THE ENGINEERING AND MINING JOURNAL.

RICHARD P. ROTHWELL, C. E., M. E.
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NOTE.—Communications relative to the editorial management should be addressed to Mr ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

CONTENTS.

ANNUAL TRADE REVIEW.

THE next number of this Journal, which will then enter upon its twenty-third volume, will contain our annual Trade Reviews. No labor or expense is spared in making these reviews the most complete and reliable analyses of the events which have marked the course of the great industries this Journal represents. The causes which gave birth to these events are discussed, and through the knowledge of the past and the present we endeavor to forecast the events of the future. The reviews will embody the experience, the knowledge, and the thought of the most able minds in each special industry, and can be relied upon as representing the exact condition of affairs, whether good or ill, as we see them. Unfortunately, we have been called upon during the past few years to announce many disagreeable facts and to make unpopular predictions. The task has been still more unwelcome to ourselves than our words could be to those whom we addressed, but we can refer to subsequent events recorded in our columns for the full confirmation of the accuracy of our views.

Our Coal Trade Review, which last year won golden praise from all sides, and especially from the best informed and most experienced gentlemen in the trade, and which was translated into several foreign languages, will this year be still more elaborate and valuable. The history and course of the late coal combination will be reviewed, and the events which have occurred in this most critical period in the history of this industry are fully analysed. In addition to this, our review will contain the first and only statement of the total *production of anthracite in Pennsylvania* since its first mine was opened in 1768. This return will give the total production year by year from 1820 to the present time. No tables ever before published gave more than the "shipments to tide-water" from 1820 to 1863, and the total production from 1864 to 1875.

We shall also give the only full and accurate statement which has ever been made of the *total production of coal in the United States*. This return will give the production by States for 1875, 1874, and the Census report for 1870, and will embody in a brief table the results of several years' persevering work. It will in fact be the only report of the production of the whole country that has ever been attempted, if we except the very defective Census report above referred to.

THE METRIC SYSTEM.

THE attempt to introduce into this country the use of the metric system of weights and measures makes, it must be confessed, but slow progress. On the field of argument there is no doubt that its advocates have won a complete victory. The superior convenience in calculation, and the great advantage of uniformity with other nations, are considerations which have been repeatedly demonstrated to be valid. The objections urged against them are either based on ignorance or trifling in importance.

It is true that the meter, the fundamental unit of the metric system, is not, as it was intended to be, an exact subdivision of a meridional arc of the earth's surface. More accurate measurements have shown that the surveys upon which it was based involved an error; and, moreover, it is now admitted that that the shape of the earth is irregular, so that different meridians differ in length from the equator to the pole. But this feature of the metric system was never more than a fancy. It is not really important that the unit of measurement shall be an exact divisor of any geographical or astronomical constant. Professor PIAZZI SMYTH, with his (slightly modified) English inch, deduced from the dimensions of the Great Pyramid and found to be a divisor of the earth's polar diameter, is quite as unpractical as were, in this respect, the authors of the metric system. But the latter, built up, upon the basis they assumed, a complete, consistent, decimal system; and the political influence of France, reinforcing the natural advantages of this reform, has spread that system round the world. Books of science everywhere employ it; and in all the nations of Continental Europe it is understood and used by the common people. Only the proverbial conservatism of the Anglo-Saxon race resists the change.

We have two societies in this country engaged in advocating the employment of metric weights and measures—the Metric Bureau and the Metrological Society. We presume that these two will operate in harmony, or else coalesce entirely. Certainly there should be no division among the friends of such a movement. The work before them is slow enough and difficult enough to require all the patience and perseverance which they can command.

Meanwhile, all that can be done is to "keep pegging away." Scientific writers and professional men should accustom themselves to use the metric nomenclature wherever it is possible. It is not always practicable in a journal like ours, which publishes reports and articles from all quarters, and is often forced to follow local or trade customs. But we shall do what we can; and at all events we shall not conceal our strong desire for a reform which, once inaugurated, would save us and all other professional writers endless trouble and unmeasured liability to error. *

ASSOCIATION OF INSPECTORS OF COAL MINES OF PENNSYLVANIA.

WE note with great pleasure the permanent organization of this body at Wilkes-Barre, Pa., on the 18th inst. The Association must necessarily be limited in number, there being at present but six inspectors for the anthracite mines, and, we believe, three for the bituminous fields of the State. We have been favored with a report of the first regular meeting (a preliminary meeting was held in March last), from which we make the following notes: The meeting was attended by Messrs. T. D. JONES of Hazleton, S. GAY of Shenandoah, W. HEMINGRAY of Northumberland, T. M. WILLIAMS of Wilkes-Barre, and W. S. JONES of Scranton. Mr. PARTON of Pottsville was prevented from attending by an accident which occurred in his district at the time.

The object of the Association is the interchange of experience and counsel between the inspectors, and the adoption of greater uniformity in the form of the statistical information given in their reports.

One of the first acts of the Association was the adoption of the same names or terms to express the same objects in the several regions. In the absence of such an understanding hitherto, much confusion has resulted, many of the terms in use in the respective regions being of local significance, and not a few somewhat absurd.

Most of the tabular forms to be selected are still under consideration, though two or three of those contained in Mr. WILLIAMS' reports have, we believe, been adopted.

The inspectors, appearing to be quite sensitive to the ridiculous position in which MCANDREW's reports place them, adopted a "protest against having any other than their own reports bound within the same cover and under the title of 'Reports of Inspectors of Coal Mines of Pennsylvania.'" The Clerk of the Schuylkill District (MCANDREW) seems to be a sort of fifth wheel to the inspectors' wagon—a kind of gyroscopic wheel that revolves in all kinds of unexpected ways. He is not required by law to make any report, yet he so completely monopolizes the field that a few years ago he did not allow even the names of the inspectors, whose clerk he was, to appear anywhere in the report. This ambitious individual is to be "squelched," and though we shall greatly miss our annual recreation in reading his entertaining absurdities, we must nevertheless congratulate the inspectors upon this resolution. They have also raised their voices against the extraordinary manner in which their reports are published, without allowing them to read the "proofs," in consequence of which very serious typographical errors and omissions have been made. We cordially endorse this movement of the inspectors, and feel certain it will result in a marked improvement in their reports, and great satisfaction to themselves.

We shall at all times be pleased to afford them space in these columns for bringing their views before the public. The Association is to meet twice a year, the next meeting to be held at Scranton, June 5, 1877.

FUEL.*

THE word "fuel" is used to denote substances which may be burned by means of atmospheric air with sufficient rapidity to evolve heat capable of being applied to economical purposes.

Fuel, with the exception of the whale and seal oil used to a small degree by the inhabitants of some Northern countries, consists either of vegetable matter or of the products of the natural or artificial decomposition of such matter.

Vegetable matter, which consists principally of woody tissue, may practically be regarded as composed of carbon, hydrogen and oxygen, comprising the *organic* part, and a small proportion of so-called earthy matter, that which is *inorganic*.

The sun is the source of the heat-producing power of fuel, since the organic parts are derived from water, and—except in particular cases—from the carbonic acid of the atmosphere, which are decomposed in the economy of plants by the action of solar light.

Hydrogen in fuel must always be in association with carbon, but carbon *practically* free from hydrogen may be procured abundantly and applied as fuel. In all fuel containing carbon, hydrogen and oxygen, the proportion of hydrogen may be equal to or greater, but never less, than that required to form water

* Condensed, principally, from "Percy's Metallurgy," London, 1875.

with the oxygen. It is only the hydrogen in *excess* of this which is available as a source of heat, so that in the combustion of a substance whose composition is represented by carbon and water, the carbon alone is the source of heat. The hydrogen existing in combination with oxygen in the state of water, so far from contributing to the actual amount of heat produced, must be evaporated at the expense of the heat developed by the combustion of a portion of the carbon.

a. COMBUSTION.

Combustion in general simply means the oxidation of combustible elements, though, strictly speaking, it is any change in chemical composition of combustible elements which is attended with the development of heat. The product of the perfect combustion of carbon and hydrogen, either in oxygen or atmospheric air, are carbonic acid and water respectively.

The amount of heat or *calorific power* which any element, in the same allotropic condition, developes on perfect combustion is perfectly definite or constant, and is the same whether combustion be *slowly* or *rapidly* effected.

The *calorific intensity*, or the temperature developed, is, however, proportionate to the *rapidity* of combustion, or, in other words, inversely as the time in which combustion is effected.

FLAME.

Flame is gas or vapor of which the surface, in contact with the atmospheric air or other supporter of combustion, is burning with the emission of light. The luminosity of flame is generally admitted to be caused by the presence of particles of solid matter within, or in immediate contact with, the gas in active combustion. In the flame of a candle or jet of coal-gas, this matter is either wholly or chiefly carbon in a fine state of division. The flame of a candle or of gas burning in atmospheric air is highly luminous, whereas that developed by the combustion of hydrogen by oxygen, in which case no solid particles, in the ordinary sense of the term, are present, is very feebly so ; yet the intensity of the heat of the former is very small as compared with that of the latter. The luminosity, therefore, of flame affords no certain indication of its temperature except where the conditions of combustion are similar. FRANKLAND, in opposition to the generally accepted theory, maintains that highly luminous flames may be produced which contain no solid particles, in the usual sense of that term ; and asserts that the luminosity of flame is proportionate to the density of the gas or vapor undergoing combustion, and to the temperature which is thereby produced. He designates as a hydrocarbon compound, and not as pure carbon, the black substance deposited on a glass rod held across the flame of a candle or jet of coal-gas, but this seems irrelevant to the issue, because whatever it may be, it is certainly for the most part fixed, not volatile.

CALORIFIC POWER OF FUEL.

According to the dynamical or mechanical theory, heat is the result of motion among the atoms of matter, or, as it may be otherwise stated, of inter-atomic movement; and this motion is capable of being propagated through space from one body to another by undulations of a so-called ether, assumed to be everywhere existent in the universe. The relative effect of such heat-producing motion, or, in other words, the relative proportions of heat required to cause given effects, may be accurately indicated by numbers, just as if heat were a ponderable agent; and it is usual to speak of heat as if it were an independent material substance : thus it is said to be evolved or emitted, radiated, conducted, absorbed, and stored up or accumulated. As a variable amount, and one which cannot be measured, of the heat evolved in the combustion of a body is absorbed in the work of effecting alterations in the physical condition of the combustible elements necessary to their effective oxidation, it is impossible to estimate the absolute quantity of heat evolved by the combustion of a body; yet the relative quantities of heat evolved by the combustion of different bodies which may be utilized can be accurately determined. RUMFORD estimated the calorific power of a body by the number of parts by weight of water which one part by weight of the body would, on perfect combustion, raise one degree in temperature. Thus, assuming the specific heat of water to be the same at all temperatures, and that there is no conversion of water into steam, 1 part by weight of charcoal, in combining with 2⅔ parts by weight of oxygen to form carbonic acid, will evolve heat sufficient to raise the temperature of 8,080 parts by weight of water 1° C. Similarly, one part by weight of hydrogen in combining with eight parts by weight of oxygen, to form water, will raise 34,462 parts by weight of water 1° C. The relative calorific powers, therefore, of carbon and hydrogen are in round numbers as 8 : 34.

UNIT OF HEAT.

The quantity of heat required to raise 1 gramme (15·432 grains) of water from 0° to 1° C. is conventionally taken as the *unit of heat, thermal unit*, or simply *caloric*.

DETERMINATION OF THE CALORIFIC POWER OF VARIOUS SUBSTANCES.

a, RUMFORD'S CALORIMETER.

RUMFORD employed in his experiments a rectangular vessel of thin sheet-copper 8 inches long, 4½ broad, and 4½ deep, containing a worm of three horizontal coils of the same metal, and consisting of a flat tube ½ inch in depth and 1 inch in breadth. One end protruded through the top of the box, and the other was fitted to a circular hole in the bottom, 1 inch in diameter, and in this hole was inserted a funnel, of which the mouth was 1½ inches wide. The lower end of the worm was situated near one of the short sides of the vessel, and the other end issued vertically near the opposite side. There was an opening in the top of the box, through which could be introduced a thermometer, having a cylindrical bulb in length equal to the depth of the vessel, so that the mean temperature of the water could be ascertained. The substance of which the calorific power was required, was burnt under and within the funnel, when a current of air circulated upward through the worm, and escaped at the opposite end. The heated gaseous products of combustion thus conveyed the heat which was developed through the worm, from which it was communicated to the surrounding water.

In order to counteract the error arising from loss by radiation, the temperature of the water in the vessel was reduced, just before the commencement of the experiment, a few degrees—say 5—below that of the surrounding atmosphere. By this arrangement it was estimated that the vessel would receive as much heat as it would lose, by radiation and conduction during the experiment. With a view to diminish the effect of conduction as much as practicable, the vessel was supported on pillars of wood. In order to test the power of the instrument to extract the whole of the heat from the gaseous products of combustion, they were, on their escape from the first, made to pass through a second similar vessel, when it was found that the temperature of the water in the second vessel was not increased.

The data required in the use of this instrument are as follows :

n The weight of the substance consumed.

w The weight of the water.

c The weight of the copper forming the vessel.

s (=0·9515) The specific heat of copper.

t The initial temperature of the water at the beginning of a test.

t^1 The final temperature of the water at the close of a test.

By multiplying the weight of copper used in the instrument by the specific heat of copper, we obtain the weight of water, which, in respect to absorption of heat, would be exactly equivalent to the weight of copper in the instrument.

Let x represent the amount of heat produced by the combustion of one part by weight of any given body in atmospheric air ; the following formula will then express the calorific power of the body :

$$x=\frac{(t^1-t)\times(w+cs)}{n}$$

b. THOMPSON'S CALORIMETER.

This instrument is intended to give approximately, by means of a simple experiment, the theoretical evaporative power of any fuel tested. The method is briefly as follows :

Thirty grains of the finely powdered fuel is intimately mixed with from ten to twelve times its weight of a perfectly dry mixture of three parts of chlorate of potash, and one part of nitre ; the resultant mixture is burned in a small furnace at the bottom of a vessel previously charged with 29,010 grains of water of known temperature ; the heat produced by the combustion is communicated to the water, and from the rise in temperature of the latter is calculated the number of parts of water which the combustion of one part of the fuel will raise one degree in temperature ; this number being divided by the latent heat of steam (537 or 967 units, according as the Centigrade or Fahrenheit scale is used) gives the evaporative power of the fuel, *i.e.*, the number of pounds of water (supposed to pre-exist at the boiling point) which one pound of the fuel is theoretically capable of evaporating.

By using 30 grains of fuel and 29,010 grains (967 times this weight) of water, the rise in the temperature of the water, expressed in degrees Fahrenheit, is equal to the number of pounds of water which one pound of the fuel will theoretically evaporate ; but 10 per cent. is directed to be added to this number as a correction for the quantity of heat absorbed by the apparatus itself, and consequently not expended in raising the temperature of the water.

c. THOMPSON'S METHOD FOR DETERMINING THE VALUE OF COALS.

The apparatus required is a small cast-iron crucible about the size of a common tea-cup, and furnished with a lid. This crucible should be as light and thin as possible. The one now in use weighs 6 ounces, holds 4 ounces of water, and costs one shilling. Having obtained a fair sample of the coal, reduce it to an impalpable powder, and carefully mix 1 part by weight of this with 24 parts of common salt, previously dried, and then add and thoroughly mix with this 48 parts bichromate potash ; place the mixture in the crucible, put on the lid, counterpoise the whole in the scales ; then, allowing the counterpoise to remain, place the crucible in a common fire where it may become dull red-hot, and allow it to continue so for a quarter of an hour ; after which, when cold, place it again in the scales, and notice how many parts it has lost ; then, deducting from this the weight of the coal (1 part), the remainder represents the quantity of oxygen carried off by the really useful combustible constituents of the coal. This he has found to vary in the coals supplied to the London market from 19 to 28.

d. BERTHIER'S PROCESS FOR ESTIMATING THE CALORIFIC POWER OF FUEL.

BERTHIER thus describes his process : Mix intimately 1 part, by weight, of the substance in the finest state of division, with at least 20, but not more than 40 parts of litharge. Charcoal, coke, or coal may be readily pulverized, but in the case of wood, fine saw-dust must be employed. The mixture is put into a close-grained, conical clay crucible, and covered with twenty or thirty times its weight of pure litharge. The crucible, which should not be more than half full, is covered and then heated gradually, until the litharge is melted and evolution of gas has ceased. At first the mixture softens and froths up. When

fusion is complete, the crucible should be heated more strongly for about ten minutes, so that the reduced lead may thoroughly subside and collect into one button at the bottom. Care must be taken to prevent the reduction of any of the litharge by the gases of the furnace. The crucible, while hot, should be taken out of the fire and left to cool, and when cold, broken, and the button of lead detached, cleaned and weighed, or the melted contents of the crucible may be directly poured into a conical ingot mold.

e. FORCHHAMMER'S MODIFICATION OF BERTHIER'S PROCESS.

FORCHHAMMER recommends the use of 3 parts, by weight, of litharge, and 1 part of lead instead of litharge only, as this mixture fuses at a lower temperature than litharge, and does not corrode the crucible so much as that substance.

BERTHIER'S process is based upon the erroneous belief that the amount of heat evolved by combustion is proportionate to the amount of oxygen consumed. In respect to pure carbon, or matters containing carbon and no other agent, the relative calorific power could be determined in the manner described by burning the fuel by the oxygen in protoxide of lead, and ascertaining the quantity of lead thereby reduced to the metallic state. But when hydrogen exists in excess of that required to form water with the oxygen present, the process may lead to erroneous conclusions, as will appear from the following: 3 parts, by weight, of carbon reduce the same quantity of protoxide of lead as 1 part, by weight, of hydrogen. But the calorific powers of carbon and hydrogen are, in round numbers, as 8 : 34. The calorific power, therefore, of 3 of carbon : 1 of hydrogen is as 24 : 34. Hence the same weight of lead obtained by reduction would, in the case of carbon, indicate a calorific power of 24, and in that of hydrogen 34, so that the process is inapplicable to the determination of the calorific power of substances containing variable proportions of carbon and hydrogen.

f. DITTE'S METHOD FOR DETERMINING CALORIFIC POWERS.

DITTE has deduced the calorific power of certain metals by an indirect method, for a description of which see the *Comptes rendus*, 1870, lxx. 935 ; 1871, lxxii. 762. By this method he has found the calorific power of zinc to be 1357·6, and that of magnesium 6130·5 thermal units.

The most obvious basis from which to calculate the calorific power of any fuel, the combustible part of which consists of variable proportions of carbon and hydrogen, was the assumption that its calorific power would be equal to the sum of the calorific powers of the units of carbon and hydrogen respectively which it contained. The theoretical result given by this method of computation is seen to agree nearly with that obtained by experiment in the case of olefiant gas, but differs in the case of marsh gas. In the case of fuel containing carbon and hydrogen combined with oxygen, it was conceived that the oxygen was virtually in combination with hydrogen, and that only the disposable portion of the latter in excess of that required to form water with the oxygen present was available as a source of heat. These propositions have until recently been generally accepted as correct, but if the experimental results obtained by SCHEURER-KESTNER and MEUNIER are trustworthy, the preceding data cannot be accurately relied upon. The results which they give, however, sufficiently approximate to the truth to be of considerable practical value.

Upon theoretical grounds the sufficiency of the above data might fairly be questioned. The proximate constitution of coal is wholly unknown ; we are ignorant whether force is liberated or absorbed during the decomposition—previously to or at the moment of combustion—of the various compounds of carbon, hydrogen and oxygen, of which the organic part of coal must be composed. Moreover, the oxygen and perhaps the hydrogen are present in the solid state, and we are unable to determine what amount of force may be absorbed during their conversion into the gaseous state.

RUMFORD AND HASSENFRATZ'S EXPERIMENTS ON THE CALORIFIC POWER OF WOOD.

RUMFORD and HASSENFRATZ many years ago experimentally determined the calorific powers of various kinds of wood by means of the ice calorimeter, in which the number of units of heat evolved by the combustion of a substance is deduced from the quantity of ice melted. The results of these observers gave the calorific power of perfectly dry wood determined by experiment—3,654 (RUMFORD), 3,675 (HASSENFRATZ).

To compare these results with the theoretical ones, calculated in the manner above described, we may take the mean ultimate composition of dry wood as deduced from CHEVANDIER'S analyses ; it is in round numbers as follows :

Carbon	50
Hydrogen	6
Oxygen	41
Nitrogen and ash	3
	100

Whence the number of units of heat theoretically produceable by the perfect combustion of 1 part by weight of dry wood will be :

	Units per cent. of the dry wood.		Units of Heat.
Carbon	50	will yield $\frac{50}{100}\times$	8,080= 4,040
Disposable hydrogen, $6-\frac{41}{8}=$	1	" $\frac{1}{100}\times$	34,462= 345
Total			4,385

If the water supposed to pre-exist in the wood be regarded as existing in the solid state, it will be necessary to deduct its latent heat of fusion, namely, $\frac{(41+5)}{100}\times 79=36{\cdot}3$ units of heat, which will leave $4{,}385-36{\cdot}3=4348{\cdot}7$ as the theoretical calorific power of perfectly dry wood.* This number, it will be seen, is considerably in excess of the numbers obtained experimentally by RUMFORD and HASSENFRATZ, but in the absence of information as to the precise composition of the wood upon which they experimented, the comparison is not altogether satisfactory; and again, it should be remembered that their experiments were made at a time when the calorific powers of different substances in the calorimeter were unknown.

LAKE COUNTY, COLORADO, MINING NOTES.

Special Correspondence of the Engineering and Mining Journal.

TO THE EDITOR : SIR—As another winter has put an end to our mining season, I thought you might feel interested in a few remarks on the results of the Centennial year, in this remote corner of the Centennial State. Our gold product for the season just closed amounts to 45,200 dollars. Gulch mining was not by any means as lively as heretofore, and the early storms put a stop to it about a month earlier than usual. Next season we expect that gulch mining will be carried on extensively, as it is understood that a company are prepared to purchase a large number of the claims, and work them on an extended scale.

The silver product has amounted to about 40,000 dollars, with much more in sight at the present time. The greater part of silver and lead ores taken out this season have been treated successfully at the works of the Malta Smelting Company. This company has had many difficulties to contend with, that of procuring good coal and brick being one of the greatest. The lack of the latter article caused the works to be idle for a long time, and it was not until the company had gone to the extraordinary expense of 45c. per brick, for English brick, that the latter difficulty was overcome. Now, however, the energetic Manager, EMILE LEOSCHER, Esq., may congratulate himself that the difficulties of beginning such an undertaking in (to him) a strange locality have by his exertions been overcome, and we opine nothing but success in future. The principal feature of this season in regard to the lead mines is the large number of new and successful discoveries. There has not been so much prospecting done since 1861 as this season. Among new discoveries I may mention the Donkey, owned by P. J. GORRIS & Co.; it runs on an average 160 oz. in silver to the ton, plenty of ore in sight ; but being discovered late in the season, inclemency of the weather put an end to work. The Joe Doyle averages 490 oz. in silver, this being lower down in working; shipping ore to the Smelting Company goes on steadily, and will do so all winter. BRADY, NORRIS & Co. have discovered within the last month a lead showing large bodies of carbonate, which ran 66 oz. in silver, and 50 per cent. in lead per ton. They will work all winter. The George B. McClelland lode, owned by P. GALLAGHER, & Co., runs 22 oz. in silver, and 20 per cent. in lead. WALLS, POWELL & Co., owners of the Bonanza, show ore running 29 oz. in silver, and 50 per cent. in lead. The Mike lode, owned by HAYES, LYNCH & Co., has been reopened with entirely new working, including a shaft 60 ft. deep; levels have been run east and west 160 ft., and the lead struck again, the ore running 1 oz. in gold, and 11½ in silver. This valuable property will be fully developed this winter. The Danna, owned by the LONG BROTHERS, is shipping ore averaging from 160 to 200 oz. silver per ton. The Pilot is being worked by BERNARD and Co., with good results. The Wonder, A. B. WOODS & Co., has a large quantity of ore, which the owners are saving with the idea of erecting smelting works of their own during the coming season.

MAURICE HAYES, Territorial Assayer.

ORO CITY, Lake County, Colorado, December 8th, 1876.

NOTES.

CALIFORNIA PLACER MINES DISCOVERY.—New placer mines have recently been discovered at Calpello, Mendocino County, and parties are at work building a ditch seven miles long, in order to open the claims.

THE PRESENT CONDITION OF THE COLORADO COAL MINES.—Two miles from Canon City, the Denver and Rio Grande Railroad are working a five-feet vein of excellent coal. It is reached at a distance of fifteen feet from the surface. The vein has a substantial slate roof. The company supply their own line with this coal : mining 100 tons per day, of which 80 tons per day are supplied to the Atchison, Topeka & Santa Fe Railroad, and for steaming purposes it is said to be unsurpassed. At Trinidad, four miles from the southern terminus of the same road, an excellent coking coal for smelting purposes is obtained. It is pronounced by judges to be equal to the Pennsylvania coal. From present indications there will be no lack of coal in this section of the State. Laramie and Cheyenne take several cars of coal weekly from the Canon City banks; and last year the demand in Denver for this coal exceeded the supply. An excellent article of coke is also made, which is taking the place of Pennsylvania coke in western smelting operations. The consumption of this coal on the Kansas Pacific Railway is quite large, and esteemed to be a most excellent fuel.—*Mines, Metals, and Arts.*

SILVER MINING AT THUNDER BAY, L. S.—There is no disguising the fact that for weeks an uneasiness prevailed in this district especially regarding the future of Silver Islet ; about a month since the force was reduced, and later the stamp mill shut down, owing, it is said, to the great falling off in the yield of the mine. It is over half a mile from the main shore, where the mill is situated to the Islet where the ore is secured, and when the ice takes, boating, of course, is discontinued until the spring. Last season a large quantity of ore had been dumped around the mill for winter use, but not so this year. Hence the stoppage of the mill. The Silver Islet Mining Company's works are situated on Thunder Cape territory, and known as Hood's Location, containing 6,400 acres (quite distinct and separate from the Ontario Mineral Lands Company), but now through a new arrangement, both of these companies were united at a late representative meeting in New York City, and combined into one company, holding over 100,000 acres of territory, scattered along the north shore of Lake Superior from east to west boundary of Algoma. Of these, likely some are first class mineral lands. The new organization is composed of leading members of both companies, and now the shares are 40,000 (instead of 60,000, as heretofore), and placed at $25 per share. $1,000,000 capital is at the disposal of the new company. We learn that the work at the Islet will steadily progress, and the diamond drill, now at the bottom of the mine, will go 400 feet further. Thus it will be seen that the "little gem of Lake Superior" is far from being abandoned. A number of changes have taken place at Silver Islet works, and it is possible others may follow.—*Sentinel*, Dec. 21.

* The calorific power of a substance, as determined in the calorimeter, is the total number of units of heat produced by its combustion. To ascertain the *useful heating effect* of a fuel, we must deduct the quantity of heat required to raise the products of combustion and associated nitrogen to the temperature required for any particular operation, and this will include the latent heat of the steam produced on combustion.

THE MINERAL WEALTH OF JAPAN.*

By Henry S. Munroe, E.M.

(Concluded from page 410.)

SILVER.

THE metallurgy of silver, and its extraction on a large scale, probably date from the year 1590, when the Japanese first learned from a foreigner to separate silver from lead and copper. The discovery of silver and its first production are placed by the Japanese, as we have already seen, some ten centuries earlier.

Between 1649 and 1671 the Dutch exported one hundred and forty millions of dollars in silver bullion; and, even supposing a large proportion of this to be silver previously produced from the mines, or brought into the country by the Portuguese for exchange with gold, the yield of the country cannot have been less than three or four millions of silver per year. Comparing this with the present annual yield, 312,000 ounces, or in value about $350,000, it is evident that there has been a great falling off in the production of this metal.

This is due to the causes already stated, viz., the abandonment of many mines on account of the rise in the value of labor, and the practical exhaustion, so far as Japanese methods of mining are concerned, of the more accessible and easily worked deposits. The silver deposits of Japan constitute, however, the most valuable portion of its metallic wealth, and offer the greatest inducements for the investment of capital. When the abandoned and the feebly worked mines of silver shall be reopened and properly worked, the annual production of silver will certainly equal, and may possibly exceed, that of former times. The silver-bearing veins are, as a rule, true fissures continuous in depth; the bodies are regular and persistent; a constant supply of ore can at all times be depended upon; and there is still left below water level, in the abandoned mines, vastly more ore than was ever obtained above.

Silver occurs in twenty-five of the thirty-eight ken and fu, and in 1874 ninety-eight mines were producing larger or smaller quantities of bullion. The total yield, according to Mr. GODFREY, was about 312,000 ounces troy. Of this amount probably one-half was the product of ten mines, and thus the remaining ones must have averaged nearly 1,800 ounces of bullion; certainly a very promising exhibit when we consider the imperfect methods of working employed.

Silver occurs associated with ores of copper and of lead, and sometimes with gold. Of the ninety-eight permits for silver mining granted in 1874 by the Mining Office, but thirteen were for silver alone; the remainder for silver with copper or lead, or with both copper and lead. But three were classed as gold and silver mines; a much larger proportion, however, produced bullion containing from one to ten per cent. of gold.

Native silver, argentite, and antimonial silver ore are, so far as I know, the only silver minerals found in Japan. Other sulphides probably occur, but they have not as yet been recognized. Silver also occurs in tetrahedrite, galena, copper and iron pyrites, and in blende, in larger or smaller quantities.

M. COIGNET† describes a peculiar ore or mineral of silver containing organic or bituminous matter, which was found in one of the mines at Ikuno, in Toyóka ken

Silver occurs in Japan in true fissure veins through stratified rocks, and in irregular mass deposits distributed through volcanic rock. The ore in the first class of deposits is found usually in regular and well-defined seams in the vein, and rarely in pockets or lenticular masses. In the mass deposits the occurrence of ore is more irregular and uncertain.

The Japanese method for the extraction of silver from the ore is always by fusion with lead. When the ore contains a large proportion of copper, there is a previous fusion for copper matte or for black copper, which are afterwards treated with lead. In the first case the matte is alternately roasted and fused with lead till the copper is entirely lost in the slags. In the treatment of black copper with lead, by the admirable liquation process already referred to, the copper is saved and the silver more perfectly separated.

Ores free from copper are fused directly with lead, though sometimes previously roasted to agglomerate the fine material. The silver-lead, however obtained, is cupelled with charcoal on an open wood-ash cupel, as already described. The loss of lead is generally very great; and, with few exceptions, the proportion of silver saved is not usually more than sixty per cent. of that contained in the ore.

The following mines, which have come under my notice, are among the most important in Japan, and will serve to illustrate the different classes of silver deposits:

Kosaga Silver Mine, Akita Ken.—This mine is now worked by the Mining Office, and is under the superintendence of Mr. CURT NETTO, a German mining engineer. The works, which consist of several shaft-furnaces, reverberatories, an English cupelling-furnace, etc., were built by OSHIMA, of the Mining Office, from plans said to have been furnished by Mr. PUMPELLY while in Japan. The works are well arranged, but the process proves to be unsuited to the ore, which is very poor. For this and other reasons, Mr. NETTO has decided to materially change the process, in such a way, however, as to utilize a large proportion of the old plant.

The ore, which is found within a short distance of the works, occurs in irregular masses, distributed through a white feldspathic porphyry. The porphyry occurs as a massive eruption on the flank of a range of hills of stratified rock. The erosion of this porphyry, which is soft and easily decomposed, has formed a wide valley, and the rock is almost everywhere covered and concealed by deposits of alluvium. Its limits have not been determined, but I found exposures in a belt a mile or more in width, and fifteen or twenty miles in length. Ore has so far been found in the porphyry only in this one locality, but similar deposits may possibly be concealed by the river alluvium.

There are two classes of ore, both poor, but found in unlimited quantities. The first is a yellow-clay ore, consisting of decomposed porphyry stained by oxide of iron. This contains four to forty ounces of silver to the ton; and, exceptionally, as much as one hundred ounces. The second class is a black sulphuret, mostly amorphous blende, containing about twelve ounces of silver to the ton, and five per cent of copper. Beside these, certain silicious ores, containing traces of silver, are used in the furnace as flux. The ore, as mixed for smelting, contains on an average thirteen and a half ounces of silver.

The porphyry in which these masses of ore are found is often locally charged with pyrite, which assays 0·015 oz. gold, and 0·73 oz. silver to the ton. Mr. NETTO thinks that the clay ore is possibly formed from this by decomposition with concentration of the silver by segregation.

The ore occurs in the porphyry in large irregular masses. One such mass of black ore, which was partly exposed to the open air, measured about thirty-five by twenty-five by fifteen feet.

The process used for the extraction of the silver at the time of my visit was as follows:

1. Roasting of ore in piles—the blende and part of the flux being submitted to this treatment.
2. Fusion for matte in shaft furnaces.
3. Roasting of matte in piles.
4. Fusion of roasted matte with lead in a low hearth by the Japanese process.
5. Refining and cupellation of the lead.

Operations 3 and 4 are several times repeated, until the matte is reduced to very small bulk and most of the copper has been brought into the slags. These rich slags go back to the ore fusion in the blast furnace.

It is proposed, in order to obtain a larger proportion of the silver, to save the copper now lost, and to avoid the use of lead, which must now be brought from a distance, and for other reasons, to adopt a wet method of treatment. The matte from the shaft furnace is to be granulated, roasted with salt in a reverberatory furnace, and lixiviated after the Ziervogel method. Experiments to test these proposed changes had just been completed at the time of my visit, and had proved very successful. I have since been informed that these changes have been made, and give very satisfactory results. 3,497 tons of ore (of 2,240 lbs. ?) were treated in the year 1874, yielding 172 oz. gold and 22,621 oz. silver.*

Mukoginzan, Ani Mines. in Akita kóri, Akita ken.—On the other side of the river from the Ani copper mines, and under the same management, is the Mukoginzan (literally, the opposite silver mine). The mine, at the time of my visit, belonged OHNO, and is now under the control of the Mining Office. I understand, however, that it is still worked by Japanese methods.

The ore, like that of the Kosaga deposit, occurs in a large erupted mass of white feldspathic porphyry in small or irregular seams or impregnations. The mass of volcanic rock is much smaller than at Kosaga, though its extent is unknown. There are also numerous dykes of the same white feldspathic rock traversing the stratified rocks of the vicinity.

The ore is porphyry, more or less decomposed, and impregnated with sulphurets. It contains copper and iron pyrites, galena, argentite (?), etc., and more or less free gold. The ore is crushed with hoes, and concentrated, by washing, to one-fifth of its original weight. If too hard to be thus easily crushed, it is weathered for six months or a year. The washed ore contains about three and a half ounces of gold and seven ounces of silver to the ton of two thousand pounds, and about one per cent. of lead. The bullion value of one ton will thus be about eighty dollars; or of the unwashed ore, about sixteen dollars.

About half of the gold in the ore is obtained directly by careful washing. For this purpose the finest and richest portions of the jigged ore are washed by hand on the shallow wooden *ita*, or washing board; and the gold thus obtained is added to the bullion in the last stage of the cupellation. The treatment is as follows:

1. Roasting of the washed ore in kilns.
2. Fusion of the roasted ore with lead in a low hearth.
3. Remelting of the slags and matte with lead.
4. Cupellation of the lead.

The bullion, which is two-thirds silver and one-third gold, is sent to the Innai silver mine and there parted. The product of the mine at the time of my visit, in 1874, was about 75 ounces of bullion per month

Innai Silver Mine—Okatsu kóri, Akita ken. This rich mine has been known and worked for over 250 years. At the time of my visit, in December, 1874, it was owned by the merchant OHNO. During my stay, however, an officer arrived and took possession in the name of the government. It has since been turned over to the Mining Office; but is, I believe, still under Japanese management.

There are here quite a number of veins; but one only is worked, and little or nothing is known of the others. The one worked is a fissure vein, five to thirty feet in thickness, traversing strata more or less metamorphosed in an east and west direction. The dip of the vein is steep; from fifty to eighty degrees southward. The vein rock is calcite, usually quite crystalline.

The ore is quartz, through which the silver is disseminated in the form of argentite and antimonial silver; and contains also sufficient gold to form one per cent. of the bullion produced. The ore holds but little pyrite or other sulphurets, though the veins sometimes contain seams of blende. The ore seams are from a few inches to three feet thick, the average being five to six tenths of a foot. There is sometimes one such seam, and sometimes two, three, or five symmetrically arranged in the vein.

The ore, as mined, averages 130 ounces to the ton of 2,000 lb. This is crushed and hand-picked—not washed—to yield one and a half to two per cent. of silver, or 448 to 583 ounces to the ton. Several amounts of ore are sometimes found which will yield over five per cent., or about 1,500 ounces of silver. Ore that, by hand-picking, cannot be made to yield 200 ounces, is either left in the mine or thrown on the dump. Thousands of tons of such ore, which, without dressing, would probably yield 80 to 100 ounces to the ton, would thus be available for treatment if a stamp mill were erected.

As may be inferred from this fact, the process of treatment employed at this mine is extravagant and wasteful. This is occasioned by the extraordinary richness of the ore, which has made profit possible in spite of the most unskillful treatment, and has rendered effort after improved methods of working unnecessary. The process employed is as follows

1. Roasting for agglomeration.
2. Fusion of roasted ore with lead.
3. Treatment of slags.
4. Cupellation.

Small quantities of ore, not more than two or three pounds, are treated at an operation—with large quantities of fuel and an energetic blast. The consequence is that fifty to sixty per cent. of the lead is sent up the chimney, carrying with it a large part of the silver. The small scale on which operations are conducted, involves, moreover, an unnecessary amount of labor, and adds largely to the expense of the treatment.

The mine is quite dry, and the Japanese miners have thus been able to extend their workings far below water level—having reached, at the time of my visit, a depth of 750 feet below their lowest drainage tunnel. To raise the water, however, a force of about fifty men and 274 pumps are required. The water is pumped in over a hundred lifts, each pump raising it being less than eight feet. Although the amount of water so raised is small, it entails an expendi-

* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, June, 1876.
† An. des Mines. Tome VI.

* International Exhibition 1876, Official Catalogue Japanese section, p. 4.

ture of $250 per month—an amount exceeding the average monthly yield of most other silver mines.

This mine is one of the richest in Japan, and, when properly worked, will prove exceedingly profitable, and materially increase the bullion product of the empire. The yield of this mine in 1873 was 44,378 ounces, and in 1874* about 41,400 ounces of silver bullion. This bullion contains about one per cent. of gold, and five per cent. of base metals—one per cent. of copper and four of lead.

Ikuno Silver Mines—Asako kôri, Hiogo ken. These were, at one time, probably the richest silver mines of the country. They were opened about three hundred years ago, and at the beginning of this century gave employment to some four thousand miners.† As the workings became deeper, the ore was found to be harder and more difficult to smelt, and the scale of operations was reduced, so that in 1869 only five hundred men were employed. It is at present worked by the Mining Office, and is under the superintendence of M. COIGNET and a large staff of assistants. Mr. NAKANO, my assistant, visited this mine last year, and the following description is based on his notes and on information derived from other sources‡:

The ore is calcite and quartz (?), containing silver mainly in the form of argentite, and occurs in veins one to three feet thick, traversing volcanic (?) rock. Associated with the argentite, specimens from the mines show gold, silver and native copper, blende, galena, copper and iron pyrites, malachite, smithsonite and other minerals.

The ore varies in richness from a few ounces to thirty or more to the ton. As it comes from the mine it is sorted, and the richer portions treated separately. Some of this rich ore is reported to yield as much as 1,500 to 1,800 ounces to the ton.

The bullion produced contains seventy per cent. of silver, ten per cent. of gold, and twenty per cent. of base metal (copper). At the present value of silver, this bullion would be worth about $2 85 per ounce.

About half a million dollars have been invested in machinery. The ore is stamped dry, in a mill said to be capable of treating fifty tons per day. This is only partially finished, and not yet running at full capacity. The stamped ore is roasted with salt, and the silver extracted by barrel amalgamation. A part of the ore seems to be treated by a dry process, as I find mention made of smelting works—possibly Japanese. About five hundred miners are employed, and the expense of running the mine and mill is variously reported at from $15,000 to $30,000 per month. The accounts of profits are also conflicting; but there seems to be no reason why these should not be large, when the works are fairly started. The product of these mines in 1874 was 3,236 tons of ore (of 2,240 lb.), but only about 62 tons were treated, yielding 1,410 ounces of bullion, 1,269 ounces of which was silver and 141 ounces gold. §

In June, 1875, at the time of my assistant's visit, the monthly yield was said to be 4,416 ounces of bullion, showing a large increase of production.

Sôriyo Silver Mines—Takaki kôri, Kagoshima ken. These mines are owned by a Japanese company and are entirely under Japanese management. The working of them is chiefly interesting as showing how foreign methods may be adapted to the wants of the poorer mines of the country.

There are here three quartz veins, running about N. 55° E. through metamorphic rock, and dipping towards the southeast 30° to 36°. The largest of these veins varies between two and four feet in thickness; the second is two to three and a half feet thick; and the third is smaller, though the exact dimensions are not known. In the largest vein there are usually two seams of ore, one near either wall, each averaging one foot in thickness. In the second vein there is but one such seam, from eight-tenths of a foot to two feet thick. The third vein is not now worked.

The ore is cellular quartz, stained black by oxide of manganese, containing silver as sulphide. The vein-rock is quartz, sometimes white and massive, and sometimes cellular and stained black, like the ore. The ore averages two and a third ounces of bullion per ton (of 2,000 lb.). This bullion contains one-tenth of gold, and would be worth, at present, about $3 per ounce, making the value of one ton of ore about $7.

This very poor ore is treated in a rude stamp-mill and by barrel amalgamation, the process being modeled after that used at Ikuno. The ore is first crushed in two stamp-mills of eight stamps each, run by water power. The stamps are of wood, shod with iron, and are quite light. The mortar is also of wood, with a small iron anvil in the bottom. The united capacity of these mills, when in good working order, is about one and a half tons of ore per day; but the average amount treated is little more than one ton.

The crushed ore, sifted by hand through forty-mesh sieves, is roasted with salt, about one and a half per cent. by volume, in shallow cast-iron pans. This roasting is continued for six hours over a wood fire. The ore is then cooled, transferred to barrels and amalgamated with a few pounds of mercury, one-half per cent. by weight of the ore treated. The barrels are revolved at a moderate speed from twelve to eighteen hours; and the charge is then run into a settling tank. Finally, the mercury is separated from the amalgam by straining and squeezing through several thicknesses of Japanese paper. The whole process is rudely, but still fairly well conducted; and I was able to suggest but few improvements.

The yield of the two mills is about three ounces of bullion per day; but on account of frequent stoppages for repairs, the monthly product averages only seventy-two ounces.

GOLD.

According to Japanese historians, gold was first found in Japan in the year 749 A. D., about eighty years after the discovery of silver. When we consider the frequency with which gold is brought to view in grains or nuggets by the natural action of running streams, and the ease with which it may be obtained by gravel washing, while silver, on the other hand, but rarely occurs native, and requires a complicated metallurgical process for its separation, this commonly received statement, that gold was discovered at so late a date and after the discovery of silver, is certainly open to doubt.

During the ninety years in which the Portuguese exported gold from Japan in such large quantities, the gold mines must have been taxed to their utmost to keep up the supply. This export averaged three and a third millions of dollars per year; and with the most ample allowance for the supply derived from the hoarded gold of centuries of non-intercourse, the annual yield of the mines must certainly have been more than two millions. It is also probable that the mines reached their maximum of production during this time; for so great a demand must of necessity have stimulated the supply. Indeed, we find partial confirmation of this supposition in the steady increase for a long period of the amount exported, which at one time reached the sum of twelve million dollars for a single year.

From our present knowledge of the character of Japanese gold deposits, it is evident that this great yield was obtained from placer workings. These, being shallow and of small extent, were quickly exhausted; and the attention of the miners was then turned to the quartz veins, which thereafter yielded small but more constant returns. When, however, the imperial edict of 1671 put a stop to the exportation of bullion, this exhaustion of the placers had hardly begun to show itself; for the annual exportation of the Dutch between 1649 and 1671 averaged nearly three millions—but little less than that of the Portuguese in the previous century.

The yield of gold in 1874 is estimated by Mr. GODFREY at 100 *kan*, about 12,000 ounces troy. From this we see that there has been a great falling off in the production of this metal. 12,000 ounces are worth but about $250,000—a very small portion of the average annual export of former times.

Gold occurs in about one-half of the ken and fu of Japan; but in most cases the deposits are not now worked. The records of the Mining Office show that permits were granted in 1874 for the working of fifty-eight gold mines. Of these mines I can learn of but six, worked solely for gold, which produced notable amounts of bullion; and of the six, three together produced, in that year, but fifty ounces. Most of the gold now comes from mines worked for silver. Five such mines have already been described.* Mines producing gold alone are, as a rule, not worth working.

Gold occurs in Japan in quartz veins and placer deposits, as well as in association with silver and other ores, as already described. The placer deposits are generally of fluviatile origin, and the gravel beds are thin and of limited extent. They are often found covering the terraces of the river valleys. These placer deposits are uniformly poor. The richest gravel found in Yesso yielded less than seven cents to the cubic yard; while the average of even the best field was only five and a half cents. From information gathered from various sources I infer that this is about the usual richness of similar deposits—even the most celebrated—in other parts of the country.

The quartz veins, as a rule, are also very poor. Rich quartz is found only in small and thin deposits. The usual yield is about one-third to one-half an ounce ($7 to $10) to the ton. In exceptional cases the yield may be as much as $90 or $100; but the veins are then so thin that the extraction of the ore becomes very expensive.

The methods employed in the separation of gold from the quartz of the veins and from the gravel of the placer deposits are exceedingly interesting. The method of extraction is, in either case, purely mechanical. The gold-bearing quartz is first crushed, and then ground with water, repeatedly and in small quantities, between heavy millstones moved by hand, until reduced to an impalpable slime. This, as it issues from the mill, is largely diluted with water, and conducted over a series of short and narrow boards covered with numerous diagonal saw-cuts. These boards, which collect the gold and other heavy metals very perfectly, are frequently cleaned in a tank; and the concentrated material so collected is washed with great care and skill on the board or *batea* of the gold-washers.

According to careful experiments made by the late Mr. CARLYLE while in charge of one of the Government gold mines, this process extracts, at the first working of the ore, sixty-five per cent. of the assay value, and the reworking of the slimes yields an additional fifteen to twenty per cent. Before the material is considered by the Japanese to be exhausted, it is treated a third time by the same process; bringing the proportion of gold saved to fully ninety per cent. of the assay value.

The method of washing employed in the working of the gravel deposits has already been described in my report on the gold fields of Yesso. Briefly, it is as follows: Ditches are cut from convenient streams in such a way that the water flows over the bed rock through the gravel deposit. A certain quantity of gravel is brought into the ditch by undermining the bank. The larger stones are carefully washed by hand and thrown out of the ditch, and the smaller ones separated with the aid of proper tools. The rapid current at the same time washes out the clay and fine sand, leaving a bed of fine gravel only in the ditch. When this has reached a thickness of about one foot, two or three small straw mats are placed side by side in the bottom of the ditch near the head of the working; and the gravel, a little at a time, is hoed carefully over them. As the gravel is swept over the surface of the mats by the force of the current, the heavy gold and the iron sand sink between the thick twisted strands of straw, and are so retained. From time to time the mats are moved a few feet down stream, and the new material, exposed by their removal, is hoed over their surface in the same manner until finally all the gravel has thus been several times subjected to treatment. During the operation, the mats, as they become charged with gold, are taken from the stream and others substituted. The concentrated material collected by the mats is finally washed with great care on the *ita*, or washing board, for the separation of the gold.

Gold Fields of Yesso.—A description of some of the Yesso gold fields, condensed from my report to the Government, will serve to illustrate the general character of the placer deposits of Japan. Gold-bearing gravel is found on the island in many of the river valleys, apparently divided in every case from the metamorphic strata of the immediate vicinity. These deposits in each of the more important fields are found in the wider portion of the valley, where the river passes through some soft and easily eroded formation, and where a large reservoir has thus been formed to receive the gravel. Where the valley is wholly in metamorphic strata, it is, as a rule, quite narrow, and the deposits of gravel, though perhaps not poor, are of little value because of limited extent. Again, where in the gold regions the valley is entirely within the limit of the soft strata, the gravel will be composed chiefly of fragments of sandstone and shale, and will contain little or no gold.

These auriferous gravels everywhere afford unmistakable evidence of having been deposited in running water; and the direction of the old current, which can usually be determined from the position of flat stones in the beds, coincides, as a rule, with the general course of the present river valleys.

The most important gold field of Yesso is in the upper valley of the Toshibets River, in the province of Iburi. The river here passes through the Toshibets series of clay rocks and tufas, and the valley is wide and deep. The gold occurs in the river gravel, and the deposits extend for a distance of five or six miles along the valley. The hills on either side are eight to nine hundred feet high, and a thousand to twelve hundred feet above the sea.

The bottom of the valley lies in three or sometimes four terraces, which are about 12, 40, 85 and 260 feet respectively above the level of the stream. Each of these terraces is underlaid by clay rock, and represents a former bottom

* Estimated—eleven months' yield being 38,014 oz.
† International Exhibition, 1876, Official Catalogue of the Japanese Section, p. 41.
‡ An excellent account of this mine was given last year in the *Hiogo News*.
§ International Exhibition, 1876, Official Catalogue of the Japanese Section, p. 41.

* Vid. pp. 150, 170.

of the valley. They are covered by beds of gold-bearing river gravel, which are usually nine to twelve, but sometimes as much as thirty or forty feet in thickness. The gravel, in turn, is covered by yellow sand and loamy silt, usually only a few feet in thickness, but in the case of the highest terrace, fully fifty.

The gold is found to be concentrated in the lower layers of the gravel beds and next the bed rock. This concentration is probably due to the repeated stirring and re-washing of the gravel as the old river shifted its bed from one side of the valley to the other. The richness of the gravel also increases very perceptibly as we ascend the stream—indicating the probable source of the gold. Numerous tests were made in different parts of the field by a modification of the Japanese method of gold-washing. In each case several cubic meters of gravel were treated. These tests yielded from 68 to 136 milligrammes of gold per cubic meter of gravel washed, representing a richness of three to six cents per cubic yard. The average value of the gravel, for the whole field, would seem to be about three and three-fourths cents per cubic yard; and for the upper and more productive part of the valley, perhaps five and two-thirds cents.

On the Musa river, in Oshima province, is another large gold field, similar to that of the Toshibets, but much poorer. The upper valley of the river is in metamorphic strata, and is quite narrow and deep, the hills on either side being several thousand feet high. The lower valley is in the soft strata of the Toshibets and Chingkombe groups—clay rocks and shales—and is quite wide, and surrounded by low hills. The transition from the narrow ravine to the broad valley is very abrupt, and marks sharply the line of junction between the hard and soft strata.

The gold field comprises the upper five or six miles of the broader portion of the valley. The gravel covers the terraces and the bottom of the valley in regular beds averaging eight feet in thickness—varying between five and thirteen feet in different localities. As on the Toshibets, the gravel beds are everywhere covered with sand and silt, three to ten feet thick. The gravel is composed of pebbles of metamorphic rock; and, from its composition, seems to have been derived from the similar metamorphic rocks of the upper valley.

The results obtained from the washing of over a hundred tons of gravel from many different localities, show the field to be very poor. The richness of the gravel varies between 8 and 32 milligrammes to the cubic meter; though in one case we obtained 146 milligrammes. Omitting this exceptional result, the gravel steadily decreases in value from the upper end of the valley to the lower. The average richness is about 16 milligrammes to the cubic meter, or but three-fourths of a cent's worth of gold to the cubic yard.

Near Esashi and near Matsumai, in Oshima province, and near Kudo, in Shiribeshi province, are small gold fields; but these are even poorer than the Musa field. Near Uragawa, in Hitaka province, and extending thence to the Tokachi river, in Tokachi province, is a large gravel formation, probably covering an area of over a hundred square miles, which in some places contains gold, but in infinitesimal quantity.

The remains of old workings are to be seen in all these localities; and it would seem that in former times the Musa and the Toshibets fields must have been extensively worked. Indeed, there is a tradition that about the year 1205 A.D., a party of several hundred miners from Chikuzen, a province of Kinshiu, came to Yesso, while the island was still in the hands of the barbarous and warlike Ainos, and worked the gold deposits of the Musa valley and other places in the vicinity. From data obtained in our survey of the Musa field, it appears that these old gold-washers must have obtained about $21,000 worth of gold from that locality alone; and, as they remained on the island thirteen years before they were massacred by the Ainos, they must have secured quite large amounts of the precious metal.

From the extent of the old workings on the Toshibets, this field also must, in former times, have yielded much gold; but there is, in this case, neither record nor tradition of the old workers. The Toshibets field was, however, worked in a small way about twelve years ago by the government of the Shôgun. A few men only were employed, and the total yield was quite insignificant and hardly paid the expense of working.

Kanaba Gold Mines—Okuzo, Akita kôri, Akita ken. At the time of my visit, these mines were under the direction of Mr. ROBERT G. CARLYLE an engineer of the Mining Office. Since the death of Mr. CARLYLE, the mine has been under the superintendence of Mr. R. J. FRECHEVILLE, of the same office.

These gold mines have been worked for many centuries, and hundreds of tunnels and adits penetrate the hills in every direction. A number of these old workings have been re-opened and surveyed. Tunnels over two miles in length have been found, and drifts and stopes innumerable,—all driven with imperfect tools, before the time of gunpowder; and affording, especially in the carefully dressed walls and squared corners of some of the larger tunnels, evidence of slow and patient labor. One of these tunnels is said to have been the scene, many years ago, of a desperate hand-to-hand fight between the rival miners of two provinces, whose workings, driven from opposite sides of the mountain, met in this place. The connecting winze was afterwards blocked up; and has been only recently re-opened, for ventilation.

The gold occurs in small veins, traversing a porphyritic rock. The veins vary in thickness from three feet to a mere sheet. The gold is associated with copper and iron pyrites, blende and galena. The thin veins contain the richest ore, while the larger veins are usually to poor to be worked. These large veins contain copper and lead; but neither are they rich enough in these metals to be worked. These large fissures are quite regular: run north and south, and dip from 45° to 70° W. They are usually filled with decomposed porphyry, often in the form of a plastic clay. The copper ore occurs in local deposits of a limited extent, near the foot-wall.

The large veins intersect and cut off the smaller gold-bearing veins; these latter being either branches of the main fissures, or faulted to a considerable extent by them. Mr. CARLYLE was inclined to adopt the former view. There seems to be little parallelism between these gold veins, though the general direction is about east and west.

The average richness of the ore, as hand-picked and prepared for treatment by the Japanese process, is about $90 per ton (containing 4.4 ounces of gold). Forty miners produce, of such ore, only about one-third of a ton per day. Including all expenses, the cost of mining reaches nearly $38 per ton (of 2,000 lb.)

A ten-stamp mill, of the California pattern, with a capacity of fifteen tons of ore per day, has been erected by the Mining Office. At the time of my visit it was not finished, but has, I believe, since been put in operation. In working the mine on the scale necessary to supply this mill, the cost of getting out the ore will be greatly reduced; but, at the same time, it will be impossible for the miners to select, as heretofore, the best places and the richest mineral. The average richness of the ore mined will not probably be more than $20 per ton, if indeed it reaches that figure. The cost of treatment by the Japanese process is but $8.65 per ton of 2,000 pounds—and by the stamp mill will probably be much less; so that the question is whether the cost of mining, now so large, can be reduced to a figure that will permit a profit. The solution of this problem will perhaps determine whether any of the gold deposit of the country can be worked with profit; for this Okuzo mine, through perhaps not the richest, is better than the average of Japanese gold mines. We shall therefore await with interest the result of this experiment.

Yamagono Gold Mines—Kuwabara kôri, Kagashima ken. These mines are owned and worked by a private corporation, the Satsuma Mining Company. A fifteen-stamp mill, built in France, and originally ordered, I believe, by the advice of M. COIGNET, is being erected here, under the superintendence of a Japanese machinist from the Ikuno mines. The mill will be run by a large turbine, and will treat 24 tons of ore per day.

There are several mining districts in this vicinity. The mines of Nagano, in the neighborhood of the mill, are at present flooded, and work has been suspended, pending the completion of a new drainage tunnel. This, with its branches, it is said, will be about two and a half miles in length, and will require thirty years for its construction. The mines which will be drained by this tunnel are reported to be very rich.

In the meantime the supply of ore is drawn from the mines of Yamagano and Musoyama. The gold occurs in quartz veins traversing a stratified tufa rock. This tufa, which is quite soft, alternates with a hard, dark blue crystalline quartzite, and in the vicinity are beds of sandstone and shale. Both the quartzite and the shales contain in places leaf prints of maples and other deciduous trees. The strike and dip of the gold-bearing veins correspond usually with the strike and dip of the stratified rocks, and they are apparently bedded veins, though without doubt true fissures. The general direction is east and west, the dip towards the south.

At Yamagano the veins are rarely more than one-tenth of a foot in thickness, and when thicker, are too poor to work. The average yield of the ore is about three-tenths of an ounce, or six dollars to the ton of 2,000 pounds, which, it is said, does not pay expenses.

At Musoyama there is a vein five to six feet thick, filled for the most part with fragments of wall-rock, cemented by thin seams of gold-bearing quartz. The yield of this ore is nearly one-half of an ounce of gold, or $9.70 to the ton. As the vein is so exposed that it can be quarried in the open air, twenty-five workmen, mostly boys, produce six tons of ore per day, At another mine, Yamanokamiyama, small quantities of ore are obtained, which is said to yield 1·58 oz., or $28.80 to the ton.

At both Yamagano and Musoyama there are large deposits of gravel containing gold quartz. These deposits are washed for gold and the quartz picked out by hand. One cubic yard of this gravel yields about eleven cents worth of gold by washing, and the quartz picked out, when crushed and treated by the Japanese process, yields about as much more.

Sado Gold and Silver Mines.—The mines of the Island of Sado are said to be the richest and most valuable in Japan. They have, it is said, been worked for more than a thousand years, and formerly yielded much gold. The bullion produced by the mines at present is mostly silver, gold occuring in small proportions only. It would seem proper, therefore, to class the mine among those of silver, though describing it in this place. They are now in the control of the Mining Office, and under the superintendence of Mr. ALEXIS JANIN.

From a short account of the principal mines given by Mr. GUBBINS, of the British Legation, in a paper read before the Asiatic Society in April, 1875,* I extract the following details:

The mines are situated near Aikawa, towards the southern extremity of the island. The old workings, which are very extensive, are of the most primitive kind, and the mines have, for the most part, been abandoned for want of means to control the water. About sixty years ago three hundred miners are said to have lost their lives by a sudden flooding of one of the principal mines, perhaps caused by the accidental tapping of a large body of water collected in some older working.

Of the character of the deposits, the richness of the ores and the nature of the work now going on, Mr. GUBBINS gives no information. He mentions a little episode, however, which illustrates the difficulty sometimes attending the introduction of labor-saving machinery and new methods of working. It seems that a few years ago a tramway was constructed to bring the ore from the mine to the works. Its use, however, has recently been discontinued, because of difficulties of working, frequent accidents, etc.; and it proves better policy and quite as economical to employ women at four cents a day to carry the ore on their backs.

The principal problem at present is to drain the mines and put them in proper working order. It is estimated that it will take five years and a considerable outlay of capital to accomplish this. There is, however, ore enough on hand to keep the new smelting works† running for two years. In the meantime, for various reasons, the mines are being worked at a loss. This is in part due to the unproductive work now carried on, and in part to the Japanese system of administration. In one year bullion to the amount of $60,000 was sent to Tokio from the mines, but the expenses (in part capital invested?) for the same period were $75,000.

From the catalogue of the Japanese Section I extract the following additional details‡:

The ore occurs in two large veins running north and south. These veins divide into a number of smaller branches, which alone were worked in former times. Of the many old adits, but six are in working order: these follow veins from three to twenty feet thick. The ore contains gold, silver, copper, lead, and in some places antimony.

It is proposed to sink three shafts, two for hoisting the ore and one for pumping and hoisting combined. One shaft is to have a depth of 668 feet, with four horizontal galleries 2,000 feet long, at intervals of 100 feet. Another shaft will be 902 feet deep, with three galleries 2,500 feet long. The whole work will be completed within 12 years. It has been estimated that 300,000 tons of ore will be obtained in this time, and in the three years following an average of 60,000 tons per year.

At present the whole of the ore mined cannot be treated, as the smelting works are incomplete. In 1873 fully 60,000 tons remained from the working of former years, and during the same year an additional amount of 1,867 tons was produced. Of this but 1,217 tons were treated, producing 24,549 oz. of silver and 592·27 oz. of gold, which would be worth at present prices of bullion about $40,000. The ore would thus seem to average nearly $33 per ton (2,240 lb.?), and to be rather an ore of silver than of gold.

* Trans. Asiat. Soc. of Japan, vol. III, part II, p. 96.
† Query: stamp-mill also?
‡ Official Catalogue, Japanese Section, Phila. 1876, page 41.

TIN.

Tin is found in but three of the thirty-five ken of Japan. According to Mr. GODFREY, the total yield in 1874 was 16,800 pounds. In the same year four permits were granted for tin mining. In two of these tin was apparently of secondary importance, being associated in the one case with copper and in the other with lead.

Tin occurs in Japan, so far as I know, only in veins; though in 1874 two permits for exploration were granted to parties who claimed to have discovered deposits of stream tin.

Taniyama Tin Mine—Taniyama kori, Kagoshima ken. Nearly the whole of the tin produced in Japan is from this place. The mine is said to be owned by the Prince of Satsuma, but is under the control of the company that works the Yamagano gold mines. There are twenty-one distinct veins of tin averaging one and a half feet in thickness, but varying from a few inches to four feet. These veins traverse a series of sedimentary rocks similar to the formation at Yamagano, composed of soft tufas, shales, and sandstones, with occasional beds of hard, dark-blue quartzite. The surface is almost everywhere covered with a deposit of modern pumice, and exposures of volcanic rock are of common occurrence.

The general direction of the veins is northwest and southeast, while the strike of the rocks is northeast and southwest, sometimes approaching an east and west direction. The veins are sometimes bedded between hard and soft strata, but usually traverse both. The ore is cassiterite, found in almost microscopic crystals scattered through a gangue of quartz. As mined, the average richness is twelve to thirteen per cent. of tin, though specimens of nearly pure cassiterite are occasionally found. One rich specimen, assayed by one of my students, yielded 56·7 per cent. of metallic tin. The ore is crushed, and is ground between millstones in the same manner as ores containing gold. It is then concentrated by washing on the *ita* to a richness of about fifty per cent. The first grinding and washing yields about fifteen per cent. of concentrated ore; the second, five per cent.; the third, two per cent.; and the final treatment, after two years exposure to the weather, one-half of one per cent. The boards used for washing are similar to those used in the treatment of gold. They are of circular form and very shallow—2·2 feet in diameter and 0·08 feet deep. This elaborate system of concentration is very expensive, requiring for the treatment of a single ton more than eighty days' work, nine-tenths of which is expended in the slow and laborious washing of the ore, a little at a time, on these wooden pans.

The washed ore is treated by the following process:

1. Roasting of the ore in kilns.
2. Fusion of roasted ore in low hearths.
3. Re-melting of tin, in an iron kettle, for purification.
4. Washing and re-melting of slags.

In the case of impure ores, the first roasting is sometimes repeated. In the fusion on the low hearth the ore is charged between dampened layers of old straw matting, and the operation is conducted with great care to avoid mechanical loss of fine ore. The slags from this operation and from the refining of the tin are quite pasty, and contain much metal in fine grains. They are crushed and washed before re-melting. The final refining of the tin is a simple re-melting, though the surface is kept covered with fine charcoal to prevent oxidation.

The mine and smelting works give employment to about 120 men and boys. They are paid by the amount of tin produced, about sixteen cents per pound, partly in rice and partly in money. The yield of the mine, at the time of my visit, was said to be over 2,500 pounds per month. At this rate the production would be fifteen to sixteen tons a year, nearly double Mr. GODFREY's estimate for the whole country. The statement, however, can hardly be correct, for the average daily earnings of the workmen would, at this rate of production, be fully double the wages ordinarily paid in this part of the country. From another source I learn that in 1870 the product was eight tons, which is probably nearer the average annual yield of the mine.

ANTIMONY.

Antimony is reported to occur in six of the ken of Japan. Four mines were producing ore in 1874, but only in small quantity. No ore has, to my knowledge, been smelted in the country, and small shipments only have been made to England and elsewhere on speculation. I visited one of the most important localities, that of Takehama, on the Island of Amakusa, but found the deposit quite insignificant. The stibnite occurs in small and irregular veins, quite pure and free from gangue, and in seams one inch to one foot thick. The country rocks are hard sandstones and dark-blue shales. There are at work here three or four miners, who had several tons of dressed ore on hand awaiting the orders of their agent in Nagasaki.

MERCURY

According to Mr. PLUNKETT, cinnabar occurs in two localities, but neither of these deposits is now worked. One mine in the northern part of Nippon is said to be very promising, but the present proprietors are not now inclined to expend money for its development. The other mine is near Ainoura, on the peninsula of Hirado (not on the island of the same name), in Matsûra kôri of Nagasaki ken. Mr. GOWER, who formerly superintended the working of this deposit, reports it to be valuable. The mine was opened under his direction some years ago, and a retort furnace was erected for the distillation of the metal from the ore. The furnace was worked successfully, and mercury was produced in some quantity. During the absence of Mr. GOWER, however, the workmen, by careless firing, melted the iron retorts, and discouraged by this accident, the owners decided to abandon the undertaking.

The cinnabar occurs here as a local impregnation in sandstones of the coal measures, and filling small seams and fissures in the rock.

SULPHUR.

As might be expected from the volcanic nature of the country, deposits of sulphur are of common occurrence in Japan. It occurs in no less than seven different ken, and in four of the provinces of Yesso. It is found usually in superficial deposits in the craters and on the flanks of inactive volcanoes, and in solfataras. A small quantity is also found deposited from the water of certain hot springs.

In 1875 about six hundred and seventy tons were exported from Hakodate, Yokohama, Hiogo and Nagasaki. The annual production of sulphur, making allowance for that consumed at home, and that sent abroad from other ports, must be much more than this. In 1874 there were twenty-one productive mines, and three permits for exploration were issued by the Mining Office.

A description of the sulphur deposits of Yesso will serve to illustrate the manner of occurrence of sulphur in Japan. These deposits have been examined and described by Mr. LYMAN, and the following notes are condensed from his reports*:

Superficial incrustations, where the sulphurous fumes continually escaping from fissures in the mountain condense in the cooler earth and volcanic scoriæ of the surface, are found near the tops of three volcanoes, viz.: Esan, in Oshima province; Tarumai, in Iburi province; and Iwaonobori in Shiribeshi province. The richer portions of the sulphur-bearing earth yield about forty per cent. The sulphur is extracted by heating the earth in iron kettles, and is afterwards purified by repeated meltings in the same vessels. The beds are quite thin, and the amount of sulphur in sight at each place is small. Mr. LYMAN estimates the available amount of sulphur at these places at about 140 tons. At the time of his visit the deposit at Esan was alone being worked. Remains of old furnaces, however, were seen at the other places. The yield at Esan was about sixteen tons per year, though the work was carried on only in the three summer months. The expense of working was very large; and, according to Mr. LYMAN's data, the sulphur was produced at a large pecuniary loss.

Superficial deposits are also found in Horoleets kôri, in the province of Iburi, at Nuburibets and at Oil Lake in the immediate vicinity. At Nuburibets the sulphur is found in a small valley about 900 feet above the sea. Oil Lake is a large pool of boiling water, one quarter of a mile wide, apparently occupying an old crater. The sulphur is found on the banks of the lake. Mr. LYMAN estimates the amount of sulphur at these places at 100 and 35 tons respectively.

Bedded deposits of sulphur occur at Kobui, in Oshima province, not far from the volcano of Esan, and about twenty-seven miles east of Hakodate. The sulphur, as a rule, is of a peculiar gray color; and, for this reason, though quite pure, is not merchantable and has not yet been mined. A bed of yellow sulphur was found in the same vicinity, but has been exhausted. The beds appear to have been deposited from sulphur waters, and are probably of small extent. The bed of yellow sulphur was one foot thick, and was followed by a drift for a distance of two hundred and forty yards, when it became too poor to be worked. The gray sulphur occurs in a bed twelve feet thick, exposed for a distance of 100 feet. There are also exposures of smaller beds, two feet and four feet in thickness, of unknown, but probably small, extent.

The most remarkable deposit of sulphur in Yesso is that of Itashibeonai, in Shari kôri, in the province of Kitami, near the northeast extremity of the island. The sulphur is found in a small valley, about two miles from the coast. An area of about eight acres on the slope at the head of the valley is carried with a superficial deposit of sulphur, averaging six inches in thickness. In the center of this deposit, about 100 feet lower than the top of the ridge, is a large cavity, 100 feet in diameter and thirty feet deep, from which clouds of sulphur fumes are continually rising. These condense, and the sulphur is distributed over the surrounding earth. In the bottom of this cavity is a small crater, twenty feet by fifteen, apparently filled with melted and boiling sulphur of a dark brownish gray color, through which gas and fumes of sulphur are continually escaping with great violence.

Mr. LYMAN estimates the sulphur in sight, on the surface of the ground, at 3,200 tons. He suggests, moreover, that an almost inexhaustible supply might be obtained from the crater by means of a proper derrick with a dredge-like scoop, "or perhaps by means of a pump."

RESUMÉ.

Coal is, in our day, the main source of national power and prosperity; and few countries possess a richer supply of this mineral than Japan. Coal, as the principal generator of steam, moves the machinery which so largely multiplies the power and the usefulness of human labor, and transports the products of the soil and of industry by land and by sea; coal aids in the extraction of the useful metals from their ores, and gives us heat, light and other comforts of civilized life. It has been estimated that the coal product of Great Britain is equivalent to the labor of one hundred and thirty-three millions of operatives working without wages for her enrichment.† Japan, in the Ishikari coal-field alone, has stored up and available for at least two centuries use the labor of an equal body of men.

To secure the full advantage of this store of fuel, a supply of iron is necessary; for, in the construction of the machinery by which the power of steam is utilized, no available substitute for this metal has been found. It is therefore fortunate that rich deposits of iron ore of the finest quality are so abundant.

Next in importance, perhaps, to coal and iron, are the porcelain clays, which form the basis of a very considerable industry. The deposits of sulphur, also, are by no means unimportant.

Of metallic minerals other than iron, ores of copper and silver alone occur in considerable quantity, and in deposits that can profitably be worked. Lead and gold are found in many parts of the country, but the deposits are almost always poor—and as a rule, not worth working. Tin and mercury are of rare occurrence; while other metals, such as antimony, cobalt, etc., occur only in unimportant deposits.

The universal wealth of Japan, therefore, lies not, as was formerly supposed, in inexhaustible deposits of the precious metals, but chiefly in its abundant stores of coal and iron.

HYDRAULIC PROPULSION OF TRAMWAY CARS.—About midway on a line or network of tramways, or at any other point of the same line, a motive-power engine is, according to the invention of Mr. L. ROUSSEAU, C. E., of Brussels, mounted and arranged in combination with pumps and apparatus in a similar manner to those employed in ports, docks, or warehouses, where the lifting apparatus are actuated by hydraulic pressure. For this purpose a pipe or tube for conducting water under pressure is laid down along the whole of the line of tramway or its branches, and in communication with a reservoir or receiver. At suitable distances apart valves or taps are placed in the said pipe or tube in order to supply water under pressure to the carriages of the train, which are placed at certain stations in communication with the reservoir or receiver above-mentioned. At these different points or stations each carriage completes or renews and stores away the necessary quantity of water under pressure which is required to enable it to act automatically in the distance comprised between two hydrants for taking in the water. In order to maintain the water under pressure stored in each carriage, a receiver is fixed either horizontally or vertically under the floor of the carriage. This receiver is composed of one or more cylindrical metallic vessels containing compressed air at high pressure (from 20 to 30 atmospheres), according to the power required. The compressed air contained in each receiver acts by its elasticity similar to a spring, either direct or by means of a piston, on the water supply contained also in one or more cylindrical vessels. The water under pressure in the reservoirs or receivers puts in motion the mechanism, and thereby gives rotary movement to the wheels of the carriage. In order to put the mechanism in motion, an ordinary hydraulic capstan is employed, or the well-known multiple cylinder apparatus of Brotherhood or West, or the well-known cyclo-dynamic machines of Mathon, or any other suitable mechanism, in order to obtain the same result.

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* Kaitakushi Reports, 1871 to 1875, pp. 5, 143–148, 470–473.

† J. S. NEWBERRY, Report of Progress, Ohio Survey, 1869; p. 33.

ABSTRACTS OF LECTURES ON MINING.—No. XXIII.

By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(*From the London "Mining Journal."*)

There is no subject, perhaps, in connection with the art of mining requiring more thought than that of illuminating the workings, simple as it may be in some cases, and in others involving a great number of moot points, and one on which the most skillful viewers are by no means yet agreed. In some of the Scandinavian mines torches and large open lamps are employed, as was formerly the case in the days of the old Romans; but there are not many places where such large flames would not be inconvenient, from the amount of smoke they produce. They would only be applicable in large and wide workings, where there is nothing to interfere with the ventilation, and where pine wood for making torches is present. In the greater part of our mines, and in many Continental ones, candles of one sort or other are employed. These are made of different sizes, and carried in different ways. In some Continental mines, where large spaces have to be lighted up, and where there is nothing to interfere much with the steady burning, as in some salt mines, large candles of 6 or 8 to the pound are used; in the majority of cases those of from 18 to 24 to the pound are used; and in colliery districts where fire-damp occurs, it was formerly the custom to use very thin candles, of 40 or 50 to the pound. Sometimes a larger size is provided for the managers or overmen, called captains' candles. As regards the materials and method of manufacture, it may be said that nothing but the test of experience will satisfactorily decide whether any particular variety is better than others. Before the introduction of the safety-lamp the candle was used to test for fire-damp, and some of the men acquired great skill and steadiness in performing the operation. A candle properly trimmed was raised cautiously up to the suspected region, which will generally be at the top of the work, on account of the lightness of the gas, and the height and color of the flame noted. Fire-damp would indicate its presence by the flame elongating and becoming blue, on seeing which the operator would, with great steadiness, cautiously lower his candle again. Some of the men would almost play with this, advancing their candles to such an height as to be within a hair's breadth of exploding the whole gas. Among the methods of holding the candle may be noticed, in the first place, the Somersetshire plan of having a copper or iron holder, about 6 inches long, with a spike at one end by which it can be carried, or stuck in a loop of the cap when it is necessary to creep, or into timber or a joint in the coal while the men are at work, the candle being held at the other end by means of two small cheeks or springs. This rude Mexican holder of wood carries the candle, so that its flame is in a kind of lantern, and the candle can be pushed up so as to keep the flame in this position; the holder is carried by means of a handle at top. This Saxon "blend" which carries a candle, fixed into a socket at the bottom, has the convenience of a hook by which it can be hooked into a buttonhole, or into a collar round the neck, leaving the hands free for climbing. For the officers and others who have to travel much about the mines there is a pane of glass, in order to shield the light from draughts. In our own country it is more commonly the case that the candle is carried and fixed by means of a little wet clay; the clay being dabbed against a piece of timber or a projecting piece of rock, so that the light may be thrown where it is the most required.

The amount of candles given out varies a great deal in different mines, the management of the mine generally undertaking to supply the men at a given price, thus ensuring that they are provided with good materials. In some districts 1 lb. of candles per week is allowed, in most of our Cornish districts 1½ to 2 lb. are allowed for six shifts of eight hours each. The use of candles has been objected to in some Continental districts for the great waste attending them; and in some of the deeper mines this waste is very great, in consequence of the high temperature. In the collieries the men will often cry out if you have too strong a wind on the face of the coal, causing "swealing" of their candles, and will even place obstacles to obstruct the ventilation.

In many districts candles have been replaced by lamps of various kinds. The lamps of ancient times were fed by tallow, and were more or less of the shape of the old Roman lamps, and in some of the Continental districts this shape is retained, and tallow is still the material employed. But oil lamps are now often substituted for tallow-fed lamps; as, for instance, in this Saxon lamp, of a somewhat globular form. The lamps have this convenience, that the light remains constantly at the same height, and a pricker is generally supplied along with the lamp for trimming it. In Scotland very small oil lamps are employed, which give a very fair light, and cost but little, about 2½d. each. They are carried by the means of a little handle of curved iron wire, by which also they may be hooked into the cap if necessary. In some of these cheaply constructed lamps the cost of the light does not exceed 1d. for some seven or eight hours. This lamp is one used in the collieries at Mons, in Belgium: the lamp itself is of a flattened circular form, and is carried by a long handle, having on the other side a long iron spike, by which it can be stuck into timber, or into joints in the rock. In Spain and other southern countries, where oil lamps are employed, the oil used—olive oil—is so fluid that the lamp has to be carried with great care and steadiness, otherwise there is great waste of oil. In many mines, and parts of mines, it is difficult to get anything to burn, the air is so stagnant. If it is necessary to enter any of these places at such a time, or if old workings in such a condition have to be examined, various devices are necessary to obtain a light. Inclining the candle at various angles, down to 45° will be sufficient in some of these cases to maintain a light; if this will not do two candles must be employed, inclined towards each other. It has been said that petroleum will burn in air where candles will not; that while a candle will not burn where the oxygen is reduced to 18 per cent., petroleum will burn with the oxygen present at only 14 per cent. In some cases this matter becomes truly important.

The lecturer had heard of cases in Brazil where a number of fire-flies were caught and put into a bottle, in order to utilize the fitful light they emit; or other cases where a mass of highly decomposed fish was employed for the phosphorescent light it gave out. Difficulties of this kind will arise in cutting cross connections between two parallel roads in the collieries, or again, in communicating between two levels. In the end of the cutting the air may be quite stagnant, and this together with the presence of fire-damp, or in some cases of exhalations of carbonic acid, ordinary lights cannot be employed. One plan, suggested by the accidental flashing of light into the pit from the saw of a carpenter at the bottom of one of the Newcastle shafts, was to reflect the sun's light by a combination of mirrors, but the moisture, dust, &c., in the workings soon render the mirrors almost useless. The difficulties are increased where you have a deal of explosive gas about, and the method was adopted of getting the men to work in the dark in such places, and a man who could so work was at a premium. A contrivance was then adopted, which was sometimes spoken of as "the miner's friend"; a disk of steel was made to rotate against a piece of flint, and the light given off from the sparks struck was such as to enable one or two men to work by. This contrivance was considered safe for a time, but we have only to turn to the evidence contained in some of the Blue Books to see that several explosions have resulted from the presence of such sparks.

About the year 1815 several very serious explosions occurred, and led three persons of very great ingenuity to endeavor to invent a means of lighting which should be safer than those employed. These persons were Dr. CLANNY, GEORGE STEPHENSON, and Sir HUMPHREY DAVY. Although Dr. CLANNY may have been in the field a little sooner, yet the discovery of Sir H. DAVY that the wire gauze should be of a certain degree of fineness, in order to check the passage of the flame, was so decidedly an improvement that both Dr. CLANNY and STEPHENSON introduced DAVY'S safety gauze into their lamps. Since 1816, when Sir H. DAVY sent down to the North of England the first lamps which were taken underground, Mr. BUDDLE, the greatest viewer of the day, was satisfied that they could be practically used. Since that time the number of lamps brought forward may be termed legion, but a large proportion of them have been found not to answer practically. The simple lamp proposed by Sir H. DAVY was to have a cylinder of wire gauze 6 inches high and about 1¼ inches diameter; the great object being that if in a fiery place the gas should take fire within the lamp it should not produce such a body of flame or heat as to destroy the gauze. DAVY gave very good advice regarding this; he pointed out that in such a case the lamp was not to be depended on for any length of time, that the flame within was to be extinguished, not by blowing out, but by dipping the whole into a vessel of water, or by drawing down the wick with the pricker. The lecturer thought some improved form of pricker might be introduced with advantage, the one used being simply a piece of wire introduced through a hole from below. In testing with such a lamp for the presence of fire-damp the wick should be pulled down, so as to get a small flame, and then the lamp should be advanced towards the suspected place (which from the lightness of the gas will probably be towards the top of the workings), and then the size and the color of the flame should be noticed. If the lamp becomes filled with a blue flame it must be brought down very cautiously. Sir H. DAVY saw clearly another point which must be remembered—that if the fire-damp were propelled at the rate of 5 or 6 feet a second there might be introduced the danger of the flame being forced out. Special precautions must be taken in extinguishing the lamp when filled with flame not to jerk it, and to protect the lamp when passing through parts where there is a considerable current. It is not only the rate at which the current is travelling which must be noticed; if the current is moving at the rate of 3 or 4 feet per second only, and you are advancing against it at the rate of 2 or 3 feet, it might be dangerous; or, again, a stumble or jerk by an inexperienced person carrying a light might introduce danger. The late Dr. PEREIRA was the first person to point out how this might be experimented on, and, following out his instructions, it is easy to jerk out the flame, so as to light a jet of ordinary coal gas.

In the return airways of the mine, which are likely to be loaded with gas, no one should have access but the officers and thoroughly trustworthy men. Where open lights can be used they should be, because they may even contribute to the safety of men, causing them to look to the ventilation more carefully, which is, after all, the main point. They will, if possible, work by open lights, as we might expect, since by a better light they can do more work and earn more wages; and unless the lamps are securely locked, they will open them. In two different systems of working collieries the distribution of open lights and lamps is very different: in the long-wall system the fall of the roof is often apt to liberate large quantities of gas, and here the use of open lights should be confined to the narrow workings, and such a current of air carried round the face of the work as to destroy the power of the gas. In the other system the use of safety-lamps might be limited to the working of the pillars, and open lights be employed in the bords.

The lecturer then referred to a large number of lamps on the table, pointing out the main features in which they differed, and some of the improvements introduced. A very simple improvement is to introduce a reflector, which at the same time may serve as a shield for the current, or a shield of mica or horn may be used, which can be slid up and down the wires. Another and very safe plan is to have a shield which you can drop over the whole lamp when passing for a moment through a strong current—as, for instance, in getting through a door. Next to the Davy lamp the Stephenson, or "Geordie," lamp is most commonly employed: it is a larger and heavier lamp, and inside the gauze there is a cylinder of strong glass, so that it is not so liable to have the flame driven through; you can also use a larger wick and flame, and, therefore, get a better light. In consequence of the glass cylinder coming down to the base of the lamp, the air to feed the flame is admitted by a series of holes below, which have the disadvantage of becoming choked up by dust, &c., and, therefore, of causing the flame to burn low and smoky. In explosive mixture the lamp goes out, and this is regarded by some as an advantage, whereas the Davy will burn till the gauze gets red-hot if it is kept in the mixture. The Stephenson is a valuable lamp if care be taken to suspend it properly, and it is much used in the North of England. In the Clanny lamp the upper part of the cylinder is of Davy's gauze, while the lower part is of well annealed glass; some of these give a very fair light, but they are rather difficult to manage, on account of the air required to feed the lamp having to pass downwards from the gauze. The Boty lamp—one of the few allowed by the Belgian Government—has much the appearance of a Clanny lamp, but the feed air is admitted below in the same manner as in Stephenson's. The lamp mainly used in Belgium is the Mueseler, and in 1862 the Chief Inspector of Belgian Mines stated that upwards of 20,200 were in use, and that, so far, not a single accident could be laid to their charge. Inside the lamp is a chimney of copper or brass above the flame, up which the heated products of combustion pass; the feed air passing through the upper wire gauze and down in front of the glass cylinder tends to keep it cool; a very good light is given by this lamp. A good account of this last lamp is given from certain pits in Nottinghamshire and North Wales where they have been employed. No doubt a large number of glasses are broken from time to time, but it appears on examination that, as a general rule, these are broken in the shafts. The gauze used by Davy had 28 apertures to the linear inch, or 784 to a square inch; others have been tried with larger apertures, but have failed, while those with smaller openings obstruct the light too much. Many different means for locking the lamps have been proposed; some with the common padlock, others of the most artless character, which could easily be turned with the finger and thumb. One of the best methods is the Belgian one of locking them with a pin of lead, stamped at the office, and lamps then can only be opened by breaking the pin. Another plan is that of Mr. DUBRULLE, in which by means of a screw the wick is pulled down, and the flame extinguished if the top is attempted to be removed; in such a case, however, the man has only to put a few matches in his pocket, and may thus pass undetected. Another,

and perhaps the best method of all, is one which was exhibited in the last Paris Exhibition. The top of the lamp can be unscrewed only when placed on the poles of a large horseshoe magnet, which could be kept in the office; at other times it remains safely locked and unmoveable by reason of a small iron catch. The rule should be made in the works that as soon as a man finds anything wrong with his lamp he should take it to a properly appointed official at a certain part of the works, and have it put right again.

NOTES ON THE IRON WORKS OF MEXICO.

Special Correspondence of the Engineering and Mining Journal.

THE COMAUJA IRON COMPANY.

COMAUJA is a village of 2,000 people on the boundary line between the States of Jalisco and Guanajuato, seven leagues east of the town of Lagos, and ten leagues northwest of the town of Leon, which is in a very rich agricultural district. It has the most poverty-stricken population in the Republic of 150,000, and is well known as the center of the system of the various projected lines of Mexican railroads. The silver mines at Comauja were formerly very productive, which caused it to be quite a flourishing place; but the ores, though still abundant, having changed in character, and requiring a system of concentration to which the natives are unaccustomed, it is, like many other places in this country, now in a state of torpor.

The iron company was organized in 1866, and built a small blast-furnace at Laucedo, four leagues east of Lagos. This location was selected on account of abundant water power, but being soon recognized as very bad as regards the supply of ore and fuel, the establishment was removed to its present site on the outskirts of the village, where ground was broken in 1870, and steam-power only is used.

The works occupy a sloping piece of ground of about six acres, inclosed by a high, prison-like masonry wall to protect it from marauders and pilferers; each gate being provided with its special porter with his club, and in the background his sword and musket. The general plan is in the form of an L, and is all one building, 50 feet wide, 20 feet clear, 150 feet long on one side, and 200 feet on the other; the sides are of rubble masonry of the most solid description. The carpenter shop and foundry occupy the shorter side; steam engines, hammers, bloomary fires and bar mill the other side. The blast-furnace is placed in the angle.

The carpenter shop is large, well lighted, and airy, and well supplied with the most necessary tools; but one is most struck with the elegant cut stone columns, with capitals and bases of the Roman Doric order, that support the roof. The foundry has two cranes and one cupola, and all the usual fixtures, of the best workmanship. The cupola is extremely well built, even to elaborateness; it is said to melt 1,000 lb. of iron per hour, with 500 lb. of charcoal.

All varieties of castings are made, such as sugar boilers, sugar-mill rolls, bannister railings, cog-wheels, etc. A cog-wheel that we saw, nine feet in diameter, was particularly clean and neat. Castings are usually made from the blast-furnace direct, and, when it is not working, from the cupola. White iron for shoes and dies of quartz mills is made by repeated melting in the cupola, and has quite a reputation.

The blast-furnace is a brick stack, ornamentally yet strongly bound, and is a very pretty structure. Hearth, 26×26 inches; bosh, 6½ feet; height, 26½ feet; two tuyeres, 2½ inches diameter. The stack is hoisted by hand-power and windlass, up an inclined plane to a platform two feet below the charging door, which opens and shuts, and is surmounted by a chimney about twelve feet high.

The average charge is said to be—

Roasted ore	300 lb.
Charcoal	250 "
Calcined lime	35 "
Limestone	20 "

—40 to 55 charges a day producing from 80 to 100 quintals of pig iron, or about 66 per cent. of the weight of the ore.

The ore is roasted with charcoal braise in a furnace similar to a lime-kiln; 300 charges of 200 to 250 pounds are burnt every three days. It is then broken by hand, sorted, and transported on men's backs to the stock-house, about 200 feet distant; total cost per ton of ore (2,000 lb.) $1.50.

The mines are two leagues east of the works, and, although one deposit, they are known as La Mina de Santiago, La Mina del Sanco, and La Mina del Sitio. The outcrop can be distinctly traced more than a league, the average width being from 10 to 30 feet; the exploitation so far is merely on the surface.

The ores are brown hematites of every degree of richness up to 70 per cent. metallic iron, and apparently very easy to smelt. Pyrites occur, but not to such an extent that they cannot be sorted out at the mine with a little care. It is to be regretted that these ores have never been analyzed, and that the character of the deposits has never been determined at a greater depth than twenty feet.

Limestone is abundant and is delivered at $3.00 per ton.

Oak and mesquite are abundant three leagues from the works, and charcoal is delivered and paid for by weight at 25c. to 37½c. per quintal of about six bushels. A refractory stone found in the vicinity is used as a lining for the blast-furnace, and is said to give every satisfaction, the campaign lasting four months. The cost per ton of iron may be approximated as follows:

1·5 tons of ore at $1.50	$2 25
150 bushels of charcoal at 6c.	9 00
550 lbs. of lime at $3 per ton	0 83
For engine—2 cords of wood at $2	4 00
Labor	1 00
Superintendence, repairs, etc.	2 50
	$19 58

The blast engine is from RAMSWELL & SIMS, Ipswich, England, and is about 60 horse power; horizontal steam cylinder 16 inches by 5 feet; 2 blowing cylinders 30 inches (made at Comauja), double-acting, with clack valves, 45 to 50 revolutions per minute; pressure of blast, 2 to 2½ lbs. This machine is also connected with the cupola and bloomary fires. Near this engine is a smaller one of 15-horse power that runs a 1,000-lb. trip hammer. These two engines are supplied by steam from two boilers 30 inches by 16 feet; another is on hand, but not yet in place. Two bloomary fires are placed at the side of the boilers, and a flue conveys the waste heat under them, but it is insufficient. The bloomaries are very elaborately built, and as neat as a cooking range; space is left to place others. A 7-horse power portable engine from A. TROUSSET DU VEAU & CIE, Angouleme, France, with a No. 3 Root blower, will supply them with blast when the main engine is not working. The bloomaries have recently been put in operation. The present production of the two fires is 25 tons a week, 2 tons of charcoal, or 240 bushels, being used per ton of iron; loss of iron, 30 per cent. Three French forgemen were specially imported to teach the Mexican laborers this work, and at our visit, April 17, they were hardly well under way. A small spring hammer, put in operation by a belt for drawing out small bars, may be said to complete the list of machinery in operation.

A partition wall divides the bloomary from the bar mill, the sides of which are built, but it is not yet roofed. The rolls, engine and other machinery have been on hand for two years, but are not yet placed. Puddling furnaces are to be used. The establishment is liberally supplied with lathes and all the necessary tools for construction and repair, and many of the details of the work indicate the presence of some mechanics far above those usually found in the country.

These works are said to have already cost $450,000; they certainly present a very imposing and ornamental appearance, and in this respect are a most decided improvement upon those of Tula. Possibly more could have been done with less money, but the constructing engineer has succeeded admirably in following old traditions, and faithfully reproducing structures which are only known to the engineer of to-day by the plates in ancient works on metallurgy. The castings produced sell from six to ten cents a pound, and give every satisfaction; but it is reported that the reputation of the works was much damaged by the sale of a few tons of bar iron two years ago, which was so bad that it was turned and the money refunded.

The public say that the ores contain copper. Judging from the ores and the appearance of the iron, we must decidedly doubt this assertion. If it is true, it is an instance where a few hundred dollars spent in analyses would have saved thousands. The cause is more likely due to inexperience and sulphur.

When a good hot-blast furnace and a little judicious management is added to its present resources and admirable geographical position, there is every reason to suppose that these works will command a most brilliant future, second to none in the Republic. The following works are said to exist, but we were unable to visit them on account of the pronunciados, and can only speak from report. Blast furnace in State of Durango, iron reported to be softer than lead, and they have found no means of making it harder! Can it be iron, one naturally inquires.

At Monterey there is also a furnace, but nothing said about it.

In the District of Mexico, within two hundred miles of the City, there are the following works: Apulco and Trinidad, which have been idle a long time. Zacualtipan has been stopped on account of litigation; that being arranged, it was about to be put in blast in May, but was prevented by the demand for a loan (?) of $1,000 per week from the pronunciados. At Zimpan there is a blast furnace and bar mill capable of rolling all sizes of iron from ¼ inch up to three inches round; the capacity is 2,000 tons of bar iron per annum. That seen in the store-house in Mexico City was as smooth and well finished as any ordinary iron of the States, and the company has the reputation of making, in every respect, a first-class iron.

Near Mexico City there is a great deal of competition, so much so that we saw eighteen-inch mine pumps, plunger, etc., complete, delivered at the mines of Real del Monte and Pachuca at 6 cents per pound, which is as cheap as in Pennsylvania for the same class of work. In the interior the price does not depend upon the cost of production, but the cost at which foreign iron can be transported to a given point added to the necessity of the buyer, only enough being produced to meet standing orders; therefore, the works only run about half time. Some maintain that as the Government admits all machinery for the development of the mineral resources of the country free of duty, the iron men should sell cheaper, and it is their interest to do so, as they would sell more, because numerous small industries would spring up which are now prevented by the high price of iron. The producers maintain that as only a limited amount of iron is consumed in the country, lowering the price would not increase the consumption; and that those who need it, must pay for it. They certainly ought to be the best judges of their own affairs. J. P. C.

September 9, 1876.

NOTES.

THE CLEAR CREEK COMPANY'S REDUCTION WORKS are located at Georgetown, Colorado. The rates paid for silver ores by the works on the 21st inst were as follows:

40 oz.	Ore 23c.	per oz.	140 oz.	Ore 81c.	per oz.	400 oz.	Ore 99c.	per oz.
50 "	36c.	"	160 "	84c.	"	450 "	$1.01	"
60 "	46c.	"	180 "	86c.	"	500 "	1.02	"
70 "	55c.	"	200 "	88c.	"	600 "	1.03	"
80 "	62c.	"	225 "	90c.	"	700 "	1.04	"
90 "	68c.	"	250 "	93c.	"	800 "	1.05	"
100 "	72c.	"	300 "	95c.	"	900 "	1.06	"
120 "	77c.	"	350 "	97c.	"	1000 "	1 07	"

Lead over 22 per cent. paid for at market rates. Concentrating ores low in silver and high in lead, and copper ores at special rates.

THE DIVES SILVER MINE employs 30 men, nearly all on development work. A great deal of concentrating ore has been disposed of recently, and there are still about 180 tons on hand. The low grade ore, for which our concentrating works have opened up a good market, will add largely to the aggregate production of the mine.

DIAMOND JO SILVER MINE.—Another new strike has recently been made in this famous mine on Kelso mountain, consisting of two feet of mixed ore and quartz, including a six-inch solid streak, the mineral milling 316 ozs. silver per ton, second-class, and 710 ozs. for the first-class. Eleven men are now engaged; and five others are employed in driving tunnel No. 3, which cuts 250 feet below the workings of No. 2 and which is now in 140 feet.

THE SILVER GLANCE MINE is located on Democrat Mountain. The lessees are now stoping in the lower level and taking down an ore vein that varies from 8 to 15 inches in width, and mills from 200 to 800 ozs. silver per ton. The mine is looking well all over.—*Georgetown Miner*, December 23.

THE SALT LAKE CITY ORE MARKET.—The shipments of ore and bullion for the week ending Dec. 9 are as follows: To Omaha, 13 cars; to Newark, 11 cars; to St. Louis, 5 cars; to New York, 10 cars; to Pittsburg, 1 car; to Pittsburg (lead) 15 cars; to Sacramento (lead), 11 cars; to New York (copper), 5 cars. Total cars, 71. Total bullion, 834,705 lb; total lead ore, 541,000 lb.; total copper ore, 100,000 lb. Aggregate shipments of bullion, lead and copper ores. 1,475 705 lb. The market is firm at $1.19 per ounce for silver, and $71 for lead, and $20 per ounce for gold. No actual sales to report. We think that the published statements this year will be different from last in that it will show the actual amount of silver; whereas, last year the total yield of this Territory, Colorado, and Nevada was published, and the impression got abroad that it was all silver, while it was divided up into gold, silver, copper, and lead. The Vallejo and South Star Mines are endeavoring to compromise matters. The South Star is still in possession. The Mingo Furnace at Sandy, belonging to a Pittsburg company, is completed, and ships to-day its first car of bullion. We are all the time receiving the most encouraging accounts of the present condition of the mines in all parts of the Territory. Business of every kind is good, if we can judge from the appearance of the street.—Correspondence of the *Inter-Ocean*, dated Dec. 22.

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 Dec. 23.

Tons of 2,240 lb.	1876.		1875.	
	Week.	Year.*	Week.	Year.*
Wyoming Region.				
D. and H. Canal Co.	33,934	1,966,600	46,466	2,938,767
D. L. and W. RR. Co.	57,664	1,967,701	29,337	2,910,135
Penn. Coal Co	14,535	1,073,862	24,495	1,343,583
L. V. RR. Co	22,279	949,468	12,821	922,299
P. and N. Y. RR. Co.	821	26,304	457	87,700
C. RR. of N. J.	37,952	1,375,413	44,942	1,506,101
Penn. Canal	—	407,522	—	299,267
	167,195	7,766,870	158,518	10,057,843
Lehigh Region.				
L. V. RR. Co	58,852	2,806,045	51,496	2,248,214
C. RR. of N. J.	29,483	1,384,017	28,711	832,404
D. H. and W. B. RR.	—	40,830	662	68,834
	88,335	4,230,892	80,869	3,149,452
Schuylkill Region.				
P. and R. R. RR. Co.	87 709	4,883,780	34,560	4,767,346
Shamokin & Lykens Va.	6,249	931,789	8,779	1,186,947
	93,958	5,815,569	43,339	5,954,293
Sullivan Region.				
Sul. and Erie RR. Co.	117	30,553	838	14,632
Total	349,605	17,843,884	283,564	19,186,220
Increase	66,041	—	—	—
Decrease	—	1,342,336	—	—

* Year beginning January 1st.

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.

Belvidere Delaware RR. report.	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	—	292,718	198,767
" " " South Amboy	15,078	460,355	295,351
Shipments at Coal Port (Trenton)	—	284,423	195,362
" South Amboy	7,077	494,136	335,248

Perth Amboy business:	Tons.
Received for the week	26,068
Shipped for the week	10,160
On hand Dec. 23	96,475

Receipts of Coal at Boston, for the week ending Dec. 22, and years from Sept. 1, 1875 and 1876.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	....	18,270	49,886
Philadelphia	....	292,676	315,783
Baltimore	....	50,774	56,709
Other places	1,710	105,382	123,987
Great Britain	....	1,959	....
Nova Scotia	....	13 348	11,868

Coal Shipped at Pictou, N. S., for week ending Dec. 16. 1876 ..... 356 tons.
Previously exported, since Jan. 1 ..... 173.243 "
Total to date 173,599

The Production of Bituminous Coal for the week ending Dec. 23, was as follows:

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week. Tons.	Year, Tons.
Tons of 2,240 lb	†	1,764,108
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	8,110	352,069
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	3,448	158,562
*East Broad Top	1,240	63,287
Clearfield Region, Pa.		
*Snow Shoe	937	48,130
*Tyrone and Clearfield	30,156	1,118,040
Allegheny Region, Pa.		
*Pennsylvania RR	3,538	197,546
Pittsburgh Region, Pa.		
*West Penn. RR	2,913	188,706
*Southwest Penn. RR	1,176	53,933
*Penn. & Westmoreland gas coal, Pa. RR.	19,357	833,386
*Pennsylvania RR	6,943	286,497

* For the week ending Dec. 7.
† This report was not received this week.

The Production of Coke for the week ending Dec. 7.

Tons of 2000 lb.	Week.	Year.
West Penn. RR	1,127	50,787
Southwest Penn. RR	9,714	496,543
Penn. & Westmoreland Region, Penn. RR.	1,053	55,202
Pittsburgh, Penn. RR	3,623	149,215
Total	16,417	751,747

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, Dec. 29, 1876

Anthracite.

As usual during the holiday week but little business is being done, and prices are decidedly weak, in occasional instances being exceedingly low, while in others but little above the prices realized at last week's auction sales. The usual closing of books and stock-taking, coupled with the very liberal stocks held by dealers generally, will probably result in a very quiet trade during January, and the accumulation of large stocks at the shipping ports, unless a very great curtailment of production shall take place during next month.

There does not appear to be a sufficient unity of action to bring about a reduction in wages on January 1st, and it is impossible to say just what will be done in this direction, although the necessities of the case are so great that a reduction will soon have to be made, even though each company may be compelled to act independently.

Bituminous.

The ports at Georgetown, Baltimore and Philadelphia are closed with ice, resulting in a suspension of business at each of these cities, although temporary arrangements and concessions have been made by the Pennsylvania Railroad which enables the Clearfield coal to hold its position in the Eastern market.

Articles of incorporation were filed on the 27th inst. by the George's Creek and Cumberland Railroad. There is not a doubt expressed that this road will be built and enter into competition with the Cumberland and Pennsylvania Railroad.

New York.

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

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Rondout	3 00	3 00	3 00	3 00	3 80	3 80
Pittston at Weehawken	3 0.	3 00	3 00	3 1 2	3 60	3 35
Wilkesbarre at Port Johnston	3 00	3 00	3 00	3 00	3 75	3 25
Plymouth, R. A.	....	....	3 00	3 00	3 85	3 35
Susque. Coal Co. at Amboy W.A.	3 00	3 00	3 00	3 00	3 75	3 25
Kingston at Hoboken	3 00	3 00	3 00	3 00	3 75	3 25
Lehigh Coals.						
Old Company at Port Johnston	3 75	....	3 25	3 25	3 75	3 25
Old Company's Room Run "	3 75	....	3 25	3 25	3 75	3 25
Sugar Loaf, Hobok. & Amb. "	3 75	....	3 25	3 25	3 75	3 50
Lehigh Coal Exchange "	3 75	....	3 25	3 25	3 75	3 50
Honey Brook Lehigh	2 75	....	3 25	3 25	3 75	3 25
Beaver Meadow at South Amboy	3 75	....	3 25	3 25	3 75	3 25
Schuylkill Coals at South Amboy.						
Schuylkill white ash	3 00	3 00	3 00	3 05	3 80	3 35
Schuylkill red ash	...	....	....	....	....	....
Lorberry	....	....	....	....	....	....
Lykens Valley	....	....	..	....	....	....
North Franklin red ash	....	....	....	....	....	....

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

	Per ton.
Freight from Hoboken and Weehawken to New York	35c.
" " Elizabethport & Port Johnston to N. York.	35c.
" " South Amboy to New York	35c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt.	4 25	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
Newburgh Cannel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	6 00	7
" Gas Coal at Richmond.	4 15	5 65
Peytona Cannel W. Va. at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va.	3 50@3 75	5 20
Cumberland, at Baltimore	3 65@3 80	5 45
Clearfield f.o.b. Canton, Baltimore	3 40@....	5 00

Pennsylvania Semi-Bituminous Coals.

At the mines, per 2,000 lb., 90c. f.o.b, at Greenwich, Phila., for Eastern and Foreign shipments, per 2240 lb. $3 25@3 35 for Sound ports, 3 50@3 65, f.o.b., at South Amboy, N. J., per 2,240 lb., $4 10@4 60. Discharged, in New York, per 2,240 lb., $5 00 @5 20.

Foreign Gas Coals.

	Sterling.	Am. cur cy.
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S.	2 00	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$3 90	$4 20	$3 90
Lackawanna coal, in yard	3 90	4 20	3 90
Wilkes-Barre, delivered	5 00	5 30	4 60
Lehigh & Locust Mountain, del'd.	5 50	5 50	5 00
Schuylkill Red Ash, del'd	5 25	5 50	4 75

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$18 00
Liverpool House Cannel " " "	18 00
American " " "	11 00
Cannelton Block, or splint, " " "	10 00
American Orrel " " "	11@14
Red Bank Cannel " " "	10 00
Cumberland " " "	7 00

Baltimore, Md. Dec. 27, 1876.

Specially Reported by Messrs. E. STABLER & Co.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Boston" Vein, and Plymouth White Ash.

In cars at depot.		In cars at depot.	
Lump	$3 85	Egg	$4 10
Steamboat	4 10	Stove	4 60
Broken	4 10	Nut	4 10

Shamokin, red or white ash.

Egg ..... 4 30 | Stove 4 60

Lykens Valley, red ash,

Egg and stove 5 35

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2240 lb. ..... $6 00@7 50

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point	3 75@4 00
West Virginia Gas f. o. b. at Locust Point	4 50
Youghiogheny Gas, f. o. b. at Locust Point	4 50
Swanton	4 00

Boston, Mass. Dec. 23, 1876.

COAL is in very good demand at retail, but the market is well supplied, though, should the sharp weather continue, some scarcity might ensue before the close of winter, as supplies would then have to be brought by rail. Freights are nominal, but would rule at $3 from Philadelphia if any transactions were effected. In coal cargoes there have been no transactions. The small legitimate profits of retailers are said to be leading to more cheating on weight than usual.—*Commercial Bulletin.*

Buffalo, N. Y. Dec. 27, 1876.

Specially Reported by Messrs. LEE & LOOMIS.

The increased demand in oil regions – owing to activity in the wells—has caused an advance in prices of Catfish coals.

	Lump.	Run of Mine.	Nut.	Slack.
Connellsville Coke	$5 00	....	....	....
Brookfield Coal	4 15	....	....	....
Briar Hill	4 15	....	2 85	....
Youghiogheny	4 25	....	....	....
Monterey	3 55	3 35	....	..
Catfish	3 55	3 35	....	....
Stoneboro	....	....	2 75	2 40
Sterling Cannel	5 00	....	....	....
Reynoldsville	3 50	.. .	....	2 65
Cameron	3 15	....	....	2 40
Buffalo Coal Co.	3 15	....	....	2 40

Chicago, Ill. Dec. 26, 1876.

Specially reported by Messrs. RENO & LITTLE.

Lackawanna Stove	$8 00	Erie and Brier Hill	$6 00
" Chestnut	7 75	Wilmington & Ill.	3 50@ 4 25
" Grate & Egg	7 50	Blossburgh	7 00

Cincinnati, O. Dec. 26, 1876.

Specially Reported by Messrs. A. BUCHANAN & Co.

Per ton of 2000 lb.	Bush.	Ton
Youghiogheny, or Pittsburgh, afloat	@7c.	—
Pomeroy coal	@5c.	—
Kanawha "	7½c.	—
Ohio River Coal	5½c.	—
Cannel coal, according to quality "	@16c.	—
The following are the retail prices delivered		
Youghiogheny	10@11c.	—
Pomeroy	9c.	—
Cannel	@22c.	—
Kanawha	10c.	—
Anthracite, per ton	$9 00@9 50	
Coke, at yard	10c.	—
Coke, hard and soft, delivered	— @9c.	—

Cleveland, O. Dec. 26, 1876.

Specially reported by Messrs. LAMBIE & BATES.

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

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	1 to 10 tons.	10 tons upw'd.
Brier Hill lump	$4 25	$4 00
" " nut	3 75	3 50
Massillon and Mineral Ridge lump	4 00	3 75
" " " nut	3 75	3 50
Straitsville Lower Vein, Hocking & Shawnee, I'p.	3 60	3 35
" " " nut	3 40	3 15
Del Carbo lump	3 75	3 50
" " nut	3 50	3 25
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 25	7 00

Lehigh to be $1 25 per ton higher.
All sales to be strictly cash with order or C. O. D.

Indianapolis, Ind. Dec. 26, 1876.

Specially reported by Messrs. COBB & BRANHAM.

The prices have been ruling low thus far in the season, but we anticipate better margins on our coal after the Holidays. Trade has been brisk thus far.

Wholesale on board cars, and retail delivered to consumers.

Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton	$2 75	Peytona cannel, per ton	$5 75
Brazil Block, "	2 75	Indiana Cannel	4 50
Highland, grate, "	2 50	Hocking Valley	4 25
Block coal, nut, per car	18 00	Youghiogheny	4 50
Highland " "	18 00	Blossburg (smithing)	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$6 70	Nut	$6 70
Egg	6 70	Stove	6 70

Lehigh Anthracite.

Broken	$7 60	Nut	$7 30
Egg	7 60	Stove	7 70

Retail, per bushel, delivered.

Sand Creek	15c.	Block Nut, steam	7c.
White River	13	" Slack, "	7
Brazil Block	13	Peytona Cannel	—
Highland grate	12	Virginia "	27
Block Nut, domestic use	11	Youghiogheny	16
Highland Nut, " "	11	Blossburg	26
" " steam	8	Piedmont	26

GAS COKE (measured.)

Crushed....14c. | Lump....12c.

ANTHRACITE,

Wilkes-Barre and Lackawanna (all sizes).....$7 50 per ton.
Lehigh, retail ..... 8 50 per ton

Louisville, Ky. Dec. 26, 1876.

Specially reported by Messrs. BYRNE & SPEED.

WHOLESALE.

per bushel		per bushel
Pittsburg	6½c.	Pine Hill —
Raymond City	6½c.	Kentucky 7c

RETAIL.

per bushel		per bushel
Pittsburgh	10c.	Peytona Cannel 18c.
Raymond City	10c.	Buckeye "
Pine Hill	13c.	City-made Coke 8c.
Kentucky	9c.	Anth., per ton, $10 00 to 10 50

Screened Pittsburgh per load	$3 50
Screened Raymond City	2 50
Pine Hill (Kentucky)	2 25
Cannel	4 50
City-made Coke	4 00

Milwaukee, Wis. Dec. 23, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

The prices on coal are unchanged from last report. Trade is but moderate.

Retail price per ton of 2000 lb.

Lehigh Lump	$ 8 00	Briar Hill, select	$7 00
Lehigh Prepared	9 00	Blossburgh	7 00
Lackawanna (all sizes)	8 00	Cannel	6 00
Pittston	8 00	Pittsburgh	6 50
Scranton	8 00	Oak Hill	6 00
		Steam coal	4@5 00

New Orleans, La. Dec. 23, 1876.

Specially Reported by Messrs. C. A. MILTENBERGER & Co.

We can report a decided improvement in the prices of coal in this market, owing to the limited stock on hand, and the upper rivers being frozen, thus cutting off the supply until probably spring. We quote:

Pittsburg coal, wholesale, by boat-load, per bbl		35@40c.
" steamboats, per bbl		50c.
" to manufacturers, per bbl		65c.
" to families		75c.
" shipments, per hhd		$6 50
Anthracite, wholesale, per ton		7@8 00
" retail, "		11 00
Virginia Cannel, retail, per bbl		1 00
Scotch " "		
Mt. Carbon, wholesale, per bbl		
" " retail, "		
St. Bernard wholesale, per bbl		30c.
" steamboat		40c.
" retail, "		65c.

Pittston, Pa. Dec. 26, 1876.

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

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 60

Delivered, fifty cents per ton additional.

Richmond, Va. Dec. 26, 1876

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 40
Coalburgh Splint	5 70	Clover Hill Coal	3 50
Lewiston "	5 70	James River Bitum	3 30
Kanawha Gas coal	4 90	" " Carbonite,	5 00

St. Louis, Mo. Dec. 26, 1876.

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

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

ANTHRACITE. per ton.

Lackawanna	$9 00@10 00	Schuylkill	9 00@10 00
Wilkes-Barre	9 00@10 00	Lehigh	10 00@10 50

BITUMINOUS.

Blossburg	9 00	Big Meadow	3 00
Pittsburg	4 50	Illinois Coals	2 50@3 00
Indiana Block	4 00	Connellsville Coke	3 50

Toledo, Ohio. Dec. 23, 1876.

Specially reported by Messrs. GOSLINE & BARBOUR.

We quote as follows for retail delivery:

Ton of 2,000 lb.

Lackawanna lump	$6 75	Lehigh lump	$7 75
" egg	6 75	" egg	7 75
" stove	7 00	" stove	8 00
" chestnut	6 75	" chestnut	7 75

Soft Coal.

Hocking lump	4 00	Brier Hill	5 75
" nut	4 00	Blossburg	8 00
Willow Bank lump	4 50	Cumberland	8 00
" " nut	4 00		

Hamilton, Ont. Dec. 23, 1876.

Specially reported by H. BARNARD, Dealer in Coal.

Retail, per ton of 2,000 lb.

Grate	$5 75	Smithing	6 00
Egg	5 75	Bituminous retail	5 50
Stove	6 00	" steam	4 00
Nut	5 75	Coke	6 75
Lehigh Lump	6 50		

Montreal, Canada. Dec. 23, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$5 25	Cape Breton Steam	$4 50
Pictou "	5 00	Newcastle Smiths	6 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 50	Chestnut	6 75
Stove	7 00		

Rates of Transportation on Anthracite Coal to Tide Ports.

PHILADELPHIA AND READING RAILROAD CO.
General Office, 227 South Fourth Street.
PHILADELPHIA, Dec. 18, 1876.

From and after this date, and until further notice, shipments of anthracite coal can be made through by rail to South Amboy, via Richmond Junction, at the following rates, per ton of 2,240 pounds, in company's cars:

From Schuylkill Haven	$1 52
" Tamaqua	1 67
" Pine Grove	1 72
" Port Richmond	65

An additional charge of twenty-five cents per ton will be made on chestnut and pea coal, unless the shipper signs the usual release.

The release now in force will apply to this trade.

(By order of the Board of Managers),
DAVID DROWN, Secretary.

Lehigh and Wyoming Coals.

per ton of 2240 lb

	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey	1 62	1 48	2 04	1 95	2 18
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	14	...	58	49	72
‡ Phillipsburg, N. J., (46 miles)	60	46	1 00	91	1 14
Elizabethp't, (114 m.) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	1 26	1 12	1 68	1 59	1 82
High Bridge, N. J.	1 95	1 75	2 43	2 34	2 52
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	1 89	1 75	2 31	2 22	2 45
Jersey City, N. J., (121 miles) and New York, via L. V. RR	1 59	1 47	2 01	1 92	2 15

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR.... $1 47

From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR 1 25

For way points between *Mauch Chunk* and *Phillipsburg*, on the New Jersey Railroads 1 00

From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware Lackawanna and Western RR., Morris and Essex Division 65

From *Phillipsburg, N. J.*, to *Newark* (75 m.) via Delaware, Lackawanna and Western RR. 1 01

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

† Transportation on Coal destined for re-shipment from this point from boat to boat is 20c. less, if discharged upon the wharf 10c. less than the above rate.

The distances in the above table are Computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 161 miles, and from *Mauch Chunk* it amounts to 106 miles.

Geneva, Ithaca and Sayre Railroad.—The rates of transportation on coal from Coxton, Pa., per ton of 2,240 lb., from and after the first of November, will be as follows:

To East Waverly, N. Y.	$1 75
" Ithaca, and for C. Lake RR. (local)	1 64
" " for C. Lake RR., and via Erie Canal (shipment)	1 56
" To Van Etten, for U. I. and E. RR.	1 61
"Geneva (local) for S. P. and S. and L. O. S. Railroads, and for N. Y. C. and H. R. RR., except Auburn and Cayuga	2 06
To Geneva, for Buffalo and Towanda	1 85
" " " Rochester and Charlotte	1 99
" " " Auburn and Cayuga	2 50
Total rate to Buffalo	3 07
" " " Rochester	2 75

REGULATIONS.

A charge of fifteen cents per ton will be collected of each consignee on all coal not unloaded within twenty-four hours after its arrival, and an additional charge of ten cents per ton for every twenty-four thereafter; Sundays and legal holidays excepted.

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

All freights will be collected weekly, by drafts on shippers, from Coxton to destination.

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

From the Mines to Cumberland and State Line (say an average of 20 miles), the legal charge is 2 cents per ton of 2240 lb. per mile.

From State Line to Amboy (346 miles) $4 per ton of 2000 lb. On coal shipped beyond this point there is a drawback of 75 cents per net ton.

From Cumberland to Baltimore (178 miles) $2.02 per ton of 2240 lb, or $1.80 per net ton (⅛ cent per ton per mile for use of hoppers over C. & P. RR.).

From Cumberland to Georgetown (152 miles) by canal, $1.10. Tolls, 46 cents.

From the Mines to Piedmont, 4 cents per ton of 2240 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 10 miles.

From Piedmont to Baltimore (206 miles) $2.34 per ton of 2240 lb., or $2.08 per net ton.

From Osceola to Greenwich, Phila (say 248 miles) per T. & C. RR., per ton bituminous coal of 2000 lb., less drawback of $1.46. $2.15; rate per gross ton, $2.60.

From Osceola to South Amboy, N.J., (317 miles) per 2000 lb. $4.03, less drawback, $1.03; rate per net ton, $3; add 12 per cent. for gross ton, 36 cents, terminal expenses, shipping, 20 cents; rate per gross ton, $3.56.

Freights

Representing the latest actual charters up to Dec. 29, 1876.
Per Ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me.	....	....	....	....
Albany	....	....	....	....
Alexandria	....	....	....	....
Amesbury, Mass.	....	....	....	2 00
Bangor, Me.	....	....	....	....
Bath, Me.	....	2 25	....	1 00
Baltimore	....	....	....	....
Boston, Mass.	....	2 00	....	1 70
Bridgeport, Ct.	....	1 80	....	60@70
Bristol, R. I.	....	....	....	1 15
Cambridgeport, Mass.	....	....	....	1 70
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	....	....	....	1 70
Fall River	....	1 80	....	1 15
Hackensack	....	....	....	....
Hallowell, Me.	....	....	....	....
Hartford	....	....	....	....
Hoboken	....	....	....	35
Hudson	....	....	....	....
Jersey City	....	....	....	35
Lynn, Mass.	....	....	....	†1 70
Middletown	....	....	....	....
Mystic	....	....	....	....
Newark	....	....	....	....
New Bedford	....	....	....	1 20
Newburyport	....	2 25	....	1 50
New Haven	....	1 80	....	65
New London	....	1 80	....	90
Newport	....	....	....	1 15
New York	....	1 50	....	35
Norfolk	....	....	....	75
Norwalk	....	....	....	80
Norwich	....	....	....	1 05
Pawtucket	....	....	....	‡1 15
Philadelphia	....	1 00	....	....
Portland	....	2 00	....	1 60
Portsmouth, N. H.	....	2 25	....	2 00
Providence	....	1 80	....	1 15
Poughkeepsie, N. Y.	....	....	....	....
Rockport	....	....	....	....
Saco	....	....	....	....
Sag Harbor	....	....	....	....
Salem, Mass.	....	2 00	....	1 70
Salisbury Pt., Mass.	....	....	....	....
Stamford	....	....	....	....
Stonington	....	....	....	....
Taunton	....	....	....	....
Troy	....	....	....	....
Warren, R. I.	....	....	....	1 15
Wareham	....	....	....	....
Washington	....	....	....	....
Weymouth	....	....	....	....
Wilmington, Del.	....	....	....	....

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

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Dec. 29, 1876.

American Pig.—As is usually expected during the holiday week, but little business has been done in any branch of the iron trade. Stocks of iron are constantly accumulating, and prices, though nominally unchanged, have still a weakening tendency. We quote No. 1 foundry at $21; No. 2, $19@$20; and forge, $18.50@$19.

Scotch Pig.—There has been no business worthy of note done during the week under review. We quote: Coltness, $29; Eglinton, $26; and Glengarnock, $28.

Rails.—There has been no business done in rails during the week under review, although there are indications that a considerable business will be done in steel rails during January. We quote iron rails, at mills, at $35@$36; and steel at $48@$54.

Old Rails.—These are without business, and nominally quoted at $19@$20.

Scrap.—In the absence of business No. 1 wrought scrap is quoted at $25.50@$26.

Baltimore, Md. Dec. 27, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

We have no change to report in the iron market; there is very little business doing in pig iron, and prices remain unchanged. We quote:

Baltimore Charcoal	$29@32	Anthracite No. 3	$19@20 00
Virginia Charcoal	28@32	Mottled and White	17@18 00
Anthracite No. 1	22@24	Charcoal C. B. Blooms	60@62 50
" No. 2	20@22	Refined Blooms	50@55 00

Boston, Mass. Dec. 23, 1876.

PIG is very quiet, but some dealers report a slightly firmer feeling, based on better advices from abroad, the prospect of enlarged exports to South America, &c., and the higher price of coal. The improvement, however, if any, is very small. We quote No. 1 $22 and gray forge $19. The market for Scotch pig is very quiet, and prices are unchanged

BAR is dull and easy, with very little demand and prices tending downward, quoting for refined $48 and for common $39.—*Commercial Bulletin.*

Chattanooga, Tenn. Dec. 26, 1876.

Specially reported by J. F. JAMES pig iron broker, etc, 233 Market Street.

No change to report in the condition of our market since last report. Demand unusually light, with only a few small sales to note.

Prices remain unchanged.

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$21@
" " " " No. 2 foundry	18@ 19
" " " " gray forge	16@ 17
" and Georgia coke, No. 1 foundry	18@ 19
" " " No 2 foundry	17@ 18
" " " gray forge	15@ 16
White and Mottled	14@ 15
Tennessee and Georgia cold-blast car wheel	21@ 25
" " gray forge	16@ 18
Old Rails	cash 19@ 20
Cast Scrap	" 10
Wrought Scrap, No. 1	" 12@ —
" " " 2	" 12@ —

Cincinnati, Ohio. Dec. 26, 1876.

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

Navigation on the Ohio River being suspended, stocks of Hanging Rock irons are rapidly decreasing. Prices are firm at quotations:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$24 00@25 00—4 mos
" No 2, "	23 00@ —4 mos
" Mill	21 00@22 00—4 mos
Tennessee, No. 1, Foundry	23 00@24 00—4 mos
Tennessee, No. 2, "	22 00@22 50—4 mos
" Mill	21 00@21 50—4 mos
Missouri, No. 1, Foundry	@ —4 mos

STONE COAL.

Ohio, No. 1, Foundry	21 50@24 00—4 mos
" No. 2, "	21 50@22 00—4 mos
Ohio Mill	20 00@21 00—4 mos
Missouri, No. 1 Foundry	25 00@ —4 mos
" No. 2, "	24 00@ —4 mos
" Mill	23 00@ —4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00—4 mos
Tennessee "	25 00@32 00—4 mos
Missouri "	30 00@33 00—4 mos
Alabama "	25 00@32 00—4 mos

BLOOMS.

Charcoal	55 00@ 65 00—cash

SCRAP IRON.

Cast	50c.@ 85—cash
Wrought	1 00@1 40—cash

Cleveland, Ohio. Dec. 26, 1876.

Specially reported by Messrs. C. E. BINGHAM & Co.

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	26 50@
No. 2, " "	26 00@
No. 1 Anthracite	24 50@
No 2, "	22 50@
No. 1, Bituminous	24 50@
No 2, "	22 50@
American Scotch, No. 1, Cherry Valley	@
" " B—1, " "	@
" " No. 2, " "	@
No. 1, Massillon	24 50@
B—1, "	23 00@
No. 2, "	21 00@

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	26 50@
No. 4 " " "	27 00@
Nos. 5 and 6 "	27 00@

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	26 50@

FORGE IRON.

No. 1, Gray	22 00@
White and Mottled	24 00@

Louisville, Ky. Dec. 27, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market is still very dull, but the volume of trade is in excess of last week, and we look for a steady improvement. There has been no change in prices.

Four months allowed on quotations below.

HOT BLAST—CHARCOAL.

No 1 Foundry, from Hanging Rock Ores	$24 00@25 00
No 2 " " "	22 00@23 00
No 1, Mill, from " "	20 00@21 00
No. 1. Foundry, from Alabama, Georgia and Tennessee ores	22 00@23 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	21 00@22 00
No. 1, Mill, from " " " " "	20 00@21 00

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	22 00@23 00
No. 2, " " " " "	20 00@21 00
No. 1, Mill, " " " " "	20 00@21 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	21 00@22 00
No. 2, " " " " "	20 00@21 00
No. 1, Mill, " " " "	20 00@21 00
No. 1 Foundry, from Missouri Ores	— @ —
No. 2 " " " "	— @ —
No. 1 Mill, from Missouri Ores	23 00@25 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@43 00
" " Tennessee "	26 00@28 00
" " Alabama and Georgia Ores	28 00@40 00
" " Kentucky Ores	28 00@42 00

Milwaukee, Wis. Dec. 26, 1876.

Specially reported by Messrs. R. P ELMORE & Co.

The prices on pig iron are unchanged from last report. Trade is quite dull. The brightest part of the iron trade is the anticipation of the future.

Lake Superior No. 1 Charcoal	$26 00
" " " 2 "	25 00
Lake Superior No. 1 Anthracite	25 00
" " " 2 "	24 00

Pittsburg, Pa. Dec. 22, 1876.

Specially reported by A. H. CHILDS.

No. 1 Foundry	24 00@25—4 mos
" 2 "	22 00@23 "
Gray Forge	20 00@22 "
White and Mottled	17 5 @19 "
Warm blast Charcoal	23 00@28 "
Cold blast Charcoal Western	40 00@45 "

Philadelphia, Pa.

(Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, JR., & Co., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending Dec. 27, 1876.)

PIG IRON.—The business has been almost a blank this week. The taking of stock, settling accounts, etc., have about monopolized the attention of the trade. But it is hoped as the new year comes in, the inquiries and promises that we have had for the past week or two will be realized in orders; if one-half should come to our city, the foundries and mills would have more than they could do. We report many inquiries and very few sales, and quote No. 1 at $21 to $22; No. 2, $19.50 to $20; Forge, $18 to $19.50

MANUFACTURED IRON.—We have very little new business to report this week, with the exception of an order for 1,000 tons skelp said to be placed at ruinously low prices, and many inquiries and promises for next year. We quote bars at 2 1-10c. to 2·25c. per lb.; tank, 2⅞c. to 3c. per lb.; skelp, 2¼c. to 2½c. per lb.

NEW RAILS.—There is nothing new to report. The old inquiries and promises for next year will soon be realized, or be allowed to drop; but it is hoped by all that it will amount to new business for the idle mills. We quote steel at $50 to $52; iron, $38 to $40; all at mill.

OLD RAILS.—There is quite a brisk demand for old rails. We report the sale of 1,000 tons at $21.50, and quote $21 to $22.

SCRAP.—We quote cast at $14 to $19; wrought, $24 to $27.

Richmond, Va. Dec. 26, 1876.

Specially reported by ASA SNYDER, Esq.

Virginia Cold Blast Charcoal Pig Iron	$27 to $33
" Warm " " "	24 to 28
" " " Coke " " 1 X	23 to 24
" " " " " 2 X	21 to 22
" " " " " 3	20 to 21
" Anthracite 1 X	— to —
" " 2 X	— to —
" " 3	— to —

St. Louis, Mo. Dec. 26, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market is still dull. Prices show no change - still firm at quotations.

CHARCOAL.

Missouri No. 1 Found'y.	$23@25
" " 2 "	22@23
" Gray Mill	22@23
H. Rock No. 1 Found'y.	25@26
" " 2 "	23½@24
" Gray Mill	23@24
Tenn. No. 1 Foundry	23½@24
" 2 "	22½@23
" Gray Mill	22½@23

COKE.

Alice H. R. Ex No. 1 F'y.	26 00
" " 1 "	25 00
B, " 1 "	24 50
" 2 "	23 50
Forge	23 50
Chat., Tenn. No. 1 Fd'y.	25 00
" " " 2 "	23 50
" " Forge	22 50
" " White Mtl'd	21 00

STONE COAL.

Missouri No. 1 Fd'ry.	25@24
" " 2 "	23@23
" Gray Mill	22@26
" White & Mt'd	21@22

COLD BLAST CHARCOAL FOR CAR WHEELS.

All Numbers.

Hanging Rock	35@46
Tennessee	30@33
Kentucky	30@33
Missouri	28@30
Georgia	28@30
Alabama	28@30
Assorted Bar Iron $2 25, rates.	
No. 1 Wrought Scrap 95c. cwt.	
Heavy cast " " 70 "	
Light " " 40 "	

METALS.

NEW YORK, FRIDAY EVENING, Dec. 29, 1876.

The holiday week and the near approach of the end of the year, which has brought about stock-taking and closing of books, continues to have a depressing effect upon the general business in metals, with no indications of an improvement during the next two weeks.

Gold Coin.—During the week under review gold has ranged from 107¾ to 107 and closed at 107.

Bullion.—The market for silver is higher than a week ago. The London quotation is firm at 56¼d., while here we quote at $1.22@$1.22¼ per oz, and in San Francisco 7 per cent. discount. Fine gold bars are quoted at ¼ per cent. premium.

Copper.—Sales of from 125,000 to 150,000 pounds are reported to have been made at 19¾c.@19¼c. There is not much copper offering and inquiries for 500,000 lb. would probably stiffen prices, while on the other side, if an equal quantity were offered for sale, it would create a corresponding depression.

Tin.—This article is very quiet. Straits, in London, continues to be quoted at £76. In this market we quote: Straits, 17½c., gold; L. & F., 17¼c.; Refined, 17½c.; and Banca, 19¼c.@19½c.

Tin Plates.—These are in only moderate request and quoted, in gold, as follows: Charcoal tins, $6.75@$7, and ternes, $6 12½@$6 25; coke tins, $6, and ternes, $5.50@5.62½.

Lead.—There have been sales of about 100 tons of ordinary domestic lead at 6·10c.@6·15c., 30 tons of Richmond lead being at the latter price. Missouri soft si quoted at 5⅞c. at St. Louis, with freights to this city at 45c. per cwt.

Spelter and Zinc.—Domestic spelter is very quiet at 6⅜c.@6½c., currency, with indications that even 6½c. would be accepted upon a round order. Sheet zinc is nominally quoted at 8c.@8¼c. currency.

Antimony.—With but a moderate business this article is quoted at 13¼c@13½c. gold.

Quicksilver is unchanged in price and quoted at £8@£8 10/ in London; 55c. in this city, and 50c in San Francisco.

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Dec. 29, 1876.

THE stock market is very dull and the dealings of the past week have been of little note. The total sales amount to about 60,000 shares; quotations are generally lower.

Delaware, Lackawanna and Western Railroad.—26,000 shares of this stock have changed hands at from 73 to 70, closing at 71¾. The directors of this company held their regular monthly meeting on the 26th inst. The statement of business for November which was submitted, showed that the company earned expenses, interest, charges and ½ of 1 per cent. on the stock. The quarterly dividend is usually declared at this meeting, but the subject of declaring a dividend was not discussed.

The company has discharged one hundred laborers employed on the road between Hoboken and Easton. The road being covered with snow, the men are unable to work.

Rome, Watertown and Ogdensburg Railroad.—At a meeting of the directors of this company, held in this city on the 27th inst., SAMUEL SLOAN, President of the Delaware, Lackawanna and Western Railroad Company, was elected its president in place of MARCELLUS MASSEY, resigned. A large quantity of Scranton coal finds a market in the many cities and towns along the line of this road and its numerous branches, which aggregate nearly four hundred miles in length, and we trust the election of Mr. SLOAN as its president, will result in a large increase of sales in this direction.

New Jersey Central Railroad.—About 31,000 shares of this stock were sold on the Board at from 37⅞ to 35⅝, closing ¾ per cent. below the highest figure.

Delaware and Hudson Canal Company's stock is down to 69¾, the highest price of the week being 71½, sales aggregate 1,715 shares.

This company has ordered a consolidation of the Albany machine shop with the shop at Oneonta, which will necessitate the discharge of three-quarters of the men employed in that branch of the company's industry.

Mariposa Land and Mining Company.—2,000 shares of this stock were sold during the week at from 6½ to 8½, closing at 7¾ bid for the common stock. Advices from the mine under date of the 21st inst. say "Tunnel is in 2,382 feet. Gouge of vein has changed to hanging wall. Vein is six feet wide, hard quartz. Have had six samples of ore assayed, resulting in value of thirty-nine dollars, sixty dollars, fifty dollars, seventy-two dollars, one hundred dollars, and sixty-one dollars per ton. Ten stamps of mill running all right; ore on hand and in sight justifies starting twenty more stamps and putting all the mills in working condition."

Georges Creek and Cumberland Railroad Company.—This company filed articles of incorporation with the Secretary of State of Maryland on the 27th inst. Engineers are already at work surveying the route, and there is no doubt expressed that the necessary capital will be forthcoming and the work be rapidly prosecuted. A sufficient tonnage is already guaranteed to place the road upon a good paying basis from the start while the low rates of freight which will be charged, will stimulate business so much, that the shipments of coal will constantly increase. The necessity of building this road has been brought about by the exorbitant charges made by the Consolidation Company on coal leaving the Cumberland region via the Cumberland and Piedmont Railroad, which have resulted in reducing the coal business from this region, since 1873, 31 per cent.

Michigan Central Iron Company.—We note the announcement that this company will hold its annual meeting in this city on the 2d of January.

Canneton Coal Company.—The coupons due January 1st, 1877, on the bonds of this company will be paid on and after that date, at the office of the Farmers' Loan and Trust Company, New York.

Quotations and Sales of Stocks and Bonds,

For the week ending Dec. 29, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	250	—
Consolidation Coal Co	—	—	35	—
Spring Mt. Coal Co	—	—	†00	—
American Coal Co	—	—	*54	—
Maryland Coal Co	—	—	9	500
Del., Lack., and West. RR. Co.	73	70	71⅞	25,990
New Jersey Central RR. Co.	37⅞	35⅝	37⅛	30,8 7
Delaware and Hudson Canal Co.	71⅛	69¼	69¾	1,715
Quicksilver Mining Co. pref'd	—	—	18½	—
" " " Common	13¾	13¾	13	400
Mariposa Land & Min. Co. pref'd	8¼	6½	8¼	2,041
St. Louis & Iron Mountain RR.	—	—	12	—
Total Shares sold				61,463
Sales for the week previous				72,258
Decrease				10,795

*Nominal. † Asked.

BONDS.

	Inter'st	Sales.	Price.
Del., Lack. & West. 2d M.....	M. & S.	....	.... @108¼
" " " 7's Con'ble	J. & D.	....	.... @106½
Cent'l RR. of N.J., 1st M., New	F. & A.	4,000	.... @109
" " " 1st Cons..	.....	6,000	88¼@ 89
" " " Convert'le	M. & N.	14,000	.... @ 83
Lehigh & W.-B'e, Con. Guar'd.	.....	7,000	.... @ 63
Am. Dock & Imp. Mt. Bonds..	J. & J.	3,000	.... @ 70
Del. & Hud. Can., 1st M., 1891	.....	27,000	.... @104
" " " 1884	.....	....	.... @103
" " " 1877	.....	....	.... @101½
" " " Coup. 7's, 1894	.....	13,000	98 @ 99
" " " Reg'd 7's, 1894	.....	.....	.... @ ....
St. L. & Iron Mountain, 1st M	F. & A	5,000	.... @102¼
" " " 2d M	M. & N	.....	.... @ 70
Chesapeake & Ohio 6's, 1st M..	.....	....	.... @ 31
" " " Ex. Coupon	.....	.....	.... @ 20
Mariposa Gold Loan con. 7s....	.....	.....	... @100⅝
Total sales..		$79,000	

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, Dec. 28, 1876.

THE Philadelphia Stock Market has been v ry quiet during the past week, the total transactions scarcely reaching 63 000, a difference of more than 100,000 shares compared with the business of the previous week. The quotations were generally lower at the close.

Pennsylvania Railroad.—This stock closed at 47⅞, 48¼ being the highest price for the week, the transactions amounted to about 24,000 shares.

Reading Railroad.—14,535 shares of this stock have changed hands during the week, at from 20⅛ to 19⅛, closing at 19¼.

Lehigh Valley Railroad.—This stock has been very quiet the quotations have ranged at from 49¼ to 48, at which it closed.

Ithaca and Athens Railroad Company.—The First Mortgage Coupons, due January 1st next, will be paid upon presentation after that date, at the office of the Lehigh Valley Railroad Company.

East Broad Top Railroad and Coal Company.—The annual meeting of this Company will be held on the 8th of January.

Lehigh Coal and Navigation Company.—Nearly 24,000 shares of this stock is represented in the dealings for this week. This stock shows an advance equal to 1¼ per cent, and closed at 31.

Quotations and Sales of Stocks and Bonds.

For the week ending Dec. 28, 1876.

STOCKS.

	Highest	Lowest	Closing	Shr s
Lehigh Valley RR. Co.....	49¼	48	48	505
Pennsylvania RR.	48⅛	47¼	47¾	23,903
Reading RR.	20⅛	19	19⅛	14,555
Lehigh Coal and Nav. Co	32	30	31	23,806
Penn. Canal....	—	—	—	—
Buck Mountain Coal Co.....	—	—	*25	—
Fulton Coal Co....	—	—	—	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	*85	—
St. Nicholas Coal Co.....	—	—	—	—
Cambria Iron Co.....	—	—	14	—
Crane Iron Co.....	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co...	—	—	62	—
Total shares sold..... ..				62,769
Sales for the week previous.....				176,423
Decrease.....				113,654

* These quotations are nominal.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s.....	$ ——	—— @107
" " " 2d " "	——	—— @103
" " " 3d " cons	——	—— @ 35
Lehigh Valley RR. Con. mtg. 6s.....	10,000	97½@ 93¾
" " " 7s, 1910.....	7,000	—— @115⅜
" " " 6s Reg.....	——	—— @107⅜
" " " 6s coup.....	——	—— @106
Pennsylvania RR., 1st mtge. 6s.....	1,000	—— @110
" " gen. " cou. 1910...	11,000	—— @109¼
" " gen. " 6s, reg.....	1 ,000	—— @107⅞
" " Cons. M. 6s reg.....	2,000	—— @ 99
Phil. & Reading RR. Con. M. 7s Reg....	25,000	95 @ 95½
" " " 6s, 45-80.....	——	102¾@103
" " " 7s 1893.....	——	—— @105
" " new convertible 7s.....	6,200	—— @ 62½
" " 6s 1880	——	—— @103½
" " Cons M. 7s coup.....	15,000	95 @ 99⅓
" " debenture 6s.....	——	—— @ 60
" " 6s gold coupon.....	——	—— @ 95
Phil. & Reading C. & I. Co. Deb. 7s.....	——	—— @ 69
" " Helfenstein tract.....	——	—— @ 65
Lehigh Coal & Nav. Co., 6s '84.....	——	—— @102½
" " " RR. 6s, '97.....	——	—— @102
" " " con. 7s.....	——	—— @ 80
" " " 6s gold loan	9,000	98 @ 99
" " " Conv. gold loan....	——	—— @101¼
Penn. Canal, 6s.....	——	—— @ 73
Penn. and N. Y. Canal, 7s...	——	—— @109
Ches. and Del. Canal, 6s....	——	—— @ 85
Susquehanna Canal, 6s	——	—— @ 68
Delaware Division Canal, 6s	——	—— @——
Susquehanna Canal Co. 6s...	——	—— @ 78
Buck. Mount Coal Co. 6s..	——	—— @——
Penn. Gas Coal Co. 6s....	——	—— @——
Honeybrook Coal Co. 7s.	——	—— @——
Total amount of sales	$98,200	

Closing quotations, in the absence of sales, represent the latest prices bid.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, Dec. 28, 1876.

THE market is at a perfect deadlock, owing in a great measure to the holidays. Calumet is a half a point higher at 174 bid, and but little stock offering. Duncan has been unusually dull, not over 200 shares having been sold; the fluctuations have been limited to .50 a share, highest 5 lowest 4½; National is in some demand at 1⅜, and Pewabic at $3. Quincy is firm at 49. International, not a sale during the week. In small coppers nothing.

Gold and Silver Stocks.

AMERICAN MINING AND STOCK EXCHANGE.

NEW YORK, FRIDAY EVENING, Dec. 29, 1876.

THE principal feature connected with the gold and silver stock market during the past week is the rumor that John Mackay has withdrawn from the famous bonanza firm or proposes doing so, and will unite with the Bank of California people, carrying the control of the Consolidated Virginia mine with him. We give very full information below from our exchanges regarding the condition of the various mines.

Consolidated Virginia.—Daily yield 350 tons of ore. The ore breasts show no difference in the quality of the ore extracted. The ore bodies on the 1,400 and 1,500 feet levels show but one important feature or change. That feature is the steady widening of the ore body on the 1,550-feet level. The ore at that point has been opened a distance of 60 feet farther to the eastward than on any of the levels above, and the east wall of the ledge has not been found. The immense width of the ore vein at that point, taken in connection with the ore development in the winze 147 feet below that point, promises a mine, when the 1,650 and 1,700-feet levels are opened, of a proportion so magnificent that the most familiar with ore values could hardly estimate its worth. The decrease in the amount of ore extracted has been owing to a loss of the Gould & Curry hoisting facilities. This was owing to the bad condition of the main connecting drift between the Gould & Curry shaft and the Consolidated Virginia ore vein after the flood of water which recently poured down through the drifts and winzes from the 1,400-feet level of the California. The water slacked the lime rock on its sides until the drift was almost closed in places, and to attempt to make a profitable use of it was almost futile. A large force of men are employed by the Gould & Curry, Best & Belcher and the Consolidated Virginia in repairing the portions of the drift belonging to each mine and enlarging it so as to increase the air circulation on the lower levels. The west drift on the 1,650-feet level is in a distance of 461 feet, and will without doubt reach the ore vein the next two weeks. The 1,650-feet station at the C. and C. shaft has been so arranged as to permit of the loading and unloading of the ore cars from double-decked cages without having to move the cage after it has once stopped, which is a valuable improvement, saving as it does a great loss of time in the loading and unloading.

California.—Daily yield 550 tons of ore, keeping the mills crushing to their fullest capacities. The ore breasts and stopes on the 1,500 and 1,600 feet leve's show little or no change, and continue their uninterrupted and splendid yield of rich ore. The ore in the face of the south drift on the 1,600-feet level continues of an excellent quality. A splendid air engine of 20-horse power is being placed in position at the deep winze near the south line for the purpose of draining the water. This air engine is the largest of the kind that has yet been put in use in any of our mines below the surface. As soon as the water is drained from the winze an east drift will be started on the 1,650-feet level to meet and connect with the west drift from the C. & C. shaft. Sinking the C. & C. shaft is making the best of progress. The flow of water is handled readily by the pumps. The tank station below the 1,650-feet level is completed. The main west drift on the 1,650-feet level is in a distance of 461 feet, the face in pretty hard rock. This drift has just had a track of steel rails laid from the C. & C. shaft to the face, which puts it in a condition ready for the extraction of ore as soon as the ledge is reached. It is confidently expected that this drift will cut the ore vein by the 1st of January. Nothing is being done on the 1,700-feet level on account of the great heat and the necessary repairs now being made to the Gould & Curry drifts.

Yellow Jacket.—Sinking the new shaft is making splendid progress, the bottom in good working ground. The flow of water is very light. It is now down 210 feet. The connection between the bottom of the south winze and the south drift on the 2,040-feet level has been completed, and the drift is now being enlarged preparatory to starting crosscuts east and a drift south toward the Crown Point Mine. The winze on the north line on the 1,740-feet level is down 46 feet, at which point a cross-drift has been started to prospect the ore recently found on the level above.

Gould & Curry.—The erection of the new pumping machinery is being pressed to completion with all the vigor possible. The two hoisting compartments of the shaft have been retimbered from the surface down, and are now in the best of working condition. The pump compartment of the shaft is now undergoing a complete retimbering from top to bottom. On the 1,500-feet level a large force of men are employed in enlarging and retimbering the main drifts and air-winzes. The same is being done on the 1,700-feet level, preparatory to more active developments in that portion of the mine. The annual meeting of the stockholders was held in San Francisco on the 18th inst. The number of shares represented was 80,179. The Secretary's report embraced the following details: Receipts—Cash balance, November 30th, $11,022.59; five assessments, $390,552.18; mine account, $32,251.21; Superintendent's house, $250; F. F. OSBISTON, $26,412.21; balance, $82,191.24; total, $542,679.43. Disbursements—Mine account, $508,508.79; general expenses, $33,588.04; total, $542,679.43.

Justice.—Daily yield 330 tons of ore. This amount of ore is a little in excess of the number of tons crushed, 30 to 40 tons per day being taken out and delivered at the mills as a reserve in case of a blockade of the roads by storms during the Winter. The ore stopes on the 400-feet level continue to yield good ore and are looking well as usual. The winze below this level is also developing a fine body of good paying ore. There is little or no doubt now but this body of ore is the same as that already being worked further to the southward on the 500-feet level. The ore stopes on the 600-feet level are showing richer and better ore than at any time in the past. The ore on this level is gradually extending to the northward. All the ore breasts on the 700-feet level are opening out better and better. The winze below the 800-feet level is still showing good ore. The cross-cuts on the 800-feet level are showing better ore. The northeast and southeast drifts on the 1,000-feet level are each making good progress toward the main ledge.

Julia.—The main south drift on the 1,600-feet level is steadily advancing, the quartz in the face showing better with every foot attained. The branch drift on the same level running to connect with the Ward shaft is following the vein matter on the east of the ledge, occasionally cutting streaks of quartz and clay of a very favorable appearance. The west crosscut from the main south drift on the 1,800-feet level has penetrated a body of fine quartz a distance of 40 feet. This quartz gives assays ranging from $8 to $20 per ton. The appearances are that it is both widening and improving in quality as developed to the southward. The main south drift on the 1,800-feet level is also looking more favorable in the face.

Hale & Norcross.—The pumps have averaged during the past week 7¾ strokes per minute, not a moment of time having been lost in any way what ver. A general gain on the water is evident, although a sudden giving way of some obstruction on some of the lower levels will cause an occasional rise of a few feet. This is the case in both the Savage and Hale and Norcross, and proves beyond a doubt that the head of the flow has been overcome, and all that remains to do now is to extract the water that now fills the lower levels. A small cave occurred in the main incline just below the 1,900-feet station, but is being cleaned out and will give no trouble. The water is now 21 feet below the 1,900-feet level.

Sierra Nevada.—The north and south drifts, on the 1,700 feet level, show little or no change, each being advanced at a very rapid rate of speed. The south drifts, on the 1,800 and 1,250 feet levels, are each steadily advancing in very favorable ground. There are no changes in any of the other prospecting drifts on the 1,250 or 1,000 feet levels. The flow of water at the bottom of the main shaft is kept well under control with the pumps, and no longer gives the least trouble.

Ophir.—Daily yield, 200 tons of ore, keeping the Nevada and Santiago mills steadily running. The ore breasts on the 1,600 and 1,650 feet levels show little or no change. The north drifts on both the 1,600 and 1,700 feet levels are steadily advancing. That on the 1,700-feet level is in very favorable ledge material. Sinking the main incline is being pushed ahead with all the dispatch possible.

Bullion.—The Alpha drift on the 2 000-feet level is still advancing without material change. The face is still in favorable ledge material. The north drift on the 1,700-feet level is making the usual steady progress. The face of the cross-cuts on the 1,600-feet level are steadily advancing without change. The face of the south drift on the 1 500-feet level is in quartz of a lively character. The east cross-cut on the 1,400-feet level shows no new features—it is still in porphyry.

Overman.—The completion of the new pumping machinery is being pushed as rapidly as the perfection of the work will permit. The 1,400 feet station is nearly completed, and a drift has been started to cut the ore vein at that point. The south drift on the 1,200-feet level, running to connect with the north drift from the Caledonia, is making the best of progress; the face is in soft ledge matter.

Belcher.—Sinking the main incline is making good progress. Sinking the drain shaft is also making excellent headway. The south drift on the 1,600-feet level is steadily advancing, the face in very favorable ledge material. During the first part of the week the works were shut down for two or three days to make some necessary repairs, but are now again in the best of working order.

Best and Belcher.—A large force of men are employed on the 1,500 and 1,700 feet levels in enlarging, repairing and putting all the drifts and winzes in the best working condition and at the same time increasing the circulation of air all that it is possible to do by such means. Cross-cutting the lower levels is also being actively prosecuted.

Chollar-Potosi.—Daily yield, 100 tons of ore, the assay value of which is $30 per ton. This ore is taken from the old upper workings of the mine, and there is no change in either the quality or quantity of the ore in the breasts. Sinking the main incline is going ahead at the rate of 2½ feet per day. Sinking the Combination Shaft is also making excellent progress.

Mexican.—The north drift on the 1,700-feet level of the Ophir has nearly reached the south line, at which it is the intention to start a cross-cut to explore the ore vein. There is no change to report of either the upraise or the cross-cut in the ore vein on the 1 465-feet level.

Imperial Consolidated.—There is no change to report of the east cross-cut on the 2000-feet level. The north drift, from the bottom of the south winze, on the 2135-feet level is still advancing, the face in very favorable ledge material. The station in the north winze at the 2135-feet level, is completed, ready to start a drift connected with the south winze on the same level.

Crown Point.—Sinking the main incline below the 1900-feet level is going forward at the rate of three feet per day. There is no water to trouble and should any be encountered it can easily be lifted with small pumps to the 1700-feet level, from whence it will flow to the drain shaft and be taken to the surface by the big pumps.

Savage.—The large lift pump at the 1900-feet level is

MINING STOCKS.

AMERICAN MINING AND STOCK EXCHANGE.

Name of Company.	Location.	Feet on Vein.	Capital Stock.	*a* No. of Shares.	Total Assessments Levied.	Date and Amount of Last Assessment per share.	Total Dividends paid.	Date and Amount of Last Dividend per share.	Closing Quotations *g* American Currency. Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	Shares sold during the week.
Alpha Cons G. S.	Nevada,	300	$ 3,000,000	30,000	$180 000	Aug. 12, '75, $1.	....	.....	$27 50	No Sales—Christmas Day.	$24 50	$19 50	$19 50	$24 75	1,000
Belcher, G. S.	Nevada,	1,040	10,400,000	104,000	660,400	April 14, '71, $1.	$15,397,200	April 10, '76, $1.	9 75		10 75	9 50	9 75	10 75	1,300
Bertha Gold Co.	Virgi'a.	645 acs.	300,000	30,000	**	..	....	.....	5 75		6 00	6 00	6 37½	6 50	5,100
Best and Belcher, G. S.	Nevada,	545	10,080 000	100,800	136,192	July 13, '74, 50c.	....	.....	51 50		48 75	43 50	45 50	46 00	850
Bullion, G S.	Nevada	943½	10,000,000	100,000	2,052,000	Sept. 22, '76, $2.50.	....	.....	24 50		....	20 50	21 00	23 87½	800
Caledonia, G. S.	Nevada,	2,188	10,000,000	100,000	1,210,000	Aug. 28, '76, $1.00.	....	.....	13 00		13 37½	13 25	13 25	14 00	1,350
California, G. S.	Nevada,	600	54,000,000	540,000	....	.....	8,640,600	Dec. 15, '76, $2.	50 50		52 00	45 00	47 00	50 00	200
Centennial, G.	Califor.	66 acres	1,000,000	100,000*b*	....	.....	....	.....	....		....	....	....	....	....
Chollar Potosi, G. S.	Nevada,	1,400	2,800,000	28,000	1,282,000	June 26, '76, $5.	3,080,000	Feb. 10, '72, $1.	86 00		82 50	81 50	85 00	84 00	300
Cleveland, G.	Colo.	3,715	250,000	25,000*b*	**	.....	....	.....	9 12½		9 12½	9 37½	9 50	9 50	5,100
Cons. Hercules & Roe, S	Colo.	16,500	1,000,000	100,000	**	.....	120,00.	.....	....		....	....	....	....	.....
Cons. Imperial, G. S.	Nevada,	468	50,000,000	500,000	125 000	July 25, '76, 25c.	....	.....	2 00		2 25	1 50	1 75	2 00	2,350
Con. N. Slope & E.C.T.	Colo.	15,000	500,000	10,000	**	.....	....	.....	.....		....	....	5 62½	5 00	75
Cons. Virginia, G. S.	Nevada,	710	54,000,000	540 000	411,200	June 11, '73, $3.	25,920,000	Dec. 11, '76, $2.	49 00		....	35 00	40 00	*42 50	300
Confidence, G. S.	Nevada,	130	2,496,000	24,963	243,840	March 18, '73, $1.	78,000	May 1, '65, $8.33½	...		....	9 87½	....	9 37½	350
Crown Point, G. S.	Nevada,	600	10,000,000	100,000	1,173,370	Oct. 26, '76, $1.	11,588,000	Jan. 12, '75, $2.	*9 25		7 00	6 50	*6 75	7 00	500
Douglas Mining Co.	Colo.	21,000	1,000,000	10,000	**	.....	....	.....	.....		23 50	28 25	29 50	29 00	400
Eureka Cons. G. S. L.	Nevada,	..	5 000,000	50,000	100,000	May 26, '76, $1.	1,000,000	Aug. 5, '75, $1.	....		12 00	*12 00	*12 00	....	200
Exchequer, G. S.	Nevada,	400	10,000,000	100,000	280,000	Sept. 23, '76, $1.	....	.....	*11 00		11 00	9 87½	9 87½	10 50	1900
Gould and Curry, G. S.	Nevada,	621	10,800,000	108,000	2,018,000	Dec. 11, '76, $1.	3,934,800	Oct. 10, '70, $10.	11 50		13 50	12 00	12 00	13 75	1300
Grant, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	6 87½		7 00	7 25	7 37½	7 50	2,900
Granville Gold Co.	N. Car.	9,000	1,000,000	100,000	**	.....	....	.....	4 00		3 87½	3 87½	4 00	4 00	4,750
Hale & Norcross, G. S.	Nevada,	400	11 200,000	112,000	2,242,000	Oct. 10, '76, $1.	1,598,000	April 10, '71, $5.	7 25		*8 00	....	6 25	7 37½	850
Hukill, S.	Colo.	3,283	1,000,000	10,000	**	.....	20,000	Nov. 1, '76, $1	....		....	....	....	....	.....
Indian Queen, S.	Nevada,	1,000	3 000,000	60,000	....	.....	60,000	.....	....		....	....	....	....	.....
Julia Cons. G. S.	Nevada,	3,000	11,000,000	110,000	110,000	Sept. 11, '76, $1.	....	.....	4 50		4 50	3 75	4 25	4 87½	1,400
Justice, G. S.	Nevada,	2,100	10,500,000	105,000	1,502,500	Sept. 14, '76, $5.	....	.....	23 00		24 50	21 50	19 00	23 62½	1,550
Kentuck, G. S.	Nevada,	95	3,000,000	30,000	270,000	Dec. 3, '74, $1.	1,252,000	March 8, '70, $5.	9 87½		9 37½	9 37½	9 25	7 00	700
Kossuth, G. S.	Nevada,	2,700	5,400,000	108,000*c*	405,000	Aug. 15, '76, 50c.	....	.....	2 00		....	*1 87½	*1 87½	1 00	220
Leopard, G. S.	Nevada,	1,500	5,000,000	50,000	50,000	March 31, '76, $1.	162,500	Dec. 15, '76, 50c.	5 00		....	4 37½	4 00	....	400
Lucerne Mining Co.	Colo.	4,200	5,000,000	500,000	**	.....	....	.....	2 25		2 37½	2 12½	2 12½	2 00	3,200
Mer. and Min. Tun. Co.	Colo.	30,000	500,000	50,000	**	..	....	.....	....		....	....	....	....	.....
Merrimac, S	Mass.	600	10,080,000	100,800	**	.....	15,000	Dec. 10, '76, $1.	4 50		4 62½	5 00	5 00	4 62½	2,800
Mexican, G. S.	Nevada,	1,500	500,000	50,000*b*	100,800	Sept. 5, '76, 50c.	....	.....	21 00		19 75	18 37½	21 50	21 12½	1,900
Morning Star.	Nevada,	1,600	8,000,000	8 ,000	....	.....	....	.....	....		....	....	....	....	.....
Northern Belle, S.	Nevada,	1,600	5,000,000	50,000	....	.....	950,000	Dec. 15, '76, $1.	33 00		....	32 75	*32 00	27 00	450
Ophir, G. S.	Nevada,	675	10,080,000	100,800	2,034,400	May 14, '75, $2.	1,394,400	March 9, '64, $4.	29 50		27 00	22 50	26 00	25 37½	1050
Original Comstock, G. S.	Nevada,	....	10,000,000	10,000	....	.....	....	.....	*75		....	....	....	....	....
Overman, G. S.	Nevada,	1,200	3,840,000	38,400*b*	2,222,280	Oct. 21, '76, $3.	....	.....	*130 00		123 00	122 25	*128 00	*125 00	150
Pleasant View.	Colo.	1,200	200,000	20,000*b*	**	.....	....	.....	*1 50		*1 62½	*1 75	*1 75	*1 62½	....
Raymond and Ely, G. S.	Nevada,	5,000	3,000,000	30,000	540,000	Dec. 5, '76, $1.	3,075,000	Sept. 10, '73, $3.	3 75		3 87½	3 37½	2 50	3 37½	110
St. Joseph Lead Co.	Missou.	2500 acs	1,000,000	100,000	....	.....	210,000	.....	....		*7 00	6 00	*7 00	6 00	.....
Santiago, G. S.	Nevada,	2,000	11,200,000	112,000	....	.....	....	.....	....		....	....	....	....	.....
Savage, G. S.	Nevada,	800	11,200,000	112,000	2,858,000	Nov. 25, '76, $1.	4,460,000	June 11, '69, $3.	11 00		9 87½	10 25	9 87½	10 87½	1,700
Seg. Belcher, G. S.	Nevada,	160	640,000	6,400	244,800	April 11, '76, $5.	....	.....	*88 00		82 50	82 50	81 50	80 00	300
Sierra Nevada, G. S.	Nevada,	3,630	10,000,000	100,000	1,500,000	Oct. 24, '76, $1.	102,500	Jan. 16, '71, $1.	10 50		....	9 50	8 50	11 00	500
Silver City, G. S.	Nevada,	3,900	6,310,000	63,100	15,775	Nov. 16, '76, 25c.	....	.....	*1 00		*1 50	*1 75	....	*75	.....
Silver Hill, G. S.	Nevada,	5,400	10,800,000	108,000	810,000	Sept. 18, '76, $1.	....	.....	9 50		....	7 62½	8 50	8 00	900
South Comstock, G. S.	Nevada,	1,500	10,000,000	100,000	44,000	May 3, '76, 10c.	....	.....	....		....	....	....	....	.....
South. California, G. S	Nevada,	1,500	5,000,000	50,000	....	.....	....	.....	....		..	....	....	....	.....
Southern Star, G. S.	Nevada,	1,500	6,000,000	600,000	....	.....	....	.....	....		*1 12½	....	....	*1 12½	.....
Trenton, G. S.	Nevada,	..	10,000,000	100,000	....	.....	....	.....	....		....	6 00	*8 00	..	50
Union Cons. G. S.	Nevada,	850	10,000,000	100,000	260,000	March 3, '76, $1.	....	.....	*11 00		9 87½	9 12½	9 62½	*11 00	800
West Belcher, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....		*2 75	....	....	....	.....
Yellow Jacket, G. S.	Nevada,	1,200	12,000,000	120,000	2,718,000	Oct. 28, '76, $1.	2,184,000	Aug. 10, '71, $2.50.	....		16 50	15 00	15 25	16 75	1300
Young America, S.	Nevada,	1,000	3,000,000	30,000	6,000	Oct. 23, '76, 20c.	....	.....	....		....	....	....	....	.....

Assessments levied to date, $27,805,537 | Div'ds pd. to date, $85,241,400 | Total sales..... 52,475

BOSTON STOCK MARKET.

									Fri.	Sat.	Mon.	Tues.	Wed.	Thurs.	
Allouez, C.	Mich	..	$1,000,000	20 000*c*	$940,020	May 9, '76, $5.	....	.....	$7 00	5 00	No sales—Christmas Day.	6 00	5 50	6 00	.....
Calumet and Hecla, C.	Mich.	¾ mile	2,000,000	80,000*d*	1,260,000	.....	$11,050,000	Oct. 21, '76, $5.	173 50	174 50		174 00	174 50	174 00	.....
Central, C.	Mich.	..	500,000	20,000*c*	100,000	June, '62, 65c.	1,020,000	Feb. 17, '76, $5.	35 50	36 00		35 12½	36 00	26 00	.....
Copper Falls, C.	Mich.	..	1,000,000	20,000*d*	535,000	May 10, '76.	100,000	Nov., '71, $1.	3 50	3 62½		3 75	3 75	3 75	.....
Dana, C	Mich.	..	500,000	20,000*d*	68,000	Jan., '71, 50c.	....	.....	10	10		12½	10	10	.....
Dawson, S.	Canada.	..	1,200,000	60,000*f*	....	.....	....	.....	10	11		10	10	10	.....
Duncan, S.	Canada.	..	1,200,000	60,000*f*	75,000	July, '76, 41⅔.	....	.....	4 87½	4 50		4 62½	4 62½	5 00	.....
Franklin, C.	Mich.	..	500,000	20,000*d*	360,000	June, '68, $5.	585,000	Nov., '71, $1.	14 50	14 50		14 62½	14 37½	14 37½	.....
Humboldt, C.	Mich.	..	500,000	20,000*d*	100,000	Sept. 28, '76, 15c.	....	.....	18	17½		18	18	18	.....
International, S.	Canada.	..	1,200,000	60,000*f*	....	.....	....	.....	50	50		50	50	50	.....
Madison, C	Mich.	..	50 1,000	20,000*d*	123,000	Sept. 11, '74, 10c.	....	.....	50	50		50	50	50	.....
Mesnard, C	Mich.	..	500,000	20,000*d*	160,000	April 12, '65, 50c.	....	.....	23	24		25	25	25	.....
Minnesota, C.	Mich.	..	1,000,000	20,000*e*	436,000	June 10, '69, $1.	1,820,000	Mch. 15, '76, 50c.	1 62½	1 75		1 62½	1 62½	1 75	.....
National, C	Mich.	..	500,000	20,000*e*	195,000	Oct., '75, $1.	360,000	Oct., '73, $1.	1 37½	1 31¼		1 37½	1 37½	1 37½	.....
Osceola, C	Mich	..	1,000,000	40,000*d*	880 000	May 1, '76, $2.	....	.....	19 50	19 75		19 50	19 75	19 50	.....
Petherick, C	Mich.	..	500,000	20,000*d*	165,513	March 22, '76, 50c.	....	.....	37½	40		37½	37½	40	.....
Pewabic, C	Mich.	..	500,000	20,000*d*	185,000	June, '68, $3.	460,000	July, '73, $1.	2 87½	3 00		3 00	3 12½	3 12½	.....
Phenix, C.	Mich.	..	1,000,000	20,000*d*	817,500	Sept., '70, $3.	....	.....	....	....		....	....	....	.....
Quincy, C.	Mich.	..	*h* 200,000	20,000*b*	....	.....	2,050,000	Oct. 28, '76, $3.	48 50	48 62½		49 00	48 75	49 00	.....
Ridge, C	Mich.	..	500,000	20,000*d*	....	.....	....	.....	4 75	4 62½		4 50	4 25	4 25	.....
Rockland, C	Mich.	..	500,000	20,000*d*	495,000	Jan., '74, $1.	....	.....	27	26		26	26	25	.....
Star, C.	Mich.	..	500,000	20,000*d*	265,000	March 30, '76, 50c.	....	.....	35	36		34	35	35	.....
Superior, C.	Mich	..	500,000	20,000*d*	340,000	March, '74, 25c.	....	.....	12½	12½		12½	12½	12½	.....

Assessments levied to date, $7,440,033 | Div'ds paid to date, $17,445,000 | Total sales .. —— shares.

G. Gold. S. Silver. L. Lead. C. Copper. *a* The par value of shares is $100, unless otherwise designated. *b* Par value $10. *c* Par value $50. *d* Par value $25 each. *e* Par value $15. *f* Par value $20. *g* Closing quotations represent the latest prices bid. Prices asked will have a * affixed. *h* Full paid. *i* On the four old companies. ** Not Assessable.

in place ready to start into operation. This pump will save a lift of 250 feet by the small pumps, and will greatly expedite the drainage of the lower levels. As it now is, the pumps are making a slow though steady gain on the flow of water.

Sutro Tunnel.—Total length of tunnel to-day 15,415 feet. Face of header in soft porphyry with clay seams, which make it rather treacherous and liable to fall when least expected.—*Gold Hill News*, Dec. 20.

La Abra Silver Mining Company.—This company will hold its annual meeting in this city on the 2d of January.

INCORPORATIONS.

We note the recent organization of the following mining companies in addition to the announcements in our issue of December 2nd :

Name of Company.	Location.	Cap. Stock.
Summit Coal Mining Company	California	$10,000,000
Wenona Mill and Mining Company	"	10,000,000
Ward Consolidated Mining Company	"	10,000,000
Panamint Valley Water Company	"	5,000,000
Lookout Coal and Transportation Co.	"	2,500,000
Grant Gravel Mining Company	"	600,000
Republic Mining Company	"	100,000
Eureka Iron Mining Company	"	.....
Champion Mining Company	"	300,000
Bunnell Mining Company	"	10,000,000
Eureka Mining Company	"	600,000
Independence Silver Mining Company	Colorado	150,000
Fidelity Mining Co. of Colorado	"	1,000,000
Eureka Gold and Silver Mining Co.	"	5,000
Consolidated North Slope and Evans Tunnel Company	"	500,000
Empire Placer Mining and Ditch Co.	"	500,000
Pine Flat Silver Mining Company	Arizona	.....
Midas Mining Company	"	6,000,000
Murray and Durfee Silver Mining Co.	Montana	1,000,000
Argenta Mining Company	Nevada	10,000,000

Gas Stocks.

NEW YORK, FRIDAY EVENING, Dec. 29, 1876.

WE note an improvement in the stock of the Brooklyn gas companies, and according advance a few of the quotations. New York stocks are dull and unchanged.

The Manhattan Gas Company has declared a dividend of 5 per cent., payable on demand.

The Citizens' Gas Company of Brooklyn has declared a dividend of 4 per cent., payable January 15th.

Boulder, Colorado, Gas Works.—The Board of Trustees of Boulder Colorado have recently authorized the erection of gas works, which are to be completed in July, 1877. The parties building the works agree to supply a gas of 16 candle power at $3.75 per 1,000 feet, with a discount of 25 cents per 1,000, if paid before the 10th of the month. The rate for street lamps will be $40 per year, five-foot burners to be used.

San Francisco Gas Company.—We note recent sales of the stock of this company aggregating nearly 700 shares, at from 109¼ ex-dividend to 111 dividend on.

Boston Gas Company.—We note recent sales of the stock of this company at $810 per share, equal to about 162 per cent. of the par value.

The Citizens' Gaslight Company's Works at Ravenswood, L. I., were sold on the 28th inst., by the receiver to Mr. E. B. LITCHFIELD, for $5.000, who besides assumes mortgages to the amount of $45 000. A new corporation will be formed, to be known as the City Gaslight Company.

New York City Gas Difficulty.—The Gas Commission, consisting of the Mayor, Comptroller, and Commissioner of Public Work, met on the 28th inst. at the City Hall for the purpose of opening bids for lighting the city lamps for the first quarter of 1877. The following is a list of the proposals received and the rates to be paid during a portion of this year :

	Price per lamp for first quarter of 1877.	Price asked per lamp for 1877 in recent rejected proposals.
Manhattan Gas-light Co.	$7 50	$36 00
New York Gas-light Co	7 50	36 00
Mutual Gas-light Co.	9 00	36 00
Harlem Gas-light Co.	10 50	37 50
Metropolitan Gas-light Co.	9 00	32 00

It will be observed that the proposals on which the above bids are based, are for lighting and keeping the lamps in order at the most unfavorable season of the year, accordingly the average rate for lighting the lamps for the whole year would be much less than the new bids given above. The saving on the quarter for which the bids are made will amount to about $10,000 The contracts were awarded on this basis.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity.	Cap. Stk.	Par.	last Divid.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.	$5,000,000	$ 100	2½	Oct. '76	100	103
" " Bonds	90,000	1,000	†3½	Aug. '76		109
NewYork, "	4,000,000		5	Nov. '76	134	136
Metropol. "	2,500,000	100	5	Sep. '76	145	—
" " Certf.	1,000,000	....	3½	"	102½	104½
" " Bonds	500,000	1,000	3½	Dec. "		102½
Harlem "	1,850,000	50	4	Aug. '76	105	—
Manhattan "	4,000,000	50	10	July "	240	246
Brooklyn, B'klyn.	2,000,000	25	5	Nov. '76	179	181
Nassau "	1,000,000	25	4	Jan. '76	80	—
" " Certf.	700,000	1,000	3½	Nov. '76	95	—
People's "	1,000,000	10	3½	Jan. '76	50	55
" " Certf.	300,000	1,000	3½	July '76	87	90
" " Bds	325,000	....	3½	Aug. "		95
Metropol. "	1,000,000	10	3½	Nov. '76	75	80
Wmsburgh "	1,000,000	50	3	Oct. '76	130	—
" " Certf.	1,000,000	....	3½	July "	100	102½
Citizen's "	1,200,000	20	2½	Jan. '76	100	103
" " Certf.	320,000	1,000	3½	Oct. "	98	102
J. C. N. J.	750,000	20	5	July, '75	160	—
Centl. Westch. N.Y.	466,000	50	4	July. "	90	—
Subur'n " "	390,000	50				90

† Gold.

COMPANIES OUT OF TOWN.

We are reported no change in the quotations of the out of town companies, which, in the absence of transactions, are nominal. Our issue of Nov. 4 contains the prices of these, as were generally prevailing on that date.

PHILADELPHIA & READING RAILROAD COMPANY.
OFFICE, 227 SOUTH FOURTH STREET,
PHILADELPHIA, December 12th, 1876.

NOTICE is hereby given to the Stockholders of this Company, that the Annual Meeting and Election for President, six Managers, Treasurer, and Secretary, will take place on the second Monday, 8th of January next, at 12 M.

DAVID J. BROWN, Secretary.