up Spanish Fork, and when finished will make them easily accessible. This coal yields a good quality of coke, which is being used at the furnace in the Salt Lake Valley.

Even now it can be delivered at the smelters several dollars cheaper than can the Connellsville coke from Pennsylvania, and still yield a handsome profit, so that upon the completion of the road, and the consequent reduction of the price, it will no doubt largely supersede the latter, unless great reductions in freight on the Pacific road take place. At the further beds mentioned is a large number of coking ovens, turning out coke continually, and of which a large stock is said to be on hand. Little need be said of the coal beds of Iron County and the far South, some of which are twelve or more feet in thickness. These and many others not mentioned and but little known—often chance discoveries—prove the presence of coal throughout the Territory, and any future demand will be at once supplied either from them or many others yet to be found.

OIL.

In the San Pete Valley, already mentioned, in the sandstones and conglomerates, with the coal, are beds of shale containing almost enough oily matter to burn alone, while in the vicinity are springs bringing to the surface considerable quantities of petroleum. Further to the north similar shales appear. In view of these facts, it is not improbable to suppose that oil will be found upon search being made. Its discovery in Southern California is at present creating considerable excitement, and Utah may yet supply, at least, her own markets.

SALT, GYPSUM, AND SULPHUR.

Fifteen or twenty miles below the railroad terminus, in Salt Creek, are seemingly inexhaustible quarries of salt and gypsum. The former, yielding 90 per cent. of the pure article, are being steadily worked, and a number of tons daily shipped to the Ontario Mill for chloridizing purposes. Of this article, the Territory can furnish almost any amount. Further to the south, along the flanks of volcanic upheavals, extensive sulphur deposits have been unearthed. On these little work has been done. As usual, they are awaiting further railroad facilities.

COPPER.

In the extreme northeastern section of the Territory, within fifty miles of railroad, a new copper district, the Ewing, has recently been opened. The veins, reported as lying in micaceous shale, associated with porphyry and varying from 5 to 20 feet in width, appear to carry almost all of the ores of copper, but mainly the oxide and glance, which yield sometimes as high as 50 per cent. of the pure metal. As yet the mines are but little developed, but the prospect



FIG. 2.—THE START FROM GREEN RIVER STATION, U. P. R. R.

are said to be exceedingly good. In view of the proximity to railroad and of the fine country in which they lie, this district bids fair to become an important one. An able description of it appeared in this JOURNAL, to which, for details, reference is made. In the far southeastern section of the Territory, not far from the Elk Mountains, rich placer diggings are being opened. The Indians, who have proved troublesome, have long prevented a fuller exploration of the eastern and southeastern parts of the country, which is believed to be a rich one, and well worthy further attention.

IRON.

Iron ore is found more or less throughout the Territory, but notably in large quantities in certain places. Heretofore its use has been comparatively limited, being applied as a flux in the lead smelting business. To be sure, even in this line, its use has been by no means inconsiderable, and great was the saving when the expensive ore from Rawlins, Wyoming, was replaced by others from Tintic; but still scarcely any attempts have been made to work it for its iron, and so vast quantities of excellent ore remain unutilized. In the southwestern part of the Territory, in Iron County, is a range of mountains containing inexhaustible amounts of a fine iron oxide, and within twenty-five miles are large beds of coal. Their present remoteness from railroad render them of but comparatively little value at present, but at the north, where good iron containing several per cent. of manganese is found, in view of the high freights from the East, and the consequent high price of iron, its manufacture might at once be undertaken with profit. Indeed an attempt, although scarcely an extensive one, was made at Ogden, but, owing to difficulties, was not carried out. In Tintic, Beaver County, and many other places, excellent iron ore is found. The finding of such ores of iron, as well as those of other metals not utilized, has been often through chance discoveries, or from the results of search to supply a small local demand; but let there once be a demand and a prospect of their future value at no distant day, and plenty more will be discovered throughout the Territory. People, especially those of limited experience and information, are slow to enter industries with which they are unfamiliar, and thus too many are content to await for others to prove the value of great beds of copper, sulphur, iron, coal, salt, gypsum, veins of graphite, etc., before they undertake to avail themselves of them. An animus, such as is displayed in the search for the precious metals, would reveal such amounts of these articles as would astonish many at the resources of the Territory. All of these represent latent wealth, awaiting but the proper energy and development to become of real value.

SILVER-LEAD BULLION.

Utah's great product is silver-lead bullion, made from low grade ores at a close margin. The market lies at the East, where she has to compete with other ores and bullion. And when consideration is made that she has to ship her products over a thousand additional miles, paying the reformed freight tariff from four to six times that on the Eastern roads, and then we see her competition successful, the conclusions as to her importance and value as a great lead region are at once drawn.

A high and exorbitant rate of freight on the Pacific roads has acted seriously against the interests of the Territory, and a decline of a few dollars per ton on freight to Omaha would serve to open hundreds of mines now idle, and vastly increase the export of the Territory. Such a reduction, a discrimination in favor rather than against the interests of the country, especially at the present depression of business and the lead market in particular, is what her citizens have a right to demand and expect. Utah, comprising an area of 84,476 square miles, about equal to the New England States, contains a population of a little over a hundred thousand Mormons and about ten thousand Gentiles. The former are generally an industrious and simple people, engaged in agriculture, grazing, and so forth, but as a whole are poor and uneducated. The bulk of them are foreigners, unacquainted with our institutions, and easily controlled by their leaders. Their settlements lie scattered throughout the Territory, at the mouths of the cañons and on the borders of streams and springs, where by irrigation over 150,000 acres of land have been redeemed. From this class must come much of the labor for the future development of the resources of the Territory. Their leaders, to whom belongs most of the blame bestowed upon the Mormons as a whole, have endeavored to suppress mining, both on the part of their followers and those outsiders attracted here, but only in part were they successful, and in spite of this impediment the industry has constantly increased from year to year. The result has been to place the industry almost entirely in the hands of Gentiles and apostates, who, it is estimated, have placed therein about thirty millions of dollars, a sum equal to the other interests combined. To this progressive and energetic class are due most of the improvements and developments of the Territory of late years.

From the character of the ores, smelting has been the usual method of treatment, and great is the improvement made of late years in that line of metallurgy. In the fine furnaces of the present day, furnished with the best machinery, supplied with the best talent, and turning out tons of fine bullion made from low grade ores, one would scarcely recognize the outgrowth (of but a few years back) of the inferior little stacks, reducing at enormous loss and great cost a few tons of rich ore. The present furnaces are of the finest in the country, using all the modern improvements, water jackets, excellent blowing machinery, and reduce from twenty to sixty tons each of ore a day. As only the best and most effective can live now, the old and small stacks are being replaced by new and larger ones, using all the modern improvements for economy. At present there are a dozen establishments, using twenty-five stacks, in operation, which turn out over 1,500 tons of bullion per month.

The product for May was 227 car loads, or 1,622 tons of silver-lead bullion, valued at \$324,000 (a great decrease over the preceding months). The mills in Leeds, Tintic, and Park City, eight in number, shipped during May \$250,000 in gold and silver bullion. The following is the Salt Lake Tribune's estimate for April and May, 1877:

APRIL.		MAY.	
Base bullion, 2,275 tons, at \$200,	\$455,000	Base bullion, 1,622 tons, at \$200,	\$324,400
Silver lead ore, 1,257 tons, at \$100,	125,000	Silver lead ore, 1,122 tons, at \$100,	112,200
Copper ore, 65 tons, at \$100	6,500	Silver bullion, Ontario	137,000
Silver bullion from Ontario	98,894	" " Tintic	16,482
" " " Tintic	45,000	" " Leeds	68,000
" " " Leeds	56,000	Gold " Bingham	4,000
Gold " " Bingham	4,800	" " Tintic	32,000
" " " Tintic	10,000		
	\$801,194		\$694,082

As will be seen the decrease for May is mostly due to the falling off in the bullion shipment, on account of the great decline in the lead market. The yield for the year 1877 will probably be over \$9,000,000.

In the preceding article it has been the endeavor of the writer to give not an exhaustive paper upon the subject, but, in as concise and clear a manner as possible, as it appears to a totally unprejudiced person, a general idea of the mining interests in the Territory: a short description of the ore, their mode of occurrence and method of treatment, a brief mention of the principal mines and districts, with such of their past history as was necessary for the understanding thereof, and to call attention to the vast undeveloped mineral resources which abound throughout the Territory, awaiting but the proper energy and capital to be turned to good account.

THE STONE HILL COPPER MINE AND WORKS, CLEBURNE COUNTY, ALA

The following description of this, one of the richest copper deposits in this country, is taken from a report recently made for the company by R. P. Rothwell, Mining Engineer. The report has been published in pamphlet form.

The property of the "Stone Hill Copper Mining Company" consists of about 294 acres of land, situated in Section 35, Township 17, Range 11 East, in Cleburne County, Alabama, on which are found two large deposits of copper ore, one of which only has been proved to any extent. The copper deposit consists of an immense bed of sulphuret ore, intercalated in a micaceous schist of Laurentian or Taconic (Enmons) Age. Near the surface the ores have been altered by atmospheric agencies and converted into limonite iron ore, which forms the "iron cap" or gossan outcrop of the deposit. In a zone below this limonite, the copper, originally contained in the ore now converted into gossan, appears to have been collected by a leaching process. This concentrated ore, known as "black oxide," is a sulphuret containing over 30 per cent. of copper. It forms a zone of variable thickness (seldom more than six or eight feet), which seems to follow, in a somewhat irregular manner, but always at a comparatively small depth, the contour of the surface. From its richness and the ease with which it is mined when found in quantity this black ore has always been highly esteemed, and, indeed, has always formed the sole object of the pioneer mining in each of the copper mining districts where it occurs.

The Stone Hill deposit is in its character and surroundings similar to the well-known and often-described "veins" of Ducktown, Tenn., Ore Knob, N. C., Carroll County, Va., and those so extensively worked in Vermont. The explorations of Stone Hill consist of an adit run in about 400 feet on the "vein," a slope down about 50 feet below this adit level, a few smaller exploration headings, and a number of trial shafts at intervals along the outcrop of the bed.

The ore occurs in a bed which has been traced on its outcrop across a hill to about 150 feet in height above the lowest point upon the property, as shown on the accompanying map. The length of the bed thus proven is about 1,200 feet to the south of the entrance to the adit; and, no doubt, it will be found to extend in the opposite direction where the nature of the surface makes it impossible to trace it without shafting. The strike of the copper-bearing rock is N. 16° E., and it dips to the East at an angle of about 45°. Though the ore occurs in well-defined beds, yet the total thickness of the deposit is somewhat indefinite; the richer beds have an aggregate thickness of 25 to 30 feet, but above these occur series of schists similar to the central portion of the great ore mass, though with copper less abundantly disseminated through them; the beds becoming poorer the further they are distant from the central mass, till the thickness of this unworkable portion exceeds in places 50 feet, throughout the whole of which more or less copper pyrites can be seen.

That portion of the cuprifera deposit which is worked, and is known as the "vein" is composed of three main divisions, shown in the accompanying sketch. The upper division is a mundic bed of from



3 to 3½ feet in thickness. The middle division, called among the miners the "Slate Vein," is from 15 to 20 feet in thickness, and is composed of micaceous schist impregnated with copper and iron pyrites, with the beds perfectly defined, and the ore pretty evenly distributed through them. It is noteworthy that the ore always conforms to the bedding of the schist, and however thin these bodies may be it does not seem to cement them together; or, in other words, whatever changes have occurred in the mineral composition of the beds subsequent to their deposition must have been confined to the gradual replacement of one mineral by another, rather than any sudden injection of the present constituents between the beds of the pre-existing rocks.

Under the "Slate Vein," or middle and richest portion of the deposit, is found a bed of mundic varying in thickness from four to five feet.

The richness of the ore varies irregularly in the bed, some places presenting nearly pure copper pyrites, running up to 30 per cent. of copper, while in other portions, especially in the mundic beds, this percentage runs down to 3 or 4 per cent. There is practically no barren rock in the bed, and the average yield of the entire mass, as determined by cyanide assay, by Adolf Thies, Esq., the chemist in charge of the smelting works, is about 5½ per cent. of the copper.

This is the average of a great number of assays made in the regular course of work during the past year or two. The figure is composed as follows:

50 per cent. of the bed yielding	.....	Cu.	7.6
20 " " "	.....		6.81
30 " " "	(tailings), say	.....	1.00
			Average 7.37 per cent.

Average yield of bed..... 5.46 or nearly 5½ per cent.

The average yield of roasting ore was 7.37 per cent. If the picking and dressing were more carefully made, there would be no difficulty in bringing the percentage of the picked and dressed ore to 8 per cent. copper.

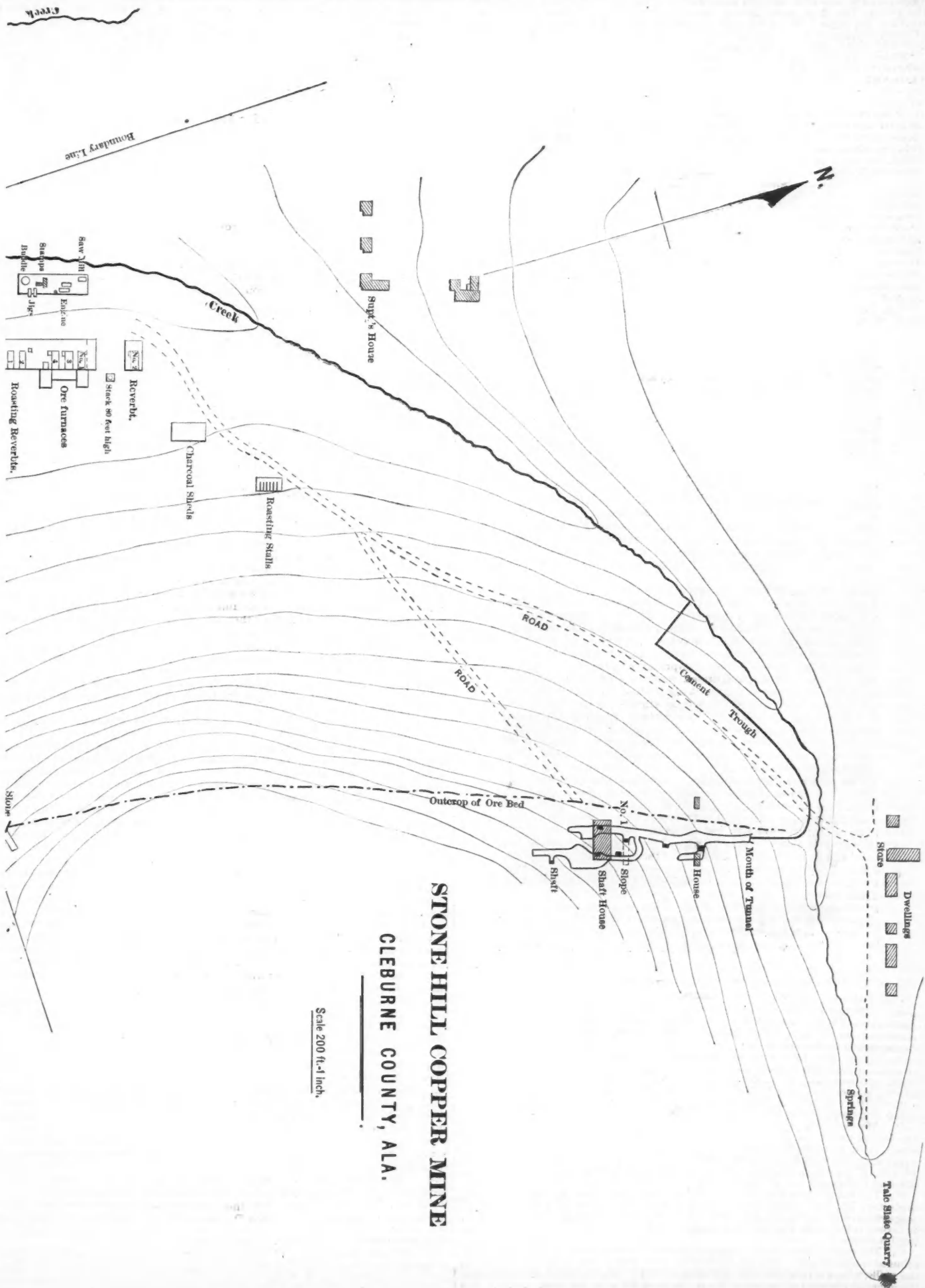
We have spoken of this ore body as a bed—not a vein—since its character seems to justify this definition.

Whatever may have been the origin of this deposit, it was certainly the same as that of the Tennessee, North Carolina, and Vermont deposits, for in all essential characteristics they are almost identical.

As these have long been worked we can refer to them as indicating the conditions which may be expected here in those points not fully developed.

In a report made by Drs. Credner and Trippel, in 1866, for the American Bureau of Mines, the nature of the Ducktown, Tenn., deposits is thus described:

"Imbedded between the soft arenaceous mica and talc slates of Ducktown, lie lenticular deposits of ore, which sometimes attain great thickness (in one instance 400 feet), and then contract to smaller dimensions, extending longitudinally for considerable distances, up to 1,000 feet and more. They have no defined hanging or foot walls, since the massive central zone, called 'the vein' by the



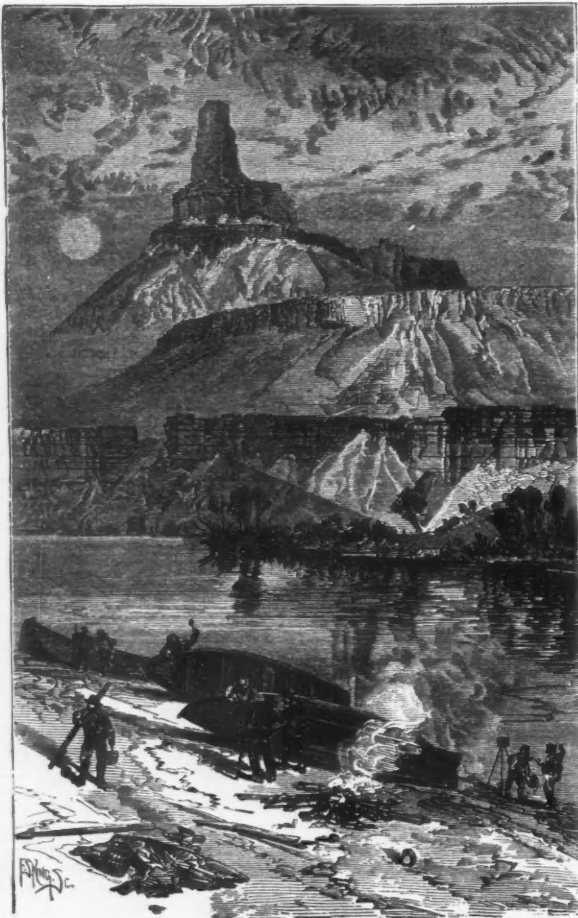
STONE HILL COPPER MINE
CLEBURNE COUNTY, ALA.

Scale 200 ft.-1 inch.

workmen, passes over on either side by gradual transition into the slates, which appear at first impregnated with particles of ore, and then, at some distance from the center, lose their metalliferous character altogether. These deposits are therefore impregnations, with massive centers of almost pure ore. In every part of them the parallel structure, corresponding with the stratification of the slates, is clearly visible, thus leaving no doubt as to the manner of their origin.

These lenticular deposits, with massive centers, seem to lie isolated in certain belts of the slates, which have been erroneously considered as veins. The Burra-Burra and East Tennessee deposits, for instance, are believed in Ducktown to be one vein; but they are really two separate lenticular deposits, having the same strike, or, in other words, lying in the same belt of the formation. Another similar error has often been made by the supporters of the fissure vein theory, as applied to these occurrences. When by following the course of a deposit its end was reached, cross-cuts were run into the hanging and foot walls, and frequently (e. g., in the Polk Co. Mine) the contracted extremity of another deposit was thus discovered, which, having a parallel strike, was regarded as the continuation of the first separated from it by a fault or dislocation. No such thing as a fault exists in this district; what are called such are nothing more than the end of one deposit overlapping, as it were, the beginning of another similar and parallel one, or two lenticular masses lying in *echelon*. The hitherto discovered deposits of Ducktown are in three series or belts, which, as already remarked, have been erroneously regarded as three great veins. It is probable that the progress of mining operations will eventually expose other deposits, so that they will appear not confined within particular limits, but scattered with less regularity over a wide area. The discovery of those deposits only which lie in certain lines is explained by the fact that the miners have always supposed them to be veins, and have therefore conducted explorations mainly or wholly on the course of mines already opened."

"The Ducktown deposits all have the same course as the county rock, viz., N. E., S. W., and the same steep dip to the S. E.



No. 3.—GUNNISON'S BUTTE, AT THE FOOT OF GRAY CANON (2,700 FEET HIGH).

"In following the Ducktown deposits from the outcrop downward, four entirely different zones or stories are passed through, which are generally sharply distinguished from each other. Their depth, their specific character, and their distance from the surface vary in the several deposits; but the following order of succession is common to all:

"1. Upper part of the 'vein' consisting of 'gossan,' i. e. sandy, porous, massive or reniform iron ore mixed with streaks of reddish-brown slate. In this zone, and especially in its lower portion, occur malachite, azurite, cuprite, in grains, masses, and threads, and native copper in foliated and dendritic forms. Cuprite (the red oxide of copper), and the so-called black oxide, become more and more abundant, and gradually form—

"2. The second zone, the transition to which occupies generally not more than ten feet on the dip of the vein. This may be called the zone of the black copper ores. It varies in depth from two to eight feet, and appears to follow with its upper limit the contour of the surface above. In it are found layers, nodules, and pockets of cuprite, and granular admixtures of iron and copper pyrites. This division is abruptly cut off below by—

"3. The third zone—that of iron pyrites and pyrrhotine (magnetic pyrites), containing but little disseminated copper pyrites, and, on the other hand, a larger proportion of tremolite and actinolite, of radial fibrous structure and wine-yellow to brown color. The disseminated copper pyrites grow more abundant in depth, until it forms—

"4. The fourth zone—that of copper pyrite. In the center of the deposit this mineral is almost pure and solid, containing some 30 per cent. of copper. Towards the walls, where it is mixed with pyrrhotine, iron pyrites, tremolite, and actinolite, the average contents of copper in the whole mass is 8 to 10 per cent. . . . The decomposition of the Ducktown deposits, from the outcrop to the water-line, is the result of penetrating waters and atmospheric influences. A slow and gradual

process of decomposition, reduction, oxidation, and mutual chemical reaction has been going on, producing new mineral combinations. Among the results of this secondary process must be included the formation of the whole zone of oxidized copper ores."

Subsequent events have quite confirmed the correctness of the above opinions, except as to the division of zones 3 and 4. More extensive developments have shown that the sulphureted ore immediately underlying the black copper zone is not necessarily or uniformly poor in copper, but merely has its poor spots and its rich spots. There exists, therefore, no such zone or division as that numbered "3" by Drs. Credner and Trippel. In other respects, their diagnosis has been fully confirmed as to this type of ore deposit by deep and extensive workings at Ducktown, in Vermont, where the slope on the bed is about 1,500 feet long, and in other places.

In our next we shall give further extracts from this report, showing the metallurgical treatment recommended, and the cost of production of ingot copper as found in some of our largest works.

TO BE CONTINUED.

FRICITION OF PLAIN SLIDE VALVES.

By Joshua Rose.

My objections to Mr. John W. Hill's method of obtaining "a concise demonstration of the true friction of slide valves" do not, from that gentleman's communication published in your issue of July 21, appear to be properly understood by him.

In the first place, he selects 0.15 as a coefficient of friction, and quotes in support of that coefficient *Wiesbach's Mechanics*, but confesses that this very authority, as well as Rankine, gives 0.15 as the minimum. Mr. Bourne, in his *Handbook of the Steam Engine*, says: "The experiments of General Morin on the friction of various bodies without an interposed film of lubricating liquid, but with the surfaces wiped clean by a greasy cloth, have been summarized by Professor Rankine in the following table:

	Angle of repose.	Friction in terms of the weight.
Metals on metals, dry.....	8 $\frac{1}{2}$ ° to 11 $\frac{1}{2}$ °	0.15 to 0.2
Metals on metals, wet.....	16 $\frac{1}{2}$ °	0.3
Smooth surfaces, greased.....	4° to 4 $\frac{1}{2}$ °	0.07 to 0.08
Smooth surfaces, best results..	1 $\frac{1}{4}$ ° to 2°	0.03 to 0.06

Where, then, is the justification for selecting the 0.15 to the 0.2? I hold that the coefficient depends entirely upon the truth and smoothness of the surfaces, and in support of my position have my surface plates 12 x 8 inches, which are certified by the Fairbanks Scale Company to have required, upon careful test, 341 $\frac{1}{2}$ lb. to slide one upon the other; this gives a coefficient of 0.237, which is more than the maximum of Rankine's summary of Morin's experiments. In *Nystrom's Mechanics* I find cast iron on cast iron lubricated with water, coefficient in motion 0.314, coefficient in starting 0.316, which is more than double Mr. Hill's 0.15. Now comes the question of lubrication, which is of vastly more consequence than the profession appears to realize, for I find that water has an infinitesimal, if any, effect upon the coefficient of friction. I find that one drop of oil distributed over a surface of 300 square inches vastly increases the coefficient, whereas if that quantity of oil be distributed over that amount of surface, and the surfaces be wiped as free from oil as they can be, by being cleaned as perfectly as possible with a piece of linen rag two inches square, the coefficient is greatly increased, while, if the surfaces are cleaned with alcohol, the coefficient is reduced to a minimum, though what that minimum is I have not as yet determined.

I object to 0.15 as a coefficient, because the amount of lubrication afforded by the oil cups with which most steam chests and steam pipes are supplied is an unknown quantity, hence the coefficient is an unknown quantity; and even were the pressure of the valve to its seat a known quantity it cannot be multiplied by an unknown one and give the "true friction." In many oil cups the feed is constant and not intermittent, and the assertion that when some valves are oiled intermittently and others almost continually "it is fair to assume the average condition of surfaces to be dry so far as lubrication goes," is one to which I cannot assent. Meantime, as I have not Rankine at hand, I must refer again to Bourne, who gives the coefficient of 0.15 as in terms of the weight, just as I stated it.

Here arises one of the main issues, for, were the valve loaded with a dead weight, the coefficient being determined upon Mr. Hill's method would be correct; but instead of a dead weight we have live steam, which will find its way beneath the surfaces and counterbalance the weight or pressure upon the valve back. If we take a cast iron surface and file it up with the finest French clock-maker's files, we cannot produce with the utmost skill a surface that will exclude the air at only 15 lb. per square inch upon it, and such a surface will be far more true and smooth than an average slide valve surface. Assuming the atmospheric pressure to be 15 lb. per square inch and a slide valve to have 100 inches of face area in contact with the seat, it should take 1500 lb. to lift the valve from the seat; but as a practical test I defy any mechanic to produce a slide valve that has worked one month and requires 1 lb. on the face-bearing inch more than its own weight to lift it from its seat. Or in other words, taking the weight of the atmosphere at 15 lb. to represent dead weight upon the valve, as it must do if there is no counterbalance of power between the contacting surfaces, or in other words, the weight of the atmosphere being (say) 15 lb. per square inch, it ought (allowing Mr. Hill's doctrine, that the pressure upon the back of the valve is unrelieved by any pressure between the fitting or contacting surfaces) to require the weight of the valve added to 15 pounds per square inch upon the valve face seated area to lift the valve from its seat; whereas, I challenge the production of a valve which, having worked one month, requires one pound per square inch more than its own weight to lift it from its seat; hence I claim that the fit of valves to their seats, even when comparatively new, is such that not one-fifteenth of the pressure upon the back acts as unbalanced atmospheric pressure. I will go further and say that I challenge the production of two valves that have worked a month being put together by hydraulic pressure or under steam pressure that shall require a pound per inch of the contacting surfaces to pull them apart against the opposition of the atmospheric (say) 15 pounds per inch, and I will extend the challenge to include any two surfaces that have worked a month, knowing full well that such surfaces cannot be made to exclude the external pressure.

Mr. Hill admits that the difference between the temperatures of the live steam in the chest and the exhaust steam in the valve-pocket produces unequal expansion, and hence throws the valve face out of true. He also admits that the pressure on the back of the valve produces a deflection, but says, "Thus it appears that the change of form of valve, due to unequal expansion, is in one direction,

whilst the change of form by pressure is in an opposite direction, and as the 'regimen' of the steam chest under pressure is such as to produce both forces, then one neutralizes the other in whole or in part. If these forces are equal, then no change of form takes place." Let us analyze this a little. The expansion of the valve will be in proportion to its temperature; the deflection of the valve under any given weight will be in proportion to its strength. Now, if a new valve of a given thickness defects under a given pressure sufficient to equalize the change of form due to a given temperature, how will it be when one-quarter of an inch of that thickness has worn away? If we could make an agreement with the valve not to wear away or to get proportionally stronger as it grew thinner, we should be all right, so far as the valve was concerned. But the cylinder face expands also, and I see no reason to assume that it expands in a straight line. In fact, I cannot see that by assuming that the minimum coefficient of friction, the disregarding of lubrication, the ignoring of whatever adhesion there may be, the supposition that notwithstanding that all valves do not fit alike, and none of them fit well enough to exclude the atmosphere, they will exclude steam of a much greater pressure; the assumption that the expansion equals the deflection, notwithstanding variations in the strength of the valve. I cannot, I say, perceive that by this process we can obtain a demonstration of the true friction of slide valves.

To obtain a steam-tight fit is one thing, but to obtain a fit that shall press two faces together so that the pressure shall be a representative of dead weight is another, and this Mr. Hill will find out if he will make a few experiments with the surface plates I shall send to the Franklin Institute exhibition this year; and I take this opportunity to say that I will send a pair of such plates to any school of engineering, either here or abroad, which has the means and disposition to use them in determining the coefficient of friction of cast-iron.

Now let me ask a final question. If Mr. Hill's 12 by 24 valve fitted so to the seat as to have no steam beneath it, there must have been a vacuum between the contacting area of the valve and seat. Now, how did he get that valve off the seat when the atmosphere was pressing it there with at least some hundreds of pounds? Why, he found, if he tried it, that he could lift it off with his hands, hence that the pressure was not effective as an unbalanced weight, and he had a practical illustration that any calculation assuming that the pressure on a valve is as effective in holding it to its seat as an equivalent weight would be, is all sheer nonsense.

HYDRAULIC MINING IN CALIFORNIA.*

By Aug. J. Bowie, Jr., A. B., Mining Engineer.

(Continued from page 64).

THE ALLUVIONS OF THE TUOLUMNE RIVER.

In the Patrickville Light Claim the pay stratum is six or seven feet thick and adjoins the bedrock. The gold is more concentrated in this gravel deposit as long as there are sand strata in the bank, but with their disappearance it is more diffused throughout the detritus. Whilst "hydraulic mining" in this claim a large hole in the bedrock twenty-five feet deep was bottomed. The hole was filled with gravel, but no pay was obtained. The pay stratum was found to be on a level with and a continuation of the pay stratum of the rest of the claim. On the other hand, at the Chesnan and French Hill claims, whenever these hollows are found, a large yield of gold is invariably obtained.

EXPERIENCE IN THE AUSTRALIAN GOLD FIELDS.

The experience of miners in the gold fields of Victoria has led to the conclusion that "in large auriferous rivers gold is always found on the bars or point, and not in the deep pools or bends."† In substantiation of these facts are cited Reid's Creek, Wool Shed, Twist's Fall, or Yackandandah, near Osborne's Flat, and Rowdy Flat; at each of these places large holes were cleaned out, and "only a few colors obtained, whilst shallow flats immediately below them were very rich."

UNDULATING BEDROCK AT FRENCH HILL.

At French Hill where the bedrock was undulating, and in depressions found around a little hill, formed by a sudden rise in the bedrock, the gravel paid better than in any other portion of the claim. The gold fields south of Miask ‡ in the Ural Mountains, present a similar case, all the undulating ground and depressions around conical hills being the most productive in gold. The bulk of the pay dirt in the cement gravel of Nevada County is within the first thirty feet of the bottom.

THE YIELD OF THE UPPER GRAVEL STRATA AT NORTH BLOOMFIELD.

It was the result obtained by the North Bloomfield Gravel Mining Company from washing three and a quarter millions cubic yards of top gravel (1870-74), yielding 2.0 cents per cubic yard, and leaving a profit of only \$2,232.84, that determined capitalists interested in these claims to investigate the question of the comparative values of the upper and lower gravel deposits.

INVESTIGATION OF THE COMPARATIVE VALUES OF THE DIFFERENT GRAVEL STRATA AT NORTH BLOOMFIELD.

Viewing with their experience of the past the contingencies of proposed explorations, and taking into consideration the attendant costs of an enterprise which has for its ultimate aim the working of the entire auriferous deposit, after mature deliberation it was (as a preliminary step) deemed of paramount necessity to ascertain, as far as practicable, the relative values of the different strata of the gold-bearing alluvia, so that they might judge to what extent the prospects would justify their expenditures. A series of explorations was subsequently carried out under the immediate supervision of their able engineer, Mr. Hamilton Smith, Jr., and the result of his investigation is best given in his own words: "To test the comparative values of ground developed by the shaft workings and top gravel, two hundred and forty samples, weighing in all two and one-half tons, were taken at even distances from the sides of the drifts, and the same quantity sampled from different layers of the upper bank. These samples were carefully panned out, and yielded, the blue \$1.10 per ton, the white a large number of colors, but an inconsiderable weight of gold. The gold from the blue dirt was from 50 to 100 times heavier than that from the white gravel."§ Although the gross yield from this sampling of the upper gravel was slight, it is a noteworthy fact that in each of the 240 pans one or more colors of gold were found.

* A paper read before the American Institute of Mining Engineers, at the Wilkes-Barre meeting, May, 1877.

† *The Gold Fields and Mineral Districts of Victoria*, P. Brough Smyth, p. 134.

‡ *Russia and Ural Mountains*, p. 438.

§ See *Report North Bloomfield Mining Co.*, H. Smith, Jr., pp. 17, 18.

COMPARATIVE VALUES OF THE GRAVEL STRATA AT PATRICKSVILLE AND LA GRANGE.

At the Light Claim, Patrickville, a comparative test of top and bottom gravel was made. 58,340 cubic yards top gravel yielded 2 cents per cubic yard. The bottom gravel (four feet deep) was then washed up, when it was discovered that this ground had been extensively drifted; but notwithstanding this fact, 4,966 cubic yards yielded 55 cents per cubic yard. A trial of top dirt was also made at the Light Claim, La Grange. 41,038 cubic yards top dirt yielded 3 cents per cubic yard, and 7,242 cubic yards of bottom dirt yielded 94 cents per cubic yard.

SAND STRATA.

In the gold-bearing drift of the Sierra Nevada, layers consisting exclusively of wash sand are generally found to contain very little if any of the precious metal. In gulch mining it sometimes happens that from the position of the bedrock the detrital accumulations assume the form of reclining cones, the apex reposing upon the top of the hill. Where such is the case, the bulk of the gold is concentrated in the lower end of the deposit. These gulches are frequently found to be exceedingly rich.

It is not within the scope of this paper to discuss the origin of auriferous detritus, or in any way to account for the mode of occurrence of gold, but these general facts are merely cited as an explanatory outline of the subject, and to show the reason why a system of sluicing is adopted which bottoms the entire deposit.

THE RECORDS OF GOLD WASHING.

The early record of gold washing extends to the days of the Greeks and Romans. History has familiarized us with the wonders of the Pactolus and Tagus, and it is a fact** that the diggings north of Aquitania produced in two months such a large amount of gold that its price fell 33 per cent. throughout the whole of Italy.

Gradually, one after the other, the well-known deposits of the Old World have been exhausted. The alluvia in Siberia, however, kept alive the interest in gold washing, and the subsequent discoveries in California and Australia infused a new life into this kind of mining. Since that time gold washing has been carried on in different parts of the world on a most extensive scale, but the application of water under great pressure to "gold placer mining" is an outgrowth of the present century.

Its use is chiefly confined to the Pacific Coast, and consequently the contributions to mining literature relative to its application have not been numerous.

HYDRAULIC MINING.

It was left to the untiring ingenuity of the California miner in his battles for fortune to devise the economical method of hydraulic mining, by which mountains of auriferous gravel are removed through the agency of a continuous stream of water, extracting the precious metals stored away by nature, and adding millions of hidden wealth to the treasures of the world.

THE EFFECTS OF HYDRAULIC MINING.

Independent of the financial importance of this most modern method of mining, its effects, from the gigantic scale with which it is now carried on, upon the system of drainage of the country as well as the navigation of rivers, will sooner or later bring it in direct conflict with agricultural and commercial interests.

Apart from the construction of ditches and tunnels necessary for the hydraulic washing of the gold-bearing detritus, engineers, as a rule, have had but little to do with the subsequent working of this class of mines. The primitive placer mining of 1853 to 1865 has passed into history. Forty-inch wrought-iron pipes have been substituted for canvas hose and stove-pipes, and with the replacing of one-inch streams by nine-inch diameter nozzles, discharging under four hundred feet pressure, the last remnant of the Argonauts†† method disappeared, and hydraulic mining, with one gigantic stride, has become an operation of such magnitude as to require the aid of science.

THE DEFINITION OF HYDRAULIC MINING.

Hydraulic mining, in its proper significance, may be defined as the art of extracting gold from the gold-bearing detritus in the most expedite and efficient way, by the application of water under great pressure. In working gold deposits by this method, it is essential to success that there should be, first, economical management; second, ample facilities for grade and dump; third, a sufficient head and an abundant supply of cheap water. As regards the "economical management," the same can be considered a *sine qua non* for success in all enterprises, but it is especially requisite in this style of mining, as its value is based on the great facility with which profitable results can be readily obtained, at trifling costs from washing vast areas of ground which contain relatively per cubic yard insignificant amounts of precious metal, but in the aggregate, when expeditiously and skillfully worked, give large remunerative returns.

TO BE CONTINUED.

INLAND SEA IN ALGERIA.—MM. Dumas and Daubree have urged several objections to the proposed artificial inland sea in Algeria, and agree with M. Naudin, who read a paper on the subject at a recent meeting of the Academy of Sciences, that its sanitary effects would be deplorable. It is thought that to fill the shallow basins of the region which it is proposed to convert into a sea with salt water would be equivalent to reproducing in Algeria all the worse features of marshy plains. Captain Roudaire, who proposed the scheme, admits that even in the centre there would nowhere be more than about 80 feet of water, and the whole coast line would have so little water that it would be little better than a sandbank with an admixture of salt and fresh water, upon which the strong tropical heat would act in the most deleterious manner for two-thirds of the year, causing a rapid decomposition of organic matter, and spreading contagion for miles in every direction. M. Naudin considers that there is no similarity between this district and Egypt, the climate of which country has been much improved by the creation of the Suez Canal and the plantation of trees; for, according to him, while Egypt lies between two seas, and is traversed by an immense river which has periodical overflows, the Algeria district is far from the sea, and is bounded by arid deserts.—*The Engineer*.

* \$1,200.

† \$2,775.07, ground two-thirds drifted out.

‡ \$1,500.

§ \$6,709.72.

¶ From Whiskey Run to Coquille River, Ohio, the beach sands, formerly very rich, have been extensively worked for 2 or 4 miles along the seacoast. The productive stratum was a layer of black sand 1 to 2 feet thick, buried from 2 to 5 feet below lighter sands. The gold occurs in minute particles. This sand likewise contained some platinum and iridosmine.—*Ext. Trans. Cal. Acad. Sciences*, W. A. Goodyear, of the *State Geo. Survey*.

** Strabo, book iv. chap. vi. sec. 12. Foot-note *Siluria*, p. 449.

†† The name is generally applied to those pioneers who arrived here in 1849-50.

NOVA SCOTIA MINING NOTES.

An esteemed and well-informed correspondent writes us as follows: In your issue of the 21st inst. you copy the newspaper canard about a \$5,000 nugget being found at Moose River. I have just returned from that locality, where I heard how the story arose. The district is new and contains but one working mine. The prospects in other parts of it are quite encouraging, though search is retarded by the depth of surface earth. Mining here is not prosperous in any other direction than in gold, at which several rich strikes have been made, and the yield of the whole province is, to date, largely in excess of that of last year. Sherbrooke, the leading district, having produced over 5,000 oz., the yield of last year. Some working men have made small fortunes, one mine clearing its owners \$7,000 in one month. Another enabling its proprietor to put away some \$15,000 in three months. These successes have induced further prospecting in both new and old localities, still it is by no means certain that the business of gold mining will be in future much developed. All that can be fairly stated is, that the industry is now on a sound footing, that it is not temporarily inflated by speculators, and has not to bear the odium of large companies failing through expensive and indifferent management.

I do not know what is to become of our coal trade. It gets worse and worse every year, and owners' hearts fail them to hold out for better times.

HALIFAX, N. S., July 30, 1877.

MINING NEWS.

OUR SOUTHERN GOLD MINES.—The Dahlonega *Signal and Advertiser* says:

"The *Benning Mine*, which has been at work for the past year with a small 10-stamp mill, doing mostly prospecting work, opening up the mine in various places, has now developed and uncovered a large amount of good paying ore, and now only needs its stamps increased to the capacity of its ample water power. It has lately, with its 10 stamps, yielded as much or more gold than some larger mills, and the mills in the vicinity are giving satisfactory results.

"The *Bagg's Branch Mine*, situated in Lumpkin County and owned by Messrs. Weaver, White & Co., has recently struck a large and well defined vein, about 11 feet in width, which shows free gold and promises to be one among the best mines in Northeast Georgia. This new strike is some distance from their mills, and altogether a new vein to the one they have been working. This company is making great preparations to commence operations on the property known as the Saltinstall lot. The new machinery for a mill is expected daily, after which time work will commence in good earnest.

"It is rumored that Mr. Taylor Norral has recently struck a very rich vein near his home.

"The *Old Loud Mine*, upon which water was brought by a ditch six miles long last year, is fully sustaining its old reputation. The water in the new ditch being very low, they only worked two or three hands, and hauling all the earth to the place in wheelbarrows. They obtained 425 dwts. of gold, some of it in nuggets from 1 to 18 dwts., at a cost of labor and tools of only \$116. The surface thus laboriously worked, say some 4½ square rods, averaging three feet deep, could have been worked in one or two days with hydraulic hose. The surface thus worked yielded about 100 dwts. of gold to the square rod. By an outlay sufficient to bring in Loud Creek water, for which they have a charter, the yield of gold would be largely increased.

"At the *Pigeon Roost Mine* all of the mills are moving along and paying a very nice profit on the capital invested. All are supplied with abundance of good ore, which can be worked very cheaply. Most of the mills are well arranged, so that when the water moves the ore from the cuts, it lands in the mills by the batteries, thereby greatly lessening the cost of milling. The ditch to the Pigeon Roost property is being rapidly pushed forward, and soon one of our richest mining belts will begin to give up the yellow dust. This ditch is high above many veins and deposits which only need water to make them profitable. This property will be, with water on it, easily worked. The slate is rotten and the quartz and sulphurets are in almost a state of decomposition, which will greatly facilitate operations. There is a great quantity of free gold on this property. Col. Moore has a new mill on the same belt, which is making a fine yield. We saw some beautiful specimens from one of his veins, which indicate a long run of rich ore. Everything now points to prosperity among the mines, and we are gratified to learn that some strong companies are being organized to keep up the good work.

"Some five new stamp mills are to be erected in Lumpkin County this season, with ninety stamps in the aggregate. These are in addition to the 96 stamps we have heretofore mentioned as now in operation.

"Col. French, of Boston, is to erect a 10-stamp mill at Allatoona, Cass County.

"The *Glade Gold Mine*.—This mine, including 2,000 acres of land, was recently sold to New York capitalists for \$30,000. This property is in Hall County, twelve miles northeast of Gainesville.

The *Gainesville Southern* says: "The *Singleton Mine* is situated about one mile from Dahlonega, the county seat of Lumpkin County, Georgia. The property consists of four forty-acre lots in fee simple, and a ninety-nine years lease on about one half of another lot. The Yahoola River passes through the property and affords a never-failing water power sufficient to drive 50 stamps at all times, and for nine months in the year probably double that number. The mine contains large quantities of good paying ore. On one side of the Yahoola River the ore is softer and carries free gold. Much of this ore is worth \$1 per bushel, and can be mined cheaply by water and floated to the mill. The mine has an independent water ditch twelve miles long, right of way secured by State charter. This mine is situated between the Hand Gold Mining Company and the Samuel Findley Mine, and carries the principal vein or lode of both these mines.

"The *Ingersoll Mines* are situated eight miles from Porter Springs, and about five from Cleveland, in White County; are among the oldest in the State, taking in the old Sprague vein, from which thousands of dollars has been taken in the past forty years. Mr. Ingersoll has tunneled under this vein where it is very rich, but is bothered with water, which he is preparing to lift with pumps. He is also opening new mines in every direction, and preparing to concentrate the ores by flumes at his mill, which will be increased largely in crushing capacity at an early day.

"The *Auraria Hydraulic and Mining Company*, of Lumpkin County, has located on what is familiarly known as the Saltinstall Lot, and controls other valuable lands in and around Auraria. The Pigeon Roost belt, over 300 feet wide, passes diagonally through their lands, giving quite half a mile in length of this exceedingly rich lead, besides other well-known veins and deposits. The company has purchased and is now sending forward two engine pumps, of capacity to force 200,000 gallons of water per day. They intend to sluice the hills by direct hydraulic pressure of from 75 to 250 pounds to the square inch. The grounds are

literally filled with gold to great depths. It can be panned, showing color, almost any place on the lot. The company is also putting in a 10-stamp mill for crushing the ore, which abounds in rich shoots, besides several well defined quartz and sand veins. A ditch is being cut sufficiently large for two lines of sluice-boxes, one for carrying the ore to the mill, the other for saving the soil deposit. The ditch is about 300 feet long, and runs up the branch from the mill site, and will bring them on a 30 foot level, below the old work, for a new sluicing ground. In excavating the receiving reservoir a gravel deposit was uncovered, which shows exceedingly well for a valuable addition to the prospects of this company. In the ditch above named, a four-inch sandstone vein was cut that promises to be very rich. About 150 feet from the road a shoot was followed down about 30 feet, which opened a well defined sandrock vein that pans from \$2 to \$4 per bushel, or from \$40 to \$80 per ton, with every indication that it is a permanent vein of from 15 inches to 2 feet in thickness. The company proposes, for its present purposes, to bring Camp Creek round in a ditch to its receiving reservoir at the mill, where the pumps are also located, taking in several smaller branches together, giving ample water supply."

The *Macon (Georgia) Telegraph* says: "Rich deposits of gold-bearing quartz have been discovered at Reading's gold mines, seven miles southeast of Talladega, Ala., and work is going on night and day. The quartz is now being carried in wagons to Talladega, and twenty thousand pounds of the ore will be shipped at a very early day, to the smelting works at Omaha, Neb. There it is to be crushed by passing through automatic batteries, and the gold to be gathered by the quicksilver process. If the yield of the precious metal is as heavy as is now anticipated, a capital of one hundred thousand dollars will be invested in the mines.

"In the gold fields of Georgia are found small strata of itacolumite, or flexible sandstone, the companion rock of the diamond and precious stones. A few small diamonds have been found in Georgia, and specimens of the ruby, emerald and several kinds of corundum have also been obtained.

"The report of the Directors of the Mint, for the fiscal year ending June 30, 1876, shows that the amount of gold and silver deposited at the mints and assay offices during that year was, from North Carolina, \$10,335,209; Georgia, \$7,397,495; and South Carolina, \$1,381,521, making over \$19,000,000 from these three Southern States."

IDAHO AND MONTANA.

Rich discoveries of silver ore carrying from \$100 to \$2,500 per ton have been made in the vicinity of Salmon City, Idaho.

The *Empire Mine*, though troubled to some extent with water in its lower levels, is yielding finely. The two veins of ore in this mine are within ten feet of each other in the lowest workings, and it is thought that when they unite a rich seam of mineral will be the result.

The *Potosi* is being sunk, and is yielding some \$60 rock.

The new superintendent on the *Chariot* has commenced sinking the mine and repairing the machinery on the property. A comparatively small force of men are at work, but the number will increase as the mine is prepared.

The *Illinois Central* has been leased, and will shortly be on the producing list, as there is ore in sight in the mine.

The *New Northwest Mine* at Phillipsburg has started up again, and it is hoped will now run continuously. It is running on Shark ore.

The *Hope Company* are working their mine with medium results as to quality of ore. The mill is to be opened shortly, it is said.

The *Northwest Mill Company* have contracted with the owners of the *Algonquin*, *Salmon*, and *Estelle* lodes for ore, and those mines are being worked energetically.

At *Glendale* a new 50-ton lead furnace, adjoining the one now so successfully engaged in turning out base metal, is to be built. A *Hallidie wire* tramway is also on the ground, and being set up. The *Cleopatra Mine*, which is the property of the *Hecla Consolidated Mining Company*, is looking very well, and yielding over 50 tons daily. The ore is argentiferous galena, producing, it is said, about 60 ounces in silver, and 40 per cent. in lead per ton. The same company own a vein of milling ore in the vicinity, and expect to put up a mill shortly to work it.

ASSAY DEPARTMENT OF THE ENGINEERING AND MINING JOURNAL.

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

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

Assays determining the actual composition and value of ores will be made at the following rates.

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

Assay for Gold.....	\$2 00	Assay for Lead.....	\$1 50
" Silver.....	1 50	" Zinc.....	3 00
" Gold and silver.....	2 50	Control Assays.....	3 00
" Copper.....	2 00	Zinc Analyses.....	5 00

Where reply by letter is desired, an additional charge of 50 cents should be enclosed.

Communications, samples, etc., to be addressed to
Western Office,

ENGINEERING AND MINING JOURNAL,
Denver, Colorado.

OR

ENGINEERING AND MINING JOURNAL,
(P. O. Box 4404.) 27 Park Place, New York.

ANSWERS.

ASSAYS.

ERRATUM.—In No. XXXIX., for 30'14 oz. silver read 2'14 oz.

XLIII. PITTSBURG.—Specimens marked 1, 2, 3, are antimony glance. If found in sufficient quantity and in accessible locality, may be of value.

XLIV. J. ROBERTSON, Scranton, Pa.—Sample sent is a variety of pyroxene, a mineral of no commercial value.

XLV. "F. W. H." St. George, N. B.—Specimens are chloritic shale and quartz, of no value, unless the quartz should contain gold which is not visible.

XLVI. J. SQUIRE, Ala.—Graphitic slate, quartz, and peroxide of iron.

XLVII. L. H., New York.—Specimen marked F 3. Blende and carbonate of iron, contains silver 1'5 oz.; gold, none.

L. C. VA. C. MG. Co., New York.—Copper pyrites with a little galena, yields copper 11'47 per cent.

LIV. J. ROPES, Ishpeming, L. S.—1. Blende and galena in quartz. 2. Antimony sulphite. 3. Iron pyrites. 4. Black ferruginous sandstone. 5. Red sandstone. Nothing of any value.

LV. A. M. GUYTON, Mt. Union, Pa.—Micaceous specular iron ore.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending July 28, and years from Jan 1st.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co.	43,760	1,281,866	.....	971,072
D. L. & W. RR. Co.	19,062	1,300,557	43,003	753,830
Penn. Coal Co.	22,774	629,069	25,478	510,375
L. V. RR. Co.	13,546	579,069	25,174	500,606
P. & N. Y. RR. Co.	↑	32,624	.....	14,003
C. RR. of N. J.	↑	831,777	.....	599,204
Penn. Canal Co.	11,013	216,490	12,714	179,620
	110,105	4,871,441	107,723	3,528,769
Lehigh Region.				
L. V. RR. Co.	47,903	1,682,294	91,595	1,312,582
C. RR. of N. J.	↑	842,049	.....	585,872
D. H. & W. B. RR.	274	8,850	1,550	23,724
	48,177	2,533,193	93,145	1,922,178
Schuylkill Region.				
P. & R. R. RR. Co.	120,710	3,374,778	128,014	2,181,395
Shamokin & Lykens Val.	2,939	350,959	28,962	464,163
	132,649	3,725,737	156,976	2,645,558
Sullivan Region.				
Sul. & Erie RR. Co.	↑	5,650	220	26,620
	290,931	11,136,021	358,064	8,123,134
Increase	.....	.....	.....	.....
Decrease	.....	.....	.....	.....

↑These reports were not received this week owing to the strikes on the railroads.

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

Receipts and shipments of coal at Chicago, Ill., for the week ending July 28, and year from January 1:

	Week.	Year.
	Tons.	Tons.
Receipts	26,790	838,160
Shipments	2,594	112,541

The shipments of coal at Cleveland, Ohio, for the week ending July 28 were as follows: shipped coastwise, 6,616 tons; total for year, 129,905 tons; foreign shipments, 1,779 tons; total for year, 44,608. Total of coastwise and foreign shipments for week, 8,395; for year, 174,513.

The Exports of Coal from Baltimore for the week ending July 27 were — tons, and since January 1st, 20,937 tons as against 18,345 tons for the corresponding time in 1876.

Receipts of Coal at Boston, for the week ending July 27 and years from Jan. 1.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.	Week.	Year.
From				
Alexandria and Georgetown	476	40,104	3,601	28,080
Philadelphia	15,130	336,920	14,325	264,415
Baltimore	5,586	77,271	2,870	73,071
Other places	3,583	161,987	4,801	147,093
Great Britain	104	1,353	102	4,018
Nova Scotia	2,192	11,871	620	5,605
Total	27,071	629,515	26,319	525,884

Perth Amboy business: Tons.
 Received for the week 17,058
 Shipped for the week 31,830
 On hand July 28 114,649

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 152,810 tons, as compared with the corresponding period in 1876.

	Week.	Year.	Year.
	1877.	1877.	1876.
Coal for shipment at Coal Port (Trenton)	185	12,246	134,923
" " " South Amboy	5,275	349,622	238,049
Coal for distribution	2,601	97,265	84,498
Coal for Company's use	1,690	41,316	32,691

The production of Bituminous Coal for the week ending July 28, was as follows:

Tons of 2,000 lb., except where otherwise designated.			
	Week.	Year.	Tons.
Cumberland Region, Md.			
Tons of 2,240 lb.	3,920	739,842	
Barclay Region, Pa.			
Barclay RR. tons of 2,240 lb.	↑	175,798	
Broad Top Region, Pa.			
Huntingdon and Broad Top RR.	1,590	74,869	
*East Broad Top	967	28,297	
Clearfield Region, Pa.			
*Snow Shoe	38	23,119	
*Tyronne and Clearfield	24,496	714,100	
Allegheny Region, Pa.			
*Pennsylvania RR.	2,501	108,555	
Pittsburg Region, Pa.			
*West Penn. RR.	3,025	103,147	
*Southwest Penn. RR.	612	22,391	
*Penn. & Westmoreland gas coal, Pa. RR.	8,537	399,733	
*Pennsylvania RR.	5,626	203,162	
*For week ending July 21.			

↑ This report was not received this week.

The Production of Coke for week ending July 21.			
	Week.	Year.	Tons.
Tons of 2,000 lb.			
West Penn. RR.	564	34,329	
Southwest Penn. RR.	10,837	336,620	
Penn. & Westmoreland Region, Penn. RR.	1,219	42,360	
Pittsburg, Penn. RR.	835	68,996	
Total	13,455	482,344	

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Aug. 2, 1877.

Anthracite.

The coal market continues in a very demoralized state. The demand since the beginning of the strikes has been very large, having varied with the reports from the mines. An advance of about 50c. per ton has been established all around where prices are named at all. Although the market is known to be very liberally stocked, and quite an accumulation of coal exists at the seaboard and at Honesdale, yet buyers have been rushing around as though they feared no more coal would be mined this year, or that they would have to pay an exorbitant advance, thereby giving the producers an undue control of prices. So soon an indications are shown of a general resumption of work prices will decline, although probably not to so low a point as they were at before the strike. Orders for a very large amount of coal have been booked at the advance, yet so soon as the decline takes place a large proportion of the orders will be cancelled on one pretext or another. Many concerns, as a matter of precaution, are not naming prices, but holding their coal to supply orders already taken.

The strike of miners is still confined almost entirely to the Wyoming region. All mining has been stopped and the mines in some cases permitted to fill with water. The strikers have burned a bridge and plane house belonging to the Pennsylvania Coal Co., but otherwise there is no destruction of property reported. In a riotous attack upon the military at Scranton several of the strikers were killed and others wounded. The Hazleton miners have very sensibly resolved not to stop work so long as those of the Schuylkill region do not, and as there is no probability of the miners of this region striking, the market may soon expect a very liberal supply of coal; for if these two regions have a demand for coal at prices that will enable the individual collieries to work, their output will be surprising. The strike among the railroad employees in the coal regions is about ended.

We have had occasion to report, previously, the efforts of interested parties in the Wyoming region of influence strikes in the Schuylkill region, by paying agitators and distributing money among the miners. Those companies whose works were the longest idle during the long strike two years ago have no doubt that funds were furnished the leaders of the strike by one or two of the other companies, that they might have the market entirely to themselves. Such contemptible actions may yield a temporary benefit, but inevitably react on those who practice them. We regret to learn that the same plan has again been tried in the present strike, though without effect. The Reading company's men are wisely inclined to make the test of the situation and take steady work at the wages now offered rather than to stop work. We understand numbers of them have volunteered to give the miners from other regions, should they attempt to disturb them, a warmer reception than they anticipate. During the strike of 1875 the miners in the employ of the Delaware and Hudson Canal Co., Delaware, Lackawanna and Western R. R. Co., and the Pennsylvania Coal Co. speedily accepted the terms of the companies, receiving steady work during the six months that the Lehigh, Schuylkill and part of the Wyoming region miners were idle and enduring much privation. This act has not been forgotten and the Lackawanna miners need not now expect much sympathy from their fellows in the Lehigh and Schuylkill regions.

According to a Philadelphia Times' reporter, Mr. John Brisbin, the attorney of the Delaware, Lackawanna and Western R. R. Co., has "expressed himself in favor of having all the coal sold by one salesman and prices fixed regularly by a committee representing the different companies. Mr. Brisbin said he would like to see anthracite sold for a moderate price that would permit the companies to pay men living wages and stock-holders a fair dividend. He thought an average of four dollars a ton, delivered on board, would admit this, and also allow of coal being sold to consumers for reasonable rates. The root of the present evil, he said, is the fact that the companies can produce more coal than there is any demand for, and some established system, call it a combination if you will, is needed to regulate prices and production. Mr. Brisbin thinks that before three months such a combination will be effected. Thomas Dickson, president of the Delaware and Hudson; Asa Packer, of the Lehigh Valley, and Mr. Lathrop, receiver of the Central Railroad, all favor it, and possibly Mr. Gowen will."

That gentlemen who ridiculed Mr. Gowen's plan but a few months ago should now not only desire to adopt it but speak of it as their own device indicates that either they are weaker, financially, than they represented, or that they have discovered Mr. Gowen's position to be a much stronger one than they supposed. The acknowledgment of the "feasibility" of the pooling scheme—the only plan indeed that has the elements of a practical economy in it—must be very gratifying to Mr. Gowen; but it is now no secret that since he proposed it his views have been modified, and the present financial position of his company enables him to make plans for its future business more in accordance with the natural advantages it possesses, and we may add more in accordance also with the fundamental principle of political economy, than is consistent with trade combinations such as that which so nearly wrecked the Reading company.

Bituminous.

Shipments have been resumed on the Pennsylvania R. R.; but now the miners have become restless and a strike is probable in the Clearfield region. The blockade on the Chesapeake and Ohio Canal still continues with indications that the boatmen are preparing to resume work at such rates as they can obtain. The miners of the Cumberland region resolved yesterday to demand an advance in wages. The Baltimore and Ohio R. R. is now open for the transportation of coal.

By the combined efforts of the strikers who have heretofore mined and carried bituminous coal they have worked an almost inestimable injury upon this trade, which will compel the mining and carrying companies to pay even lower wages than heretofore to recover but a part of the business that has been lost. The Clearfield region, although still losing ground, is ahead of the production of last year for like periods. Cumberland, however, shows a falling off of 152,110 tons. When we consider that this is a falling off from a business that was of itself smaller than for years, it should attract the attention of the miners and show them that even lower rates of wages than those paid are necessary, or at the rate at which trade is being lost the mines will, before long, have to be closed entirely.

The present competition is not now, nor is it likely to be, so much among the bituminous companies as against anthracite coal. At the present time the price of this article of fuel is higher than a few weeks ago, but when operations resume at all the mines, as they will at a very early day, the employment of their great productive capacity must steadily bring about a decline from even the present low prices. Moreover we would not be surprised to learn that a number of the principal purchasers of bituminous coals have made arrangements to use anthracite, being guaranteed a supply for a number of years at prices which will be regulated by and below those of bituminous coal in the same markets.

New York.

Wholesale Prices of Anthracite Coal f. o. b. at the Tide Water Shipping Ports per ton of 2240 lb.

Prices being merely nominal this week we omit them entirely.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.		
Per ton of 2240 lb.	At the Shipping Ports.	Along-side in New York.
Westmoreland and Penn. at Greenwich.		
Philadelphia	\$4 50	\$5 50
" " at S. Amboy.	5 00	5 50
Red Bank Cannel Pa. at Philadelphia.	8 00	8 50
Youghiogheny, Waverly Co., at Balt.	4 50	5 65
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore.	4 50	5 85
Fairmount, West Va.	4 40	5 70
Newburg Orrel, Md.	4 50	6 00
Cannelton Cannel, West Va.	.....	10 00
" Splint " at Richmond.	6 00	7 00
" Gas Coal at Richmond.	4 00	5 65
Peytona Cannel W. Va. at Richmond.	.....	10 00

Manufacturing and Steam Coals.

These are only nominal.

Foreign Gas Coals.

	Sterling.	Am. cur'cy
Newcastle, at Newcastle-on-Tyne	8/6@10/6	5 50@ 6 00
Liverpool House Orrel, at Liverpool	25/	13 00
Ince Hall Cannel	35/6	18 00
" Gas Cannel	25/6	10@10 50
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
Gold.		
Block House, at Cow Bay, N. S.	1 75	4 50
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 60	4 25
Lingan, at Lingan Bay	1 75	.....
International mines at Sydney	1 75	4 50
Pictou, Vale mines, at Pictou	2 15	4 75

Retail Prices in New York.

Table with columns: Anthracite, Bituminous, and various coal types (Pittston, Lackawanna, etc.) with prices per 2000 lbs.

Baltimore, Aug. 1, 1877.

Specially reported by Messrs. E. STABLER JR. & Co. Wholesale Prices.

Table with columns: AFLOAT BY CARGO PER TON OF 2,240 LB., Lumpy and Steamboat, Broken, Egg, etc.

Coal is retailing in Boston at \$4 for white ash stove and \$4.25 for Lackawanna do.

We quote Boston wholesale prices as follows: Anthracite, broken \$3.75 @ 3.90, do. egg \$3.75 @ 3.90, etc.

Table with columns: Buffalo, July 26, 1877. Specially reported by LEE & LOOMIS. Columns: Lump, Run of Mine, Nut, Slack.

Table with columns: Elmira, Ithaca, Syracuse, Rochester. Columns: Delivered at, Afloat, Ret. Del.

The Scranton, Wilkes-Barre, Plymouth, Shamokin, and Delaware and Hudson (Lackawanna) are offered for the present at the following prices per ton of 2,000 lb.:

Table with columns: Elmira, Ithaca, Syracuse, Rochester. Columns: Delivered at, Afloat, Ret. Del.

Cost of coal from Erie, Oswego, Sodus Point, or Charlotte for Western market, same as if shipped from Buffalo. Terms cash.

Chicago, Ill. July 24, 1877. Specially reported by Messrs. REXO & LITTLE. The following are the prices to-day for coal:

Table with columns: Lackawanna Stove, Chestnut, Grate and Egg, Erie and Brier Hill, etc.

Cincinnati, O. July 24, 1877. Specially reported by The Consolidated Coal and Mining Co.

Table with columns: AFLOAT, DELIVERED. Columns: Per ton, Per bush, etc.

Cleveland, O. July 24, 1877.

Specially reported by Messrs. LAMBIE & BATES. Per ton of 2000 lbs. f. o. b. vessels.

Table with columns: Brier Hill, Straitsville Lower Vein, Hocking Valley, etc.

The following are the prices established by the Coal Exchange until further notice:

Table with columns: RETAIL TRADE. Columns: 1 to 10 tons, etc.

Hamilton, Ont. July 23, 1877.

Specially reported by H. BARNARD. I beg to hand you state of our market corrected to date.

Table with columns: Grate, Egg, Stove, Nut, Lehigh Lump, etc.

Indianapolis, Ind. July 24, 1877.

Specially reported by Messrs. COBB & BRANHAM. Wholesale on board cars, and retail delivered to consumer.

Table with columns: White River, Brazil Block, Highland, Block coal, etc.

St. Louis, Mo. July 31, 1877.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered. Ton of 2,000 lb. Anthracite.

Table with columns: Lackawanna, Wilkes-Barre, Lehigh, etc.

Toledo, Ohio. July 31, 1877.

Specially reported by Messrs. GOSLINE & BARBOUR. We report prices of coal on cars at Toledo as follows:

Table with columns: Straitsville lump, Hocking Valley, etc.

For retail delivery in city the prices are as follows: Stove and chestnut \$5.75; grate and egg, \$5.50 per ton.

Montreal. July 23, 1877.

Specially reported by Messrs. ROBERT C. ADAMS & Co. Scotch Steam, Cape Breton Steam, etc.

Table with columns: Anthracite at retail, Egg, Stove, etc.

Milwaukee, Wis. July 23, 1877.

Specially reported by Messrs. R. P. ELMORE & Co. Retail price per ton of 2,000 lb.

Table with columns: Anthracite, egg, chestnut, and stove, Lehigh lump, etc.

New Orleans, La. July 23, 1877.

Specially reported by Messrs. C. A. MILTENBERGER & Co. PITTSBURG COAL.

Table with columns: At wholesale (by boat load), To steamboats, etc.

Pittston, Pa. Aug. 2, 1877.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb. Retail.

Table with columns: Lump, Egg and Stove, Chestnut, Pea, etc.

Richmond, Va. July 30, 1877.

Specially reported by S. H. HAWES, Dealer in Coal. Per ton of 2,240 lb., f. o. b.

Table with columns: Kanawha Cannel, Coalburg Splint, Lewiston, Kanawha Gas Coal, etc.

Sandusky, O. July 31, 1877.

Specially reported by C. E. BLACK, Agt. Con. Coal & Mg. Co. We quote coal on cars at Sandusky, as follows:

Per ton of 2,000 lbs. Anthracite.

Table with columns: Grate, Egg, Stove, Chestnut, Wilkes-Barre, etc.

Prices f. o. b. vessel for soft coal, 15c. advance on car prices. Prices retailed delivered 50c. above car prices.

San Francisco, Cal. From the Commercial Herald of July 26, 1877.

COAL—Imports from January 1 to July 1:

Table with columns: Anthracite, Australian, Coos Bay, Cumberland, English, Chili, Mt. Diablo, etc.

The market for foreign continues sluggish with no special inquiry for any description. The agents of Nanaimo mines, Seattle and other coast companies are very diligent in placing their entire receipts promptly upon arrival at current low prices.

St. Louis, Mo. July 31, 1877.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered. Ton of 2,000 lb. Anthracite.

Table with columns: Lackawanna, Wilkes-Barre, Lehigh, etc.

Toledo, Ohio. July 31, 1877.

Specially reported by Messrs. GOSLINE & BARBOUR. We report prices of coal on cars at Toledo as follows:

Table with columns: Straitsville lump, Hocking Valley, etc.

For retail delivery in city the prices are as follows: Stove and chestnut \$5.75; grate and egg, \$5.50 per ton.

Rates of Transportation on Anthracite Coal.

Table with columns: From Buffalo to Chicago, From Cleveland to Chicago, etc.

For freights on Pennsylvania & New York Railroad we refer to our issue of July 14. For freights on coal at Genesee, Ithaca and Sayre Railroad we refer to our issue of July 14.

For freights on anthracite coal from Newbury and Roundout we refer to our issue of July 21.

For rates of transportation on coal via the Erie Canal we refer to our issue of July 21.

For freights on Anthracite Coal to Tide Water Ports we refer to our issue of July 28.

For freights on Schuylkill Coal we refer to our issue of July 28.

For freights on Lehigh and Wyoming Coal we refer to our issue of July 28.

Freights

Representing the latest actual charters up to August 2. Per ton of 2240 lb.

Table with 4 columns: Ports, From Philadelphia, From Baltimore, From Georgetown. Lists various ports and their corresponding freight rates.

* And discharging and towing. † And discharging. ‡ And towing. § 3c per bridge extra.

Rates of Toll

For the above we refer to our issue of July 21.

Towing.

Rates of Towing from New York to places on the Hudson River Boats of 200 tons capacity and upwards. Per ton of 2,240 lb.

Table listing towing rates for various locations like Manhattanville, Yonkers & Spuyten Duyvel, etc.

Special Rates will be made for Saugerties and Catskill. East River and Sound Ports, from the foot of Twenty-third Street to the following points, and return, per ton of 2,240 lb.

Table listing special rates for East River and Sound Ports to various locations like New Haven and Bridgeport.

Rates to the following places and return per boat: 61st Street, E. R., 79th Street, etc.

Rates via the Hudson River are furnished to us by A. B. VALENTINE, No. 41 Jay street. Rates via the East River are furnished by the Eastern Transportation Line.

Freights on Bituminous Coals from the Mines to Tide Water Shipping Ports.

From the Mines to Piedmont, Cumberland or State Lane, etc. per ton of 2,240 lb. per mile on distances less than 4 miles, and 3 cents per ton per mile on distances over 4 miles, and 2 cents per ton per mile on distances over 100 miles.

From Piedmont to Baltimore (206 miles), \$1.85 per ton of 2,240 lb., or \$1.65 per net ton.

From Cumberland to Baltimore (178 miles), \$1.54 per ton of 2,240 lb., or \$1.37 per net ton (1/2 cent. per ton per mile for use of hoppers over C. & P. RR.).

From Cumberland to Georgetown (152 miles) by canal, 70c. @ 90c. Tolls 45c.

From Oceola to Greenwich, Phila. (say 243 miles, per T. & C. RR. per ton bituminous coal of 2,000 lb., less drawback, \$1.90 @ \$2.15.

From Oceola to South Amboy, N.J. (317 miles), per 2,000 lb., \$4.03, less drawback, \$1.28; net rate per ton of 2,000 lb., \$2.75; net rate per ton of 2,240 lb., \$3.08; transshipment charges 20 cents additional.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Aug. 3, 1877.

American Pig.—Many of the furnaces, Lehigh in particular, have, as a matter of precaution, taken their iron out of the market. There appears, nevertheless, to be quite sufficient to supply all the requirements, and such business as has been done has been at prices showing no particular advance over those ruling two weeks ago. Buyers are confronted with the prospect of a scarcity of coal, to be caused by the strike among the miners, and makers' fears that they will have to blow out furnaces. But as consumers' wants are very limited, and the market is entirely rid of any speculative element, these arguments do not cause a general rush for iron. We continue to quote No. 1 foundry at \$18@19; No. 2, \$17@18; and forge, \$16@17. Some of the Lehigh collieries started to work today, but others did not, so there is still an uncertainty about the supply of coal.

Scotch Pig.—The business doing continues in a very small way. Prices in Glasgow are firmer, but this market has not sympathized. We quote Eglinton at \$23.50@24; Glenarneck, \$25; and Coltness \$26@26.50.

Rails.—Some business in steel is reported at very low figures, the particulars being withheld for the present. We quote iron rails at mills at \$33@36; and steel at \$42@45.

Old Rails.—These are without business, and reported firm at \$19.

Scrap.—We note a sale of 150 tons of No. 1 wrought at \$23.

Baltimore, Md. July 30, 1877.

Specially reported by Messrs. R. C. HOFFMAN & Co. No transactions in iron during past week, owing to strikes, riots, etc. They being now put down, we look for resumption of the ordinary trade at about quotations.

Table listing iron prices in Baltimore: Baltimore Charcoal, Virginia Charcoal, Anthracite No. 1, etc.

Boston. July 28, 1877.

Pig has been utterly stagnant, awaiting the development of the strikes. Should they be prolonged, furnaces in the anthracite region, when the coal mines have stopped, will undoubtedly blow out right and left.

We quote \$22@23 for No. 1, \$21@21.50 for No. 2, and \$20.50@21.50 for gray forge. Scotch pig is dull at \$24@25 for store lots.

Bar is dull, quoting \$46@47 for refined, and \$37@38 for common. Nails are in light demand at unchanged prices. Sheet is selling at 3c. @ 3 3/4 c. per pound. Russia is quiet at 12c. currency. We quote English spring steel 7@8c. gold; 9@11c. for German; 9@11c. for machinery; 14@15c. for cast; 10@12c. for blister; 8c. for American spring; 13 1/2 @ 14c. for cast; 9c. for blister; and 8c. for machinery.—Commercial Bulletin.

Chattanooga, Tenn., July 30, 1877.

Specially reported by J. F. JAMES, dealer in pig iron, ores, etc. The market here remains dull and unchanged.

Table listing iron prices in Chattanooga: Tenn., Ala. and Ga. Charcoal, Tenn., Ala. and Ga. Charcoal, Gray Forge, etc.

Iron Ores.

Red Hematite (about 55 per cent. metallic iron) 1 25 f. o. c. at mines. Brown Hematite (about 55 per cent. metallic iron) 1 75

Cincinnati, O. July 31, 1877.

Specially reported by Messrs. TRABER & AUBERTY, commission merchants for the sale of pig iron, blooms, ore, etc.

Below we hand the closing quotations of our pig iron market.

Table listing charcoal prices: Hanging Rock A1 Extra, No. 1 Foundry, No. 2, Soft Silver Gray, Mill, Tennessee, No. 1 Foundry, Mill.

Table listing stone coal prices: Ohio, No. 1 Foundry, Silvery, Mill.

Table listing coke prices: Ohio & W. Va. No. 1 Foundry, Mill.

Table listing car-wheel prices: Hanging Rock, C. B. Car Wheel, Tennessee, Missouri, Alabama.

Table listing blooms prices: Charcoal, Scrap Iron.

Table listing cast and wrought iron prices: Cast, Wrought.

Cleveland, O. July 28, 1877.

Specially reported by Messrs. C. E. BINGHAM & Co. Per gross ton, on four months' time. Subject to change in market. Discount for cash 1 per cent.

Table listing foundry iron prices: No. 1, L. S. Charcoal, No. 2, Anthracite, No. 1, Bituminous, etc.

Table listing car wheel and malleable iron prices: No. 3 L. S. Charcoal, No. 4.

Table listing Bessemer iron prices: Nos. 1 & 2, L. S. Char.

Table listing forge iron prices: No. 1, Gray.

Louisville, Ky. July 31, 1877.

Specially reported by Messrs. GEORGE H. HULL & Co. No noticeable change in the market. Prices still on the down grade. The events of the past week have had a tendency to make prices still more unsettled. The usual time, 4 months, allowed on quotations below.

Table listing foundry irons prices: No. 1 Hanging Rock, Charcoal, No. 2 Southern Charcoal, etc.

Table listing mill iron prices: No. 1 Charcoal, Cold-short and Neutral, No. 1 Stonecoal and Coke, etc.

Table listing car-wheel and malleable iron prices: Hanging Rock, and Cold Blast, Alabama and Georgia, Kentucky Cold-blast.

Milwaukee, Wis. July 31, 1877.

Specially reported by Messrs. R. P. ELMORE & Co. Wholesale Price. Charcoal Iron.

Table listing lake superior iron prices: No. 1 Lake Superior per gross ton, No. 2.

Table listing anthracite iron prices: No. 1 anthracite per gross ton, No. 2.

Table listing stone coal & coke prices: Warner's Am. Sc'th (Bk. Bend) per ton, Soft Silvery per ton, etc.

Philadelphia, Pa.

[Weekly Report of the Philadelphia Iron Market, furnished by THE ENGINEERING AND MINING JOURNAL, by JUSTICE COX, JR., & Co., Iron Merchants, 333 Walnut Street, Philadelphia, Week ending July 26, 1877.]

PIG IRON.—The feeling is better than at our last; a few sales have been made, and the inquiry much greater than for a month. The strike still affects some furnaces, making their supply of coal short, but as yet we have not heard of any blow-out. We report the market a little firmer, and quote No. 1 \$18.50 to \$19.50; No. 2, \$17.50 to \$18; Gray Forge, \$16.50 to \$17.50.

MANUFACTURED IRON.—The feeling in all branches of manufactured iron is feverish; consumers are afraid to take hold and producers are fearful of taking large contracts, as they cannot tell what a day will bring forth. They may not get coal, or their men may stop at any moment. We quote: Bars, 2 to 2.1c. per lb.; Plate and Tank Iron, 2 1/2 to 6 1/2 c. per lb; Skelp, 2.15 to 2 1/2 c. per lb.

RAILS.—The demand for Rails continues exceedingly light. Most steel mills have about as much as they can do for some time, so they are not anxious seekers for orders. With the iron rail mills it is different; they have few orders to boast of. We quote: Steel, \$45 to \$50; iron, \$33 to \$36; all at mill.

OLD RAILS continue to sell in a moderate way—nothing large being quoted at this time. We quote \$19 to \$20.

COAL TRANSPORTATION AND GENERAL MINING STOCKS.

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, Rate per Ann., Fr. ct.), Highest and Lowest Quo. per Share in Currency (July 28, July 20, July 31, Aug. 1, Aug. 1, Aug. 3), Sales. Rows include Coal Stocks (e.g., Consol. Coal, Del. & H. Canal) and General Mining Stocks (e.g., Alpha Cons. g. s., Am. Flag. g.).

g. Gold. s. Silver. l. Lead. c. Copper. ** Non-Assessable. Total Assessments levied to date. \$45,242,590 Total Sales of Coal Stocks for the week. 293,25 share Total Mining Dividends disbursed to date. 120,257,900 Total Sales of Mining Shares for the week. 52,965

standard of 40 per cent. Lead, each unit above 40 per cent. 50 cents per unit added. And 75 cts. per unit over 50 per cent. Ores containing Zinc.—For each unit of Zinc above 5 per cent., deduct the value of 1 oz. of Silver. Silver Ores containing little or no Lead.—Ores with a Lime or ferruginous gangue subject to higher rates. Copper, Antimony, Zinc and Iron Pyrites objectionable in all the above ores.

FINANCIAL.

New York Stocks.

NEW YORK, Friday evening, Aug. 3, 1877. A liberal business has been transacted in the coal stocks. The market having been in the hands of large and apparently strong speculators, has been considerably advanced in the face of information which should have had quite the opposite effect. Many in-

vestment holders who have been awaiting for a liberal advance with the view of then unloading, will probably not find a better opportunity than now, if ever. The transactions in Delaware, Lackawanna and Western Railroad have aggregated 132,525 shares at from 40 3/4 @ 45 3/4, closing at 42 3/4. The range of Delaware and Hudson Canal has been much greater, having been from 38 3/4 @ 47, closing at 41 3/4. The sales aggregate 21,849 shares. Central Railroad of New Jersey has

ranged from 12 to 10 1/2, closing at the latter figure, with sales for the week amounting to 7,350 shares.

COUPONS AND INTEREST on the bonds of the following companies fall due during the present month: Central Railroad of New Jersey—Coupons. Consolidation Coal Company—Coupons. Cumberland Coal and Iron Company—Coupons paid by Consolidation Coal Company. Joliet Iron and Steel Company—Coupons. Milwaukee Iron Company—Coupons are due. Morris & Essex Railroad Company—2d mortgage and construction bonds; coupons paid by D., L. & W. R. R. Co.

New Jersey United Railroad Companies—Coupons. Oswego & Syracuse Railroad Company—Interest on stock paid by D., L. & W. R. R. Co. Oswego & Rome Railroad Company—Coupons. Pennsylvania Coal Company—1st mortgage 7 per cent. registered bonds; interest. Vulcan Iron Works—Coupons. Wheeling Iron and Nail Works—Coupons.

Copper Stocks.

Reported by Wilson W. Fay & Co., Bankers and Brokers Room 7, Traveler Building, 31 State Street.

BOSTON, THURSDAY EVENING, Aug. 2, 1877.

The market on Coppers remains dull, as they seem to be neglected for other lines of stocks. Nevertheless, the transactions have been about as heavy as they have been for the last three or four weeks, and if in-got copper would bring a better price it would make the market more active, and probably advance the price of some of the stocks.

Calumet and Hecla has rallied again, and bids fair to return to its price before the dividend, 166 1/2 being bid, and no stock offering at present less than 160. Copper Falls remains firm at \$3.25 bid and \$3.50 asked—this being a slight decline, but the stock looks rather strong than weak.

Franklin is quiet at \$4.50 to \$5.00. National is firm at 40c. bid and 50c. asked. In Quincy there has been no perceptible change and very light transactions, it closing at 33 1/2 bid and 33 1/2 asked. In the small coppers there is no change, there being no desire to buy or sell.

Duncan Silver took an upward turn during the week, and sold as high as \$3.00, but it fell back again to-day, there being large sales at 2 1/2 and 2 3/4, the stock closing at 2 1/2 bid, 2 3/4 asked.

International is just as it was last week, and looks steady at 30 to 32.

Miscellaneous Sales and Quotations.

Sales and quotations of the stocks and bonds dealt in here and at Philadelphia for the week ending the 3d inst. are given in the following tables. The Philadelphia quotations will have a * affixed.

STOCKS.

Table with columns: QUOTATIONS, High-est, Low-est, Clos-ing, Sales Shares. Rows include American Coal Co., Cambria Iron Co., Pennsylvania Salt Manfg Co., Westmoreland Coal Co., Buck Mountain Coal Co., Schuylkill Nav. Co., St. Louis, I. M. & S. RR. Co., Spring Mountain Coal Co.

BONDS.

Table with columns: QUOTATIONS, High-est, Low-est, Clos-ing, Sales Shares. Rows include D. L. & W. 78, CORAT., 1892; N. J. C., 1st mtge., new; L. & W. B. Coal Co., cons.; Am. Dock & Imp. 78; D. & H. C. Co., 1st mt., 1884; St. L. I. M. & S., 1st mt., 1892; L. V. RR., con. m. 68, 1893; P. RR., 1st mtge., 1880; Gen. mtge. reg., 1910; Con. m. 68, con., 1905; gen. M. Coup., 1910; New Loan 58; P. & R. RR., 78; con. m. 78, con., 1911; Deb. 68; Con. mtge. 78, 1893; 68, 1843-85; P. & R. C. & I. Co. Deb. 78; P. & R. C. & I. Co.; L. C. & N. Co. 68; RR. loan 1897; Con. mtge. 78; Cvt. gold, 1894; Gold Loan, 1897; Schuylkill Nav., 68; Pa. and N. Y. Canal, 78; Pa. Canal Co.; Susquehanna Coal Co. 68.

Total transactions for the week. \$367,500

†Ex-Interest, 1,000 shares. *Brady Coal Co. Tract.

Philadelphia Stocks.

PHILADELPHIA, FRIDAY EVENING, Aug. 3, 1877.

Outside of the dealings in Pennsylvania Railroad the business in the coal stocks in this city has been small.

This stock opened at 29 1/2, but upon intimation that the August dividend would be passed it began to decline, and after the official announcement was made reached 25, recovering to-day to 26. The total of transactions in this stock for the week has been 118,753 shares. The range of prices in the other stocks dealt in on this board has been quite unimportant except in Lehigh Valley, which shows a decline of \$2 per share from the opening price.

The Philadelphia Ledger says: "The Reading Railroad Company, as we announced two or three days ago, is actively paying up the wages of its employees, which were allowed to fall somewhat in arrear during President Gowen's necessary absence in Europe on the business of the company. The public, and, indeed, the creditors and owners of this company, are quite unaware of the very large amounts of money paid by it in the past two months in wages, interest and rentals, including like items for account of the Coal and Iron Company for the same time. The wages of May, payable in June on both accounts, amounted to \$737,348, and the wages of June, payable in July, of both companies, amounting to \$696,296, have also been paid, so far as relates to the Coal and Iron Company. The interest of both companies payable in June and July, amounting to \$1,909,473, has been fully met. The rentals of the two companies for the same two months were \$725,433, and have been paid. Of the aggregate of these payments, amounting to \$4,068,550, all has been paid excepting the wages payable in July to the employees of the Reading Railroad Company, amounting to only \$423,296, the payment of which will be commenced with the incoming month and be steadily continued until all are paid. Of the aggregate payments actually made, \$3,645,254, scrip was used to the extent of \$860,221, the net amount of money payments for the three items in two months being \$2,785,033. A gratifying fact in this connection, as showing the wonderful resources of the company, is that the floating debt is now \$100,000 less than on the 1st of June. Quite encouraging for the Reading.

The Cayuga Railroad was sold by the trustees on July 26, at auction, to satisfy the first lien thereon, to George C. Morris, of Philadelphia, for \$20,000. It will be reorganized and connected with the Central at Port Byron.

COUPONS AND INTEREST on the bonds of the following company's fall due during the present month: Belvidere and Delaware Railroad Company—Coupons paid by Pennsylvania Railroad Company. Catawissa Railroad Company—Chattel and New mortgages; coupons.

ADVERTISERS' INDEX.

Table listing various categories of advertisers such as Air Compressors, Assaying Tools and Chemicals, Attorneys and Counselors, Auction Sales, Bankers and Brokers, Blasting Powder, Blowers, Books and Periodicals, Cement, Coal, Fire Brick, Gas Process, Hoisting Machinery, Hot Blast Stoves, Hotels, Hydraulic Jacks and Punches, Injectors, Locomotives, Metal Brokers, Mining Tools and Goods, Machinery Tools and Machinery, Mineral Wool, Mining, Crushing, Stamping, and Smelting Machinery, Power Hammers, Railroads and Transportation, Refrigerators, Roofs, Girders, etc., and Rock Drills. Each entry includes the name of the advertiser and a page number.

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Delaware and Raritan Canal Company—Coupons. **Huntingdon and Broad Top Mountain Railroad Company**—2 mortgage, gold; coupons, also script interest.

Lehigh Coal and Navigation Company—Registered loan, 1897, and Greenwood bonds 1892; interest.

Morris Canal and Banking Company—Dividend on preferred and common stock paid by Lehigh Valley Railroad Company.

New Jersey Railroad and Transportation Company—Loan of 1878; interest paid by Pennsylvania Railroad Company.

Camden and Burlington Railroad Company—Coupons paid by Pennsylvania Railroad Company.

United Companies of New Jersey—Loan of 1883; interest paid by Pennsylvania Railroad Company.

Perth Amboy and Woodbridge Railroad Company—Interest on bonds paid by Pennsylvania Railroad Company.

Reading Coal and Iron Company—mortgage 75 coupons.

Pittsburgh, Cincinnati and St. Louis—75 coupons.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Aug. 3, 1877.

The transactions on the New York Mining Stock Exchange show even a less business for the week under review than for the previous one, which is very unsatisfactory to those making efforts to create an interest in mining investments. However, hope is expressed that a better state of affairs will exist with the opening of fall. Moose has again been the leading feature, with sales aggregating 18,670 shares out of a total of 52,995 shares for the whole list. The range of this stock has been from 4 1/2 to 4 3/4, closing at 4 1/4. 10,400 shares of LaCrosse were sold at from 34c. to 39c., and 5,000 shares of American Flag at 10c. @ 11c. 200 shares of Seaton were sold under the rule at 75c. & 87 1/2 c. The transactions in Bobtail Gold Mine aggregated 4,900 shares, 1.45 @ 1.55. In addition to the sales reported in our general table, 100 shares of Atlantic Copper were sold at 6 1/2, and 500 shares of Smith & Parmlee at 12c.

Savage.—The annual meeting of this company was held on the 26th ult. The secretary showed that the whole receipts for the year had been \$669,184.36, of which \$448,298 had come from assessments, and \$180,880 borrowed money. The disbursements had been \$668,000, viz: for mine labor, \$213,924; fuel, \$118,000; supplies, \$130,000; Combination shaft, \$100,000; minor expenses making up the balance. There is about \$1,000 on hand, and the company is in debt \$180,000. This mine is now owned by Flood & O'Brien.

Consolidated Virginia Mining Company.—From the balance sheet of this company for the first six months of this year, we glean that the receipts from gross product were \$5,143,718.19; ore sales, \$58,657.28; bullion samples, \$743.58; assaying, \$31,857.56; hoisting, \$12,365.79. Among disbursements we notice dividends, \$3,240,000; general expenses, \$1,772,080.50. There was bullion unsold, \$2,031,070.01, and an overdraft on the Nevada Bank of \$1,768,201.04.

California Mine.—The gross product of this mine for the first six months of this year was \$9,623,741.57. The dividends paid for the same period were \$7,560,000 and general disbursement \$2,085,508.76. The bullion on hand June 30 amounted to \$858,551.12, while there was an overdraft at the Nevada Bank of \$541,562.87.

INCORPORATIONS.

We note the recent organization of the following companies, in addition to the announcements in our issue of June 30:

Name of Company.	Location.	Cap.	Stock.
Fresno Gold Mining Co.	California	\$5,000,000	
Wildman Mining Co.	"	6,500,000	
Woodland Mining Co.	"	6,000,000	
Mass. Con. Yuba River & M. Co.	"	10,000,000	
Berbee Blue Gravel Mining Co.	"	10,000,000	
Newton Hydraulic D. & M. Co.	"	10,000,000	
Oroville Gravel Mining Co.	"	6,000,000	
Bulwer Mining Co.	"	6,000,000	
Dardanelles Con. Gravel M. Co.	"	3,000,000	
Green Mountain Gold M. Co.	"	2,500,000	
Quartz Mountain Gold M. Co.	"	1,200,000	
Monarch Gravel Mining Co.	"	1,000,000	
Compromise Gravel M. Co.	"	100,000	
Merced Mining Co.	"	100,000	
Santa Rita M. & Smelting Co.	"	3,000,000	
Home Mutual Mining Co.	Nevada,	50,000	
St. George Con. Mining Co.	"	500,000	
Silver Prize G. & S. M. Co.	"	10,000,000	
Sapphire G. & S. Mining Co.	"	10,000,000	
Potosi Silver Mining Co.	Colorado.	600,000	
Crown Prince Tunnel Co.	"	500,000	
Blue Bird Mill & Mining Co.	Arizona	10,000,000	
Silver King North M. Co.	"	10,000,000	
Sandy Run Coal Co.	Penn.	.....
Eissler Mining Co.	Idaho.	100,000	

Gas Stocks.

NEW YORK, FRIDAY EVENING, August 3, 1877.

The market for gas stocks is dull. New York Mutual has advanced from 90 to 95 bid, and Manhattan from 195 to 198 bid.

The Law Committee reported that the bond of the Mutual (New York) Gas Light Company was worthless on the ground that it was insufficient to afford the city a cheaper gas or to protect the streets. The report also set forth that two of the sureties were non-residents, and that the terms of the company's bonds obliged them to spend only \$400,000 in 12 years, as against \$9,000,000 capital invested by gas companies already in existence. It was also charged in the report that the policy of the new company was to supply compact portions of the city with gas,

leaving outlying portions unsupplied. The report was ordered to be printed on the minutes. Alderman Fisher gave notice that at the next meeting, which will take place in September, he would bring in a minority report.

Washington Gas Company.—The semi-annual dividend period of this Company will occur during the present month.

Peoples (Albany) Gas Light Company.—The coupons on the bonds of this Company will be paid upon presentation.

Charleston (Mass.) Gas Company has declared a dividend of 5 per cent., payable on demand.

Dorchester (Mass.) Gas Company.—This company paid a dividend of 2 1/2 per cent. Aug. 1.

Jamaica Plain (Mass.) Gas Company has declared a dividend of 4 per cent.

Lawrence (Mass.) Gas Company.—This company has declared its semi-annual dividend of 5 per cent.

South Boston (Mass.) Gas Company.—This company declared a dividend of 3 1/2 per cent., payable Aug. 1.

Brockton (Mass.) Gas Company has declared a dividend of 3 per cent.

National Gas Company (Philadelphia, Pa.)—Interest on the endorsed bonds of this company fell due Aug. 1.

Malden & Melrose (Mass.) Gas Company.—The dividend period of this company occurs during the present month.

Montreal (Canada) Gas Company.—We note recent sales of 100 shares of the stock of this company from \$1.46 1/2 to \$1.47.

Bath (Mass.) Gas Company.—We note a recent auction sale of 3 shares of the stock of this company at \$90.

South Boston (Mass.) Gas Company.—We note a recent auction sale of 10 shares of the stock of this company at \$117, ex-dividend.

Newton and Watertown (Mass.) Gas Company has declared a dividend of 5 per cent.

FIRE BRICK

B. KREISCHER AND SON,
Foot of Houston St., East River,
NEW YORK.

Blocks, Slabs, and Clay Retorts.

Branch Works at Kriescherville, Staten Island.

ESTABLISHED 1845.

CHAS. D. COLSON,

108 & 110 Franklin Street,

CHICAGO, ILL.

FIRE BRICK

"Savage," "Jersey," "Laclede," "Scioto," "W. Va.," etc., etc., for Blast Furnaces, Rolling Mills, Steel Works, Smelting and Refining Works, Zinc Works, Lime and Cement Kilns, etc.

Blacklead Crucibles, Retorts, &c.; Hydraulic Cements.

Gas Retorts and Settings.

Special shapes of Fire Brick, for any purpose, made to order from patterns or drawings.

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Information respecting stocks and mining properties, cheerfully given upon application.

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ARE CONSTANT PURCHASERS OF

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And Matte, Regulus and other Furnace Material. Also Ores bearing Copper and Silver, in any quantities, and at full market rates.

OFFICE: 57 SOUTH GAY ST.,

BALTIMORE, MD.

Works. Canton.

VALUABLE MINING PROPERTY FOR SALE.

In the matter of the West Canada Mining Company, Limited (in liquidation).

The Liquidator invites tenders for the purchase of the property of the above Company, as situated in the District of Algoma, Province of Ontario, in the Dominion of Canada. The property consists of:

1. The freehold of the Bruce Location, measuring 6,400 acres, and comprising the Bruce and Wellington Mines.
2. All the right of the said Company in the unexpired term of a lease of the Huron Copper Bay Mine, for a term of 15 years from the 1st day of May, 1874.
3. The buildings belonging to the said Company at the said Mines and locations, comprising Engine and Boiler Houses, Jigging and Dressing Houses and Sheds, Furnace Houses and Stacks, two agents' and clerks' offices, Blacksmiths' and Carpenters' Shops, Storehouse, and a number of good dwelling houses and ordinary cottages. Also a Wharf at the Wellington Mine, about 1,150 feet in length, and Warehouse, affording every convenience for the loading of ships.
4. All the Machinery and Stores belonging to the said Company, consisting of Hoisting and Pumping Engines, Crushing and Jigging Machinery, Calcining Furnaces, Iron, Timber, Tools, etc.

The property mentioned in clauses 3 and 4 is subject so far as regards any portions of it which are situated on the Huron Copper Bay Location, to the option reserved to the Lessors, on the termination of the said Lease, of taking to any portion of the Machinery and Buildings at a valuation.

The Wellington and Copper Bay Mines have been worked for several years by the above named Company, and large quantities of copper ores—yellow sulphides occurring in quartz—have been produced, yielding, when dressed, from 18 to 23 per cent. in copper.

It is believed that with a moderate outlay of capital, the necessary works could be carried out for putting the mines again into a condition for producing large returns of ore, and for this purpose the Machinery and works already existing could be easily made available.

Tenders should be addressed to the Liquidator, JOSEPH GEORGE, Esq., No. 6 Queen Street Place, London; and will be received by him up to the 15th day of September next.

The Mines and properties may be viewed on application to the Agent in charge, Mr. G. H. PLUMMER, Wellington Mine, Lake Huron, Canada West; and further information may be obtained of the Liquidator in London, or of G. G. Francis, Esq., Montreal, Canada. LONDON, June 26, 1877.

George Tritch,

Wholesale and Retail Dealer in

SHELF HARDWARE,

Iron, Nails, Steel, Horse Shoes,

Fence Wire, Pumps, Agricultural Implements, Shingle Mills Engines, Saw Mills, Circular Saws, Hose and Belting, Railroad Supplies, Stoves, Etc., Etc.

Wire Rope, Scales, Hoisting Barrels and Ore Cars with Trucks, all kinds of Steam Engine Brass Goods, Gas Pipe, Etc., Etc., at Lowest Market Price.

Corner Wazee and Fifteenth Streets.

Denver, - - - - - Colorado.

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METAL BROKER,

No. 36 Fulton Street, NEW YORK.

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INGOT COPPER, TIN PLATES, PIG TIN, SPELTER, PIG

LEAD, ANTIMONY, PIG IRON, SOLDER, SHEET

ZINC, SHEATHING COPPER, COPPER BOT-

TOMS, SHEET IRON, WIRE, &c.

Special attention given to Lake Superior Copper interests.

ZERO REFRIGERATOR,

WITH
Water, Wine and Milk Cooler.

The Best Food Keeper in the World.

Nursery Coolers for the Sick Room, Polaris, Saratoga, Newport, Spa.

Important to Housekeepers.

The Zero Refrigerator was Awarded the Highest Premium by the Centennial Exhibition.

REPORT: 1st. Beauty of design and excellence of workmanship. 2d. Absence of all communication between the ice and provision chambers. 3d. Absence of moisture on the inside lining. 4th. Impossibility of contact of hot air with the ice. 5th. The condensation of moisture on the cold surface of the ice box. 6th. Economy of ice and uniformity of temperature. 7th. The filling with cork.

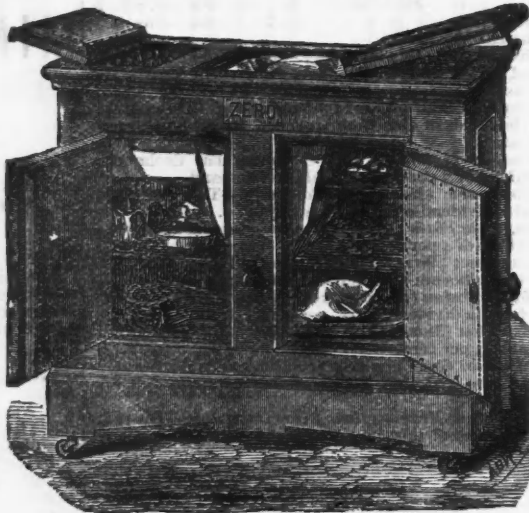
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Gas Works, Smelting Works and Machinery.

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For making Illuminating Gas from ordinary Gas Coals, enriched with Cannel or Oil.

Also, Mackenzie's Process for making Heating Gas for Smelting, Melting, Puddling, Forges, Boilers, etc.

Also, P. W. Mackenzie's New Engine and Boiler.

For Jigs, Sizers, Ore Washers, Rockers, Concentrators, Stamp Batteries, Revolving Screens, Separators, Riffle Boxes, Maltkilns, Grain Driers, Drive Wells, Pump Filters, and Riddles, in Iron, Steel, Copper, Brass, Zinc, and other Metals.



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Gold and Silver Quartz, Raw Bones, Phosphate Rock, Plaster, Dye Woods, Minerals, Shells, and all other hard and tough substances.

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The only line for Central, Idaho Springs, Georgetown, Boulder, Longmont, Golden, and the famous resorts and Parks of Colorado. Trains leave depot, foot of 16th Street, Denver, at 8.30 A. M., and at 4.00 and 6.00 P. M.

O. H. HENRY, Supt., Golden. W. G. BROWN, Gen. Freight & Passenger Agent.

NOTE—The 4.00 P. M. train runs daily, except Sunday.

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For Colorado Springs, Manitou, Pueblo, and Canon City. Connecting at Colorado Springs with stages for Pueblo and vicinity; at Pueblo with the Atchison, Topeka and Santa Fe Railway, for all points East. This forms the new and picturesque 1900 Line from Denver to the Missouri River; at El Moro—southern terminus—with stages for Cimarron, Las Vegas, Santa Fe, etc.; at La Veta for Saguache, Del Norte, and the famous Gold and Silver Mines in San Juan District.

For further information apply to Ticket Agent, City Office, 249 16th Street, Denver.

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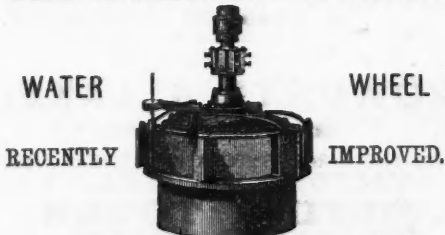
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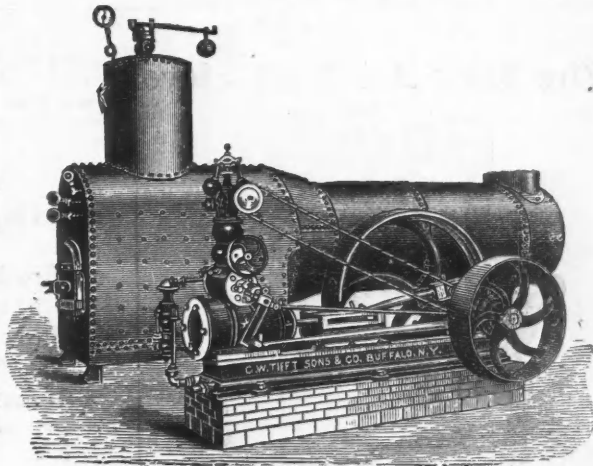
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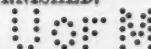
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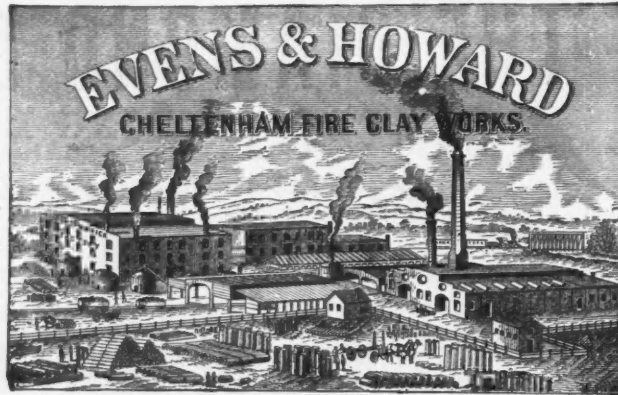
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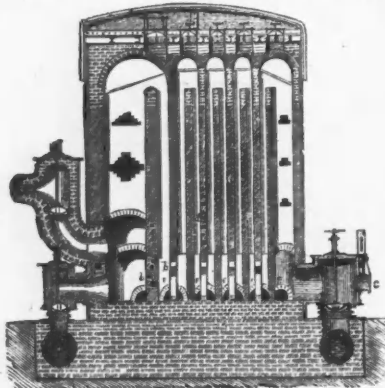
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