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Mining Interests in the South.

Dr. Joseph H. Pratt, a well-known mining engineer of Chapel Hill, N. C., writes to the editor of the "Mining Journal" regarding the future of the South's mining industry: "Mining and engineering industries in general have never been in as prosperous a condition as they are at the present time, and this is especially noticeable in our Southern states. For the past two or three years' investments in mining and mineral properties have been carried on in a more comprehensive manner, but there is still need of a determined effort on the part of those interested in the real and substantial growth of the South along this line to keep down fraudulent propositions and those that are being too highly valued to the gain of the promoter and the loss of the investor. Never has the South had the opportunity that she now has of obtaining capital for the development of her mineral resources, and with a conscientious endeavor on the part of the owner or agent and the consulting engineer they should be found profitable investments to the capitalist.

Our Iron and Steel Supremacy.

Fresh confirmation of our supremacy in the iron industry of the world is afforded by the interesting monograph on the subject recently issued by the Treasury Department. The purpose is everywhere accepted as authentic and will beyond a dispute the supremacy of the United States among iron-producing nations. For five years we have continuously outstripped Great Britain as a producer of pig iron (having passed her temporarily before, and the land is now hopelessly in the rear). Our tonnage last year of 13.6 millions, as compared with 9.3 for Great Britain and 8.1 for Germany, the third contestant for world honors.

To summarize the situation in a single sentence it may be said that the United States in 1899 produced thirty per cent of the world's iron ore, forty per cent of the world's steel and thirty-two per cent of the world's coal. Great Britain pressed us closely in the matter of coal with a thirty per cent production to her credit, but in steel her percentage is only 18.6 and in iron ore only seventeen.

Twenty years ago the United States imported five times as much in value as it exported of iron and steel products, whereas the figures are now more than reversed, as we exported last year six times as much as we imported. These imports in the last decade have been to the amount of $70,000,000, or 3.2 per cent of our total importations, while all other imports of this nature are less than 1 per cent of our total imports.

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The Metal Markets.
The Red Ash Colliery Explosion.

A Description of the Mine.—The Havoc Wrought by the Explosion—A Careful Analysis of the Possible Causes.

In W. Va.

The Red Ash colliery, Fayette county, West Virginia, was the scene on March 6, 1909, of an explosion by which some fifty men were killed or wounded, and much property was injured or destroyed. On March 10, the authorities were able to establish the exact date at which entrance was practicable, I examined the mine with the view of determining the extent, cause and point of origin of the explosion, and with the permission of the owners, those the right of the miners, and the owners of the property, for whom the examination was made, I present in this paper some results of that examination, comprising the essential portions of my report to them.

LOCATION AND PLAN OF THE MINE.

The Red Ash colliery, situated on the south side of New River, next below the Rush Run mine, with which the underground workings are connected, is a drift-mine, the entrance to which is on a slope, about 500 feet above the river.

The main entry has been driven north about 4,000 feet from the surface, with parallel entries on either side from the fourth set of cross entries, and about seventy feet of chain-pilar between the parallel entries. The five or six feet west of the entrance an exhaust fan is located in the mouth of the parallel air way on the left or west side of the main entry, which parallel is broken by the square, but connected at the fourth set of cross entries, through workings to the westward, giving about the same effect as if the air way had been continuous. I did not measure the efficiency of this fan; but the mine workings have been planned for an excellent system of ventilation, which should be ample for every requirement, with any standard centrifugal machine proportioned to the work. The fan is driven by compressed air, which is frequently used for such purposes, and I understand that several others of the same model and make are employed in the district, giving satisfactory results. Under the plan of which the main entry is the intake, with an average cross section of about six or twelve feet, or seventy-two square feet of area, which is more than enough for the safe working requirements of the mine. The current is directed to the head of the intake, where it splits, and is conducted across the face of the workings to the east and west, through a system of trap doors, brattices and stoppages; that on the east returning through the overcast at the fourth cross entry. With the double entries and break-throughs from room to room, as shown on the plan, there is no reason why the circulation should not have been as nearly perfect as any artificial system of ventilation can be, as the intake and split, and are unusually straight, with ample cross sectional areas to reduce friction and resistance to a minimum. I feel safe in saying, therefore, that if there was no ventilation at the time of the explosion, it cannot be attributed to any cause in the system or the general plan of the mine workings.

EXTENT AND EFFECT OF THE EXPLOSION.

The main entry showed no evidence of unusual heat, but its location might be expected along the intake, from an igniting coal gas, or some other part of the mine; the heated air and flame being necessarily thrown toward this entry, as offering the line of least resistance to daylight.

Beyond the ninth cross entries, the force had been expended, and from these entries, outward, everything had been swept toward the entrance like shot from the barrel of a gun—to which this entrance may be likened, the explosion having been initiated by the workings representing those of the enlarged powder chamber of the gun. From the fifth cross entry there were three escapes for the pressure they produced, first, being the west, and not the only one. A second was the parallel air way on the west, which turned square to the west at the fourth entry, and had to pass through the “squeezes” by a deviating route, before reaching the seventh room, where it was obstructed by the timber.

The third way down was the west fifth entry to the Rush Run workings. Between these and the Red Ash there was a trifle, or stopping, which was blown out; and in addition to which there must necessarily have been, in that direction, other resistance due to old workings.

The walls and roof of the main entry were covered with white dust from the floor, showing that the clay in the tracks and roadbeds had been swept out through this channel with considerable force. At the fourth cross entry the overcast timber in the two entries were blown out; there was no indication that the contracted area of the stone drift through the squeeze had dammed back the force and equalized the pressure from the east workings, the return from which was through the overcast at this point.

The fourth cross entry east shows the effect of heat, as it had been filled with flame, the ribs and roof being covered with coked dust. The indications here also point to the conclusion that the forces were dammed back by the stone drift, which probably gave the flame more time for action. At the fifth, sixth, seventh and eighth cross entries the doors on the west were blown in, and down the main entry, toward daylight; while those on the opposite side were blown eastward, toward the faces of the workings. The door of the eighth west entry was found several hundred feet down the main entry, and the six men found there, as well as the cars wrecked there, evidenced a violent force from the west, coming down this eighth cross entry. On the main entry west, five bodies were found badly mangled and in a condition of having been burned. As the beginning of the stone drift, the force and heat were probably concentrated by the contracted area inside, but had room to expand through the old workings toward the outside, before reaching the cavernous area down the nineteenth and twentieth rooms, coming from the direction of No. 4, with which they were con- nected by break-throughs. The tracks and everything movable, including a Hurrican mining machine, were thrown out of these rooms against the ribs of No. 6 entry, where the force seems to have been divided, one part being directed toward the face of the entry, the other toward the main entry. There are only two ways of accounting for this curious reversal of forces. One is, by supposing that a local pocket of gas was fired, and followed the line of least resistance, which must have been toward No. 6, possibly on account of the stone drift, by which the accumulation of a secondary or later explosion, due to either a pocket of fire-damp, or of carbon monoxide, known as “white-damp” by miners, which might have been produced by the passing over red hot carbon (in this case, coke), took up another atom of carbon in chemical combination, making two molecules of carbon monoxide (CO), which is a combustible (and when mixed with air before ignition, an explosive gas), being the principal constituent of the furnace gases used for heating the blast and boilers at all modern iron blast furnaces. The latter alternativa is as the most probable, the partial vacuum, created by the first explosion, would have directed the line of least resistance from these rooms inward, or toward No. 6, a fast hard blow out, the only effect, of a partial vacuum.

As a further evidence that there was little resistance from within, this force seems to have been expended to the east, before reaching the face of the entry, nearly to the point found the air pipe and the track, the pipe being sheared from the pipe stick in the side, neither of which had been disturbed; consequently the direction of least resistance must have been westward and inward.

Entries six and seven east, as already observed, had their doors blown outward, showing that the force originated in or beyond the main entry, and not in these east workings, in which there is little evidence of violent disturbance, though coked dust on the walls and roof shows flame and heat. No. 8 east was little disturbed by heat or force, especially near the faces of the workings; and I am confident that the explosion did not extend beyond these or more than 300 feet from the west face of the main entry. The body of a man was found on No. 8 east, in the mouth of the fifth room, to reach which he must have passed within sight and hearing of the fire boss, who was found only about 200 feet distant, on the seventh room and fifth break-through. It is evident that the body had found gas in the face of this entry, as he had raised the end of the air pipe and turned on the air, to drive it out, but it is difficult to assume to any extent in regard to it as dangerous, or he would not have permitted the presence of the three men found so near, all of whom he probably saw or heard enter. I was informed that none of the men were hurt or exhibited like conditions, it is reasonable to assume this as the origin of the explosion; and, in my opinion, the gas was first lighted at or near this point. Everything was swept through this room to No. 7 entry with great violence; the indications being that the forces directed south through this room, east to the main entry, and north up the parallel air way, were about equal, while that which was thrown out was breeched by the faces of the workings, disturbing a few hundred feet in that direction. All indications in the west workings point to the movements of the forces from that point to daylight along the lines of least resistance, through room ways, and main entry, and along No. 5 west, in both directions; eastward to the main entry, and westward to the Rush Run mine. At a point on No. 7 west, a boy was found in the line of the room already referred to, leading from No. 8 east, and I saw a pool of blood and brains where his head had rested. Near by another boy was found. The workings being extensive, there were large areas to receive the expanded gases; and a considerable portion of the forces had evidently been thus dissipated by the
time they reached No. 5 cross entry; otherwise, the fan would probably have been demolished.

CAUSE AND ORIGIN.

The primary cause of the explosion was evidently fire-damp, a colourless hydrogen gas, the principal constituent of which is CH4, also called marsh gas. We know that a mechanical mixture of more than one part of this gas to fourteen of atmospheric air is explosive—the most explosive proportion of gases being about 1:5. With more than fifteen or less than five parts of air to one of gas, the mixture is not explosive; but by reason of the diffusion of gases, this mixture must always be found in mines and must appear at any very slight circulation of air. As all coal will give off at least its own volume of gas (and some coal much more), its presence is easily accounted for, and would be detected in all coal mines but for its tendency to escape through every crack and crevice toward higher outlets, owing to its density being less than that of air. Taking this density of air as unity, that of methane, or marsh gas, is 0.559, or a little more than one-half as great. If sufficient time is allowed, air and fire-damp will make a complete mechanical mixture, according to the law of diffusion of gases; but the latter is usually found at depth in mine workings, owing to lack of time for complete diffusion, before the gas is removed by natural or artificial ventilation. In coal mines above water level, where the covering can crack, or break, fire-damp is rarely noticed in workings within less than a mile of the escapement, or outcrop. Within this limit it is carried off by the usual methods of ventilation, assisted by the movement of cars, the upward escape by lofts, through crevices, etc.; below water level, or where the lines of escapement embrace larger areas, with a heavy, unyielding cover, gas may usually be expected to give more or less trouble.

At Red Ash there is no escapement northward or westward, in the direction of the workings, for many miles, and the overlying rocks are too massive to break, in consequence of which gas had been found within 4,000 feet of the entrance, and was probably given off freely in all the workings inside, and including the eighth cross entry. During a period when the fan was idle on Monday night there must have been in these workings an accumulation of a mixture of flammable gas, which by the operation of the fan on Tuesday morning was started back in the return air course, where it was met by a naked light on the eighteenth entry near the main return air way. About fifteen minutes had elapsed since the starting of the fan for the air to travel down the intake, 4,000 feet of the main entry, and back to the point indicated the total travel being about 4,560 feet, which would make the velocity about 150 feet per minute, and (taking the section of main entry at seventy-two square feet) would be equivalent to a volume of nearly 10,400 cubic feet per minute—probably as much or more than as much as the fan was doing at the start.

The theoretical requirements for ventilation given by Andre, in his "Practical Treatise on Coal Mining," is that for thirty men in a 1,000 foot mine the air must be twenty-four cubic feet of air per minute for each man and light; seventy-two for each horse, 192 for each pound of powder burned, 100 for each cubic foot of coal mined, and one cubic foot per minute for each square yard of coal surface in the mine.

Assuming that 150 men were employed underground in the Red Ash colliery, with fifteen horses, it is probable this one twelve pounds of powder were burned per hour, and eighteen cubic feet of coal were mined per minute (or 400 tons in ten hours); and that 1,000 square yards of coal surface was exposed, a simple calculation will show that 16,000 cubic feet of air per minute would be required to satisfy Andre's requirements. But this would leave no factor of safety, whereas such a factor, of two to five—according to actual tests of the amount of gas produced in the mine—should be allowed.

From the effects observed, I think the dust had little or no influence on the primary cause, though it is necessary to play an important part in all explosions of this nature, while the secondary, by adding to the forces evolved. My impression is that the boy found on No. 7 west met the gas with a naked light on No. 8, west, on its return to the fan, and was blown down the room to the point where his remains were discovered. It is probable that one of the men found on the main entry may have lighted the gas in the return west air way or near its intersection with No. 8 cross entry, in which event the force exerted at that point was sufficient to have blown him to where these bodies were found. From all the evidence, however, I am inclined to the opinion that the gas was lighted by the boy found on No. 7 west, as he was in a straight and direct line from the evident point of ignition, indicated by circles of force, like the ripples from a stone thrown into a pond of still water; and at every other point in the mine the forces can be traced to this origin as the center from which the waves emanated. I am satisfied, from all I could see and hear, that the general plan and conduct of this mine were fully up to the standard of the New River district, and above the average in many respects. The presence of gas in dangerous quantities, however, was not fully realized, consequently some of the expense and precautions for a highly gaseous mine were omitted. Now, precautions necessary for such conditions have been considered. In my opinion, without a loss at the prevailing market prices, as the additional costs would necessarily have exceeded the profits.

Both the operators and operatives of this district are unaccustomed to gaseous mines, and both must be educated to the requirements. The operator may comply strictly with every requirement, regardless of cost, yet the ignorance or carelessness of a single workman may bring about disaster without warning, and none may live to tell the tale. Many such cases are on record, and nothing but time, strict attention, and experience will provide against such accidents.

As already observed, I did not measure the volume of air handled by the fan during my visit. Under the conditions as I understand them, however, the capacity of the fan would have had little effect upon the result, as it was not running more than thirty minutes before the explosion. The larger the capacity of the fan, the sooner the gaseous mixtures might have been drawn out and the mine rendered safe; but the danger existed as long as they remained in the return, where they were liable to ignite anywhere between the fan and the working places where they had been generated or accumulated.

The Mining Expert—An Australian View.

Few men have been made the subject of more all-round abuse than the mining expert. In this respect he has out-rivalled the surgeon and the physician, of whose professions it has been sarcastically said: "Surgeon is a science founded on assumption and demonstrated by manslaughter;" "the practice of medicine in an art the merit of which is consists in amusing the patient while Nature effects the cure." The popular opinion of the mining expert has been expressed with even more bluntness and bitterness, and is embodied in the saying, for while the sting has been retained, the epithet is in many cases been omitted. Everyone who has suffered, or who has grudgingly shared the suffering, has taken the liberty to roundly abuse him. He has been ridiculed, contumely, and derided with unbridled license. Not only has his skill been doubted, but the industry of the expert has been impeached in the well-known formula: "He is the— the— the mining expert;" and yet the mining expert, properly so called, is a most worthy, most useful, and most estimable public servant.

The expert, as a public servant, performs two duties. In the first place, he is in the position of a mining expert, and as such is bound to the company or group of investors, to whom he is in trust, to exercise the greatest care in the management of the property, the more inflated his pretensions. He combines for his lack of knowledge by his abundance of audacity, and with no better equipment than the terminology or mere patter of the profession on which he preys, he pronounces positive opinions of the most extravagant character on propositions which the competent man would deal with very differently. The great mischief of the whole matter is that the untrained expert so frequently finds equally unscrupulous employers. There are dishonest men whom it suits to employ dishonest agents as their accomplices in working a confidence trick on the public, and it is by these two classes that a profession which calls for a high standard of scientific ability, allied to a wide range of practical experience, is brought into disrepute. This, however, is not fair to the mining expert, who is thus made to pay penalty for the public inability to distinguish between the bogus and the genuine. As we have said, the mining expert is for the investing public a necessary guide, and in the great majority of cases his guidance is reliable, provided he is not made to be a man of liberal education and varied scientific attainments. He must be a surveyor, a geologist, a mineralogist, and a metallurgist. He must have a capacity for a great deal of mining work and conditions, and above all he must be a competent mining engineer. The qualifications first named will enable him to form estimates as to the character, approximate quantity, and probable value of ore contents, while those last mentioned are necessary to his calculations respecting the nature and cost of working the difficulties in the way, the methods by which they can be overcome, and the ore body upon which it is proposed to operate. Such a man is a mining expert, properly so called, and assuming that with his other qualifications he is gifted with that discretion which begets a temperance in his estimates and expectations, he is not only entitled to respect and esteem, but to the people contemplating a big mining enterprise his worth is almost incalculable. The value of the first-class man has been demonstrated and acknowledged by every great mining enterprise throughout Australasia, such as Mount Lyell, Mount Bischoff, Broken Hill, Great Boulder, and Mount Morgan. Unfortunately it is impossible to place a special brand upon the capabilities which would distinguish them from the incapables, because appropriation of
Death of Marcus Daly.

Marcus Daly, Montana's famous copper mine owner, died on the morning of Monday, Nov. 12, at the Hotel Netherlands, New York City, after an illness of two months. When he returned from Europe early in September he was suffering from a complication of diseases and his recovery has since been considered impossible. It is said that the fatal malady was contracted several years ago, owing to Mr. Daly's constant presence in his mines and smelters, where he supervised the work of his men and was always an indefatigable worker, and he considered that his personal attention was practically necessary for the successful treatment of his properties. His heart was weakened by his unceasing labor in high altitudes in the arsenical-tempered atmosphere of the smelters.

It is said that Mr. Daly came to New York for treatment some time ago, and in a characteristic manner went to three specialists in turn, requesting their advice as to forms of treatment without informing any one that he had consulted others. From all three he received the same advice. After returning from Europe his health improved and he finally went abroad. He took the baths at Neuchatel, much against the advice of his doctors, and it seems that in his case the baths were too stimulating; and that although temporarily improved, Mr. Daly soon grew worse.

Marcus Daly began his life work as a miner with pick and shovel, and ended it as the possessor of a fortune estimated at from fifteen to thirty millions. He was born in County Cavan, Ireland, in 1842, but came to this country at the age of thirteen. He worked about the mines at Butte, but frequently took a week off, prospecting, and it was said that when J. B. Hagginn wanted to buy a silver mine Daly secured the Anaconda property for him for $25,000. The mine was a good silver producer, but its enormous value came when it was found to be a wonderful copper producer, and it made Hagginn, Daly and others multi-millionaires. This was the beginning of Butte as a copper centre, and the first developers bought all the mines they could secure. Later they built a spur railroad to Anaconda, and the mines now produce more than one-fourth of the world's copper supply.

Mr. Daly early in his days of wealth developed a pampered habit, and in his time owned some of the finest horses on the American turf, including Hamburg, Tammany, Senator Grady, and others. He had a breeding farm in the Bitter Root valley, and was often seen at Eastern race meetings. A few years ago he cruised with William A. Clark, formerly his business partner, over some land near Butte which Daly and Clark purchased together. During Clark's absence in Europe, the two men were building the works of the Anaconda Mining Company on the land. When Clark came home he sued Daly and obtained a judgment for $225,000 for his interest in the land, which was about to be sold in the bankruptcy of the company. When Clark won he was in Washington and obtained a judgment for $70,000 for his interest in the company, and in his bankruptcy in the Washington courts. Thought it was known that Marcus Daly controlled the largest part of that money, a company was organized to work the mine, and it included, among others, the late Senator Hearst and J. B. Hagginn, but the original purchaser of the mine retained a controlling interest. It was said that millions of dollars began to pour into the pockets of the stockholders.

The Anaconda mine is near Butte, and to-day the worth of the property is so fabulous that no one can accurately estimate it. Some mathematical fiend has calculated that the lumber used in the main shaft and branches during a single month would build a board walk two feet wide from Washington to St. Louis. It is said that a hundred thousand cords of wood are eaten up every day by the gigantic furnace that gives motion to the machinery in the works. The daily output of the mine is upward of 3,000 tons of ore. For smelting the ore is transported to Anaconda, a distance of thirty-seven miles, and the smelting works cover a whole mountain side, the area occupied by them being eighty acres. Besides the immense amount of copper produced in the mine, it is said that a hundred thousand tons of gold and silver annually are smelted and that to defray all the expenses of smelting the copper has been estimated that the property controlled by Mr. Daly in Montana was worth at least $25,000,000. How much copper outside of that nobody knew. Of the Anaconda mine his was more than one-fourth the total stock. A minimum value placed on that property a few years ago was $80,000,000. The monthly payroll of the mine is more than $100,000, and the coal used in working it costs $50,000 a month. Under Mr. Daly's orders when, before his illness, he was the active head of the mine, there were 10,000 men on the payroll. That number does not include many more thousands in the various lumber mills and factories of different kinds which he owned.

Mr. Daly passed away on November 15th and his funeral service was held at the Hotel on November 22nd. The funeral train left for Butte on November 24th, when the funeral train left for Butte on November 24th, when the train arrived there Mr. Daly was met by a large crowd of people. Mr. Daly was also president of the American Mining Co., which is the main office of the Anaconda Copper Mining Co., of which he was president, in 52 Broadway. Mr. Daly was a member of the Manhattan Club.

Aluminum vs. Copper.

The article by Nikola Tesla which recently appeared in the Century's number of March 15th, endeavors to cut the apple pie in two parts, namely that the copper industry would soon be annihilated by the aluminum industry. It is not the purpose of this paper to enter into a discussion of the subject, but to bring to light the fact that the copper industry is far from being annihilated.

Aluminum is not a new material; it has been known for many years. It is a very strong and very light metal, but it is not as good as copper in certain respects. For example, it is not as ductile as copper, and it is not as malleable. It is also not as resistant to corrosion as copper. However, aluminum is a good conductor of electricity and it is a good thermal conductor. In addition, it is much lighter than copper, and this makes it attractive for use in the construction of airplanes and other lightweight structures.

On the other hand, copper is a very strong and durable metal. It is not as malleable as aluminum, but it is much more ductile. It is also much more resistant to corrosion than aluminum. Copper is a better conductor of electricity than aluminum, and it is a better conductor of heat than aluminum.

In conclusion, it can be said that aluminum and copper have their own advantages and disadvantages. Each metal has its own unique properties and characteristics, and it is up to the engineer to determine which metal is best suited for a particular application. It is not true that the copper industry is going to be replaced by the aluminum industry. There are many applications where copper is still the best choice, and it is likely that copper will continue to be used for these applications for a long time to come.
natural current from the powerhouse to the works. These conductors are aluminum bars twenty-five feet long, six inches broad, and one-quarter of an inch thick; these are riveted together at the ends, and each group of bars is connected to aluminum cables—the core of each cable is about one and one-quarter inches in diameter, and is made of aluminum in the new conductors is 22,000 pounds. The same work in copper would require 48,600 pounds. The conductivity of the aluminum compared with copper is sixty-three to the same weight, but the same weight of aluminum is more than double. Aluminum cables require more insulation, but enable longer spaces to be used, thus reducing the number of poles and insulators.

A curious obstacle, however, exists at present to its use as a substitute for copper; this resides in the difficulty of soldering and braising two pieces of the metal together. Many soldiers or fluxes are described for accomplishing this connection, but they can not be said to be commercially practicable. The necessity of such an art of connection is imperative in electrical industries. Let us consider the overhead wires in the trolley system. The pieces of copper wire which are employed are only a few hundred feet in length, and the railroad systems extend over many miles. It is necessary to transmit the electric current without great loss, the ends of the copper wires must be perfectly joined by soldering or braising. The same can be said of long-distance telegraphic circuits. It is true that these wire graphs are often twisted together without solder, but the advance in electrical engineering demands better connections than such mechanical ones. The need of a method of soldering seems to offer a great barrier to this method of connection.

Although aluminum may be used for overhead telegraph lines, it seems to be effectually barred from competition with copper in cable work, for in order to compete in electrical conductivity with copper an aluminum wire must have nearly twice the section of a copper wire of the same conductivity. This increases the size of the cable also, and the electrical capacity, which is detrimental to the speed and proper transmission of electrical waves. In general the use of aluminum wire for copper would lead to the greatest loss, and the conducting parts would have to be approximately twice as big. The element of labor, in working the material in comparison with a similar employment in the case of copper and brass, would have to be considered. No mechanic would work with aluminum if he could take copper or brass. Aluminum can be said in increasing use, but it is not yet a serious competitor of copper.

**Natural Gas in Colorado.**

Mining engineers and geologists have been giving much attention to the recent discoveries of oil in the western part of Routt county, Colo. The successful development of these oil fields is considered as the result of the Denver Times, a prominent Colorado mining engineer who made careful examinations of the formations of Garfield, Rio Blanco and Routt counties many years ago, says that it is destined to become one of the richest petroleum fields of Colorado. The oil wells are now working more than ten years ago, and says that gisment, natural gas and other forms of carbon exist in unknown quantities, and have been proved in several instances. On the divide between the Grand and the Gunnison rivers near the head of Buzzard's creek, Garfield county, about twenty miles south of Aspen, natural gas was found over a very large area. The gas was found escaping through the crevices of the rocks on deciduous, where the cliffs had been subjected to erosion, and an examination of the formation disclosed the fact that it was overlaid with a deposit of shale impermeable to the gas. A pilot dig in this shale to the depth of about ten feet, when the flow of gas became so strong that the men were obliged to come out of the pit. One of the men lighted a torch of brush and threw it into the pit, causing the gas to ignite with an explosion of such force that the beards of the party, who were a little distance from the hole, were singed.

**Copper Industry Thriving.**

For the first nine months of the present year this country's production of copper amounted to 400,000,000 pounds. The price at seventeen cents a pound, the cost of the product was $16,000,000, and assuming that the cost of production is eight cents a pound, the profit to the producers for this period was $56,000,000. The price of copper in the United States amounted to $25,000,000, for which an average of twelve cents per pound was received, or $12,000,000. Net profits to the producing mines may be put down at $13,000,000.

The profits for the first nine months this year are therefore 100 per cent above those received two years ago. Six years ago the price of copper was as low as nine cents, while ten and one-quarter cents marked the highest point in that year.

**Ingersoll-Sergeant Drills at Paris.**

One of the most successful American exhibits at the Paris Exposition was that of the Ingersoll-Sergeant Drill Co. of New York City. This company made a remarkable display of its air compressors and mining, tunneling and quarrying machinery. In the mining machinery exhibit especial attention was attracted by a large machine termed the track-channel— a machine running on a track and intended for cutting a long, narrow, vertical slot in any kind of rock. Thirty-five of these machines were in use on the Chicago Drainage Canal, where for miles they cut through hard rock to a depth of from twenty-

**Ingersoll-Sergeant Compressor at the Exposition.**

An effort was made to put out the fire with brush, but was unsuccessful, and they left it burning.

Another place where natural gas is found is a farm circuit in the West. Below the rim rock of these cliffs are found chunks of oilstone of excellent quality, used for paper bags, from the size of a fist to as large as a man's head, which have been washed up and are imbedded in the formation, and above the rim rock is an immense quantity of bituminous sandstone which contains fifty-six per cent of volatile, combustible matter, and four per cent fine ash. This rock takes fire easily and burns with a strong flame and is frequently used as fuel by residents of the vicinity. Further down on Piceance creek are fissure veins of oilstone of the purest quality. The entire country is extremely rich in carbonate material, which will soon be utilized. At present it is too far away from thickly settled communities to justify development, but the opening of the oil fields is expected to have such an important influence upon the settlement of the country that it is believed that the time is not far distant when all of these products will find a profitable market.
for operation, were also of interest. Described in a general way, these drills have a cylinder mounted in a guide frame and provided with a swivel base, so it can be adjusted to any desired angle. The drills are mounted on the Surgeon-General's tripod, which permits a rapid adjustment in any direction and which, while exceedingly light in weight, is unusually rigid, owing to the method of construction and clamping of the parts. Other forms of mountings for shafts and tunnels are also shown. This company yearly produces over 2,500 of these drills of different sizes and it has already sold over 36,000 drills of all sorts.

A pneumatic coal cutter, of which the company is turning out about 1,000 each year, and a type which is a novelty in Europe, consists of a substantial cylinder mounted on wheels and provided with two handles, was also shown. In a general way, this machine may be compared with a wheelbarrow from the front of which projects the cutting tool. The operator holds the handles and guides the machine forward or from side to side, and thus cuts under the coal, which is then broken down. The claims for this type are many, and not the least important of these is its extreme simplicity, rapid and large output, the introduction of an appreciable amount of clean, fresh air into the heading and the absence of fumes, which always results from the use of milling or saw cutters. The machine is very compact and light, and is inexpensive.

A variety of small parts, such as drills, sharpening tools, cutters, clamps, etc., complete this exhibit, which, as already stated, is the most extensive mining and air compressor exhibit from the United States, if not from any country exhibiting at the Paris Exposition.

This company also received the only Grand Prix awarded to any manufacturer in its line. It received the following prizes: Grand Prix, group XI, class 62, mining apparatus; gold medal, group VI, class 21, compressors; silver medal, group VI, class 22, models of apparatus used on Chicago Drainage Canal; honorable mention, group IV, class 20, small motors on channelers; various motors.

The Steel Castings Industry of To-Day.
The Changes Science and Industry Have Wrought in Fifty Years—The Special Steels.

By M. A. Tissot.

It is fifty years since the first steel castings were made, but until quite recently the production was very limited, owing to the difficulty of obtaining the liquid metal in sufficient quantity for making very large castings. Attempts were made at the time of their first appearance to utilize the Bessemer converter and the open-hearth furnace, but not with good results. About 1885 M. Robert invented his converter with side blast, which, applied to the casting of steel, enabled the works to produce complicated castings of excellent quality, and, in fact, created a new industry, for the sphere of its utility has been extending ever since. Many difficulties have, however, had to be surmounted by the steel founders, and it is only in the virtue of their perseverance and ingenuity that the new craft has become a success. The fusing point of steel is very high, ranging from 1,450 degrees to 1,500 degrees, and in working the metal higher temperatures are still employed. This high fusing point, and the contraction which steel undergoes when it cools, were some of the major challenges faced by the founders. The shrinkage amounts to from fifteen to eighteen, or even twenty mm. per meter, according to the heat and composition. If the mold offers too great a resistance to this contraction, there is risk of the casting cracking or becoming crooked. The third source of anxiety was the appearance of flaws, because it is necessary that the steel casting should be perfectly sound.

OLD DIFFICULTIES OVERCOME.

The united efforts of the manufacturers of steel, and of the founders, have, however, overcome every difficulty. After many experiments it was discovered how to prepare a suitable refractory sand, capable of withstanding the intense heat of the molten metal. It is composed of quartz, sand, silica brick pounded, and other refractory material, and is rendered plastic by the addition of clay. The great shrinkage that steel experiences on cooling has most severely taxed the resources of the founder, and he has only been able to remedy its consequences by a number of contrivances, such as the introduction of ribs to strengthen dangerous parts, the early removal of the core which opposes the contraction of the metal, the releasing the casting while it is still red hot, etc.

With the facility of obtaining a regular supply of metal, the steel founders proceeded to improve their plants; the old cranes were replaced by electrical or steam lifting machinery of a power of thirty, fifty and a hundred tons; cold saws, compressed-air machine tools, and electrical welding, for remedying slight superficial defects, were introduced; and lastly, as denoting the great extension of the industry, the molding machine was adopted in steel foundries. The converters, with side blast, supplying steel at a very high temperature—which can be stored without becoming too cold to run into the mold—enables the founder to turn out, with the aid of the machine worked by two men, 600 to 1,000 kilograms per day of complicated castings weighing from five to twenty kilos each.

IMPROVEMENTS IN PROCESSES AND PRODUCTS.

Another great improvement effected is the subjecting the pieces during annealing to a sudden cooling or tempering in air, which improves the quality of the steel. The castings are heated to 1,000 degrees, and then suddenly exposed to air at from 1,600 to 2,000 degrees. Their power to resist metallic shocks is thereby vastly increased, and they are more elastic and more tough. Improvements in the construction of the crucible furnace and the higher temperatures now obtainable, enable very delicate and malleable castings to be cast at the present time with a metal containing a much lower percentage of carbon than was possible formerly. Sundry correctives to the steel, such as aluminum, nickel, etc., are now added universally. The improvements made in the open-hearth furnace during the last ten years have greatly assisted the founder. The temperature, quality, and purity of the metal have been improved. And steel no longer necessary hard as formerly. Basic furnaces have now been perfected to such perfection that with their produce excellent castings can be made, which ten years ago was impossible. The judicious employment of aluminum is responsible for this improvement, so that basic steel is in many cases now preferred to acid steel. In both kinds of metals the hardening constituents—carbon, manganese and silicon—have been diminished. The following is the average composition of open-hearth foundry steels:

<table>
<thead>
<tr>
<th>Carbon</th>
<th>0.25 to 0.50 per cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese</td>
<td>1.00 to 1.50 per cent.</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.20 to 0.45 per cent.</td>
</tr>
</tbody>
</table>

The increased employment of cast steel has led to the construction of furnaces of a capacity of fifty tons which are as reliable as those of twenty
The Future of Copper Mining.

Production Stimulated by High Prices—Will the Supply Keep Up With the Demand?

The difference between the iron and copper mining industries is a radical one, says a writer in the Seattle Times, much as the two lines of mining resemble each other at first sight. The iron trade has been aptly called the barometer of American business interests, and like the real barometer with its column of mercury, the fluctuations are numerous, and at times sudden and severe. The average iron mine can be reopened on short notice after long idleness, but the reopening of a copper mine is a matter of years. The iron mine need not adjust his efforts to the requirements of the market for the near future, while the producer of copper is necessarily working with a view to the general average of conditions for a decade to come, being unable to adjust his efforts as a whole to the minor fluctuations of the copper market. The big mines can, of course, adjust production to immediate demand to some extent, but the fluctuations in output of even the largest future of the copper market in five or ten years is a matter of conjecture. The high price is stimulating production, and while, from the peculiar conditions surrounding copper mining, it is impossible to open new mines rapidly, the nature of the business is such that a strong stimulus once applied is more lasting in its effects than in industries where supply can more readily respond to demand.

The World's Growing Demand.

There are many good copper mines being opened throughout the Union, and many more new mines in other countries. In a few years the effect of renewed effort in copper mining over the entire globe must be plainly felt in largely increased production. This much is certain, and what the effect of doubled production will be within six or seven years must depend almost wholly upon the progress of electrical development. Should the utilisation of electricity proceed at its present rapid rate of increase both in America and abroad, the world's supply of copper in 1907, which will probably be nearly double the production of 1900, will not more than meet

mines are comparatively slight. The stimulus of very high prices enjoyed by the Lake Superior copper mines for the past two years has resulted in increasing the annual production of the red metal less than ten per cent per annum. John Stanton of New York, the veteran authority on the American copper trade, estimates the increase of product of copper for the entire United States at no more than ten per cent for the year 1900, the increase for the first half of the year being but nine per cent. This increase is barely sufficient to provide for actual requirements, and the increased production of foreign lands is scarcely as great as the average in this country.

Despite the many flourishes of trumpets and the tens of thousands of dollars expended in the columns of the press, advertising the numerous Columet and Hierac in embryo, which were to make their shareholders wealthy on small investments, the production of all the new mines, together with the increased output of all the old mines, did not exceed ten per cent last year, will not exceed the same amount this year and probably will show no greater gain in 1901. The immediate future of the copper market seems assured. With a strong and steady demand for all the copper that can be mined the price of the metal, high though it may be, is supported by the logic of demand and supply. What may be the requirements. Should, however, there be a marked falling off in electrical construction, either in the United States or Europe, or in both, there will be hard times in store for many of the mines, and eight-cent copper is probable for a time. The best mines of Michigan, Montana, and Arizona are making copper at six to nine cents per pound, and the cost of production can be materially cut if the necessity arises.

The mines are now earning larger profits than ever before in their history, and are paying the highest scale of wages, while expenditure is not being stinted in any degree. This policy of lavish expenditure in prosperous times is cushioned by many short-sighted and greedy shareholders, who grumble because all of the vast profits are not paid out in dividends as rapidly as earned, but the well-managed mines are putting themselves in splendid position for withstanding the slings and arrows of outrageous fortune when a time of trouble comes. Enormous surplus funds are being accumulated, new mills are being constructed and fitted with the best and costliest machinery, new docks are being dredged, wharves and warehouses built upon their banks, railroads are being constructed, shafts enlarged, mammoth hoisting plants and air compressors installed, houses erected for employees and money is flowing like water into scores of channels.
COINAGE FOR OCTOBER.

Coinage executed at the mint of the United States during October, 1905, was as follows:

**Denominations.** Pieces. Value.

Double eagles 500,000 $5,050,000
Silver dollars 3,000,000 $3,000,000
Half dollars 1,500,000 $750,000
Quarter dollars 3,200,000 $800,000
Dimes 769,000 $76,900
Total, silver 6,729,000 $4,146,900
Five-cent nickels 3,680,000 1,840,000
One-cent bronze 5,061,000 506,100
Total minor 9,841,000 546,100
Total coinage 16,365,000 5,686,100

A Mining Survey.

By J. F. Williams, San Francisco, Cal.

A high degree of accuracy is often required in mine-surveying, in order that expensive mining work may not be misdirected. The making of underground operations by drafts or shafts located as the result of surveys presents a crucial test of correctness not usually involved in any other class of surveying. In view of these conditions, the present notes and description of a survey made in June, 1899, for the San Francisco shaft of the New Almaden quicksilver mines, may be of interest to members of the Institution who may be acquainted with the work.

The purpose of this survey was to locate on the surface a vertical 2-compartment shaft (35 by seven feet), to connect with another vertical shaft, of practically the same size, which had been sunk a number of years before from an adit-level about 210 feet vertically below the surface, to a deeper, so-called 600-foot level. It will be seen, of course, that the most important matter was to secure and exact coincidence in vertical line, so that the resulting continuous vertical shaft from the surface should have no offset or irregularity at the point of junction between its two parts. The line of contact was not of importance; but, as this hoisting-works were to be placed in position and the new shaft permanently timbered from the start, its correct alignment was an essential requirement. The important features of the work, therefore, were in determining with certainty: 1. That the shaft was located in the right place in a general way; 2. That the ordinary inaccuracies of linear and angular measurements were so reduced as to insure correctness of location within certain defined and allowable limits.

Instruments.—The instruments used were: A Buff and Berger transit-theodolite, with a six-in. horizontal plate, reading to 2 seconds; a Holler & Brightly Y & T; a Chesterton steel tape, graduated in tenths and hundredths of a foot; and New York levering-rod, graduated to thousandths of a foot.

The levering-rod and tape were compared with a standard of measurement, and the correction for each was ascertained. In the case of the tape, the conditions for the standard were, that the tape should be tied in the same manner, that the tape should lie horizontally on the ground; and that the temperature should be 70° Fahr. (this being the average temperature in the adit underground). Three corrections were thus actually necessary, I. Reduction to the standard; to correct for the category curve; and to correct for difference in temperature.

While the graduations on the tape were made to hundredths, yet, in careful measurements, it was possible to estimate thousandths of a foot, thus making these readings correspond in minuteness with those obtainable on the levelling rods.

Of course, to do this underground, it was necessary to use very fine fish-cord for plum-line; and, on the surface, measurements were made between small leaden wire nails in stakes; provisions also being made for proper instruments. In prosperous times, and steadily increasing surplus funds, which have finally placed their shares with the best managed railroads or manufactories. Mining is usually regarded as a hazardous occupation for men, and an extra hazardous investment for capital, but, thanks to a happy combination of practically inexhaustible ore bodies and far-sighted financing, the best of the Lake Superior copper mines have advanced into a new class of preferred investments.
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in a mixture of molasses and water. Then, hav-
ning assurated that the wire hung freely between
the sides of the shaft, or any other ob-
ject, at any point, its position was instrumentally
observed at both the surface and the adit-level.
The difference between the two sets of co-
ordinate readings was, therefore, given to
be the vertical displacement of the points
in both the preliminary and the check-survey.

THE FAVORABLE CONDITIONS.

It must be said that the conditions under which
the survey was made were most favorable for
the success of the methods employed, reli-
able and experienced in that class of work; and,
so far as the work was being done in that part of
the mine at that time, there was neither tramming;
blasting, or previous excavation, to interfere with observations or distract
attention. On the surface, the atmosphere was clear
and the air steady; and, during the first part of
the survey, there was very little wind. A suf-
ficient length of time was allowed; so that noth-
ing was slighted or overlooked on account of
uneasiness.

In summary review, the special features to be
noted are: (1) the means taken to insure the loca-
tion of the shaft in the right place (two independ-
ent surveys and check-calculations); (2) the methods
used to reduce the ordinary inaccuracies of
surveying within allowable limits; and since the
practical demonstration, here given, of the ac-
curate results attainable by the use of the usual
surveying instruments and measuring apparatus,
as described, with the most approved methods of
observation are carried to the extreme, and
neither time nor care is spared to make the res-
ults as nearly perfect as possible.

By the location-survey the shaft was 9.07 foot
too far east; by the check-survey, it was absolutely
correct north and south, and 0.647 foot too far east.

By averaging the two surveys, giving to the
location-survey twice the importance or “weight”
of the check-survey (because all of its measure-
ments were made twice, while in the check-survey
some were made only once), we have the average
error of the survey; the shaft is being 0.047—
foot too far south, and 0.051 foot too far east.**

Coal Supply in Alaska.

Broad Veins Running Down to the Sea—Hun-
dreds of Tons Broken Off by Waves Upon
the Shore—Towed Out—The Nome Demand—Eskimos as Users of Pick and
Shovel.

Alaska's reputation as a mining region has been
given it by its wonderful gold deposits. Atten-
tion is now attracted to its mineral wealth, which are found to be of great value, and the
New York Evening Post has added appreciably
to the hitherto small fund of general information
on the subject by printing an interesting letter
written by Winthrop Packard aboard the steamer
Corwin, on which he had made a summer cruise
in Alaskan waters. Mr. Packard writes with par-
ticular enthusiasm of Cape Lisburne, where he says, to the eastward of all the other points
in quantities, and coal enough for the burn-
ing of the lime and the smelting of the iron can be
found.

The cape itself is one mountainous mass of this
limonite, while almost the whole, rising 600 feet
from the sea. Behind this and running forty or
fifty miles to the southward rises hill after hill,
culminating in a great dome-shaped mountain
several miles across. Every one of these hills is
clad from base to top with broken lime-stone rubble from the weather-beaten ledges. No
inch of soil, no patch of verdure finds footing
on these domes or ridges, nothing but the white

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frames of enduring rock. Yet in the gullies
between which this hard and un-
melted snow banks are narrow strips of meadow,
rich with blue grass and studded with count-
tless thousands of beautiful flowers. You may not
walk without tripping over your feet, and
among them Mr. Packard noted three varieties
of small butterflies as well as a yellow bumblebee,
who bunted from bloom to bloom as cheerfully
as if he were among the luscious hills of Kentucky,
and knew there would be no frost until November.

WHERE THE IRON IS FOUND.

Among the foothills of this white range you
will find the little-known hemetite, in
nODULES large and small, and probably
in veins. Mr. Packard found here, too, the
beginning of the coal, in rather small veins, but
of good quality. This, as well as all the other coal
which we were to find later, is semi-bituminous,
somewhat resembling cannel coal, burning
with little smoke, kindling readily, and leaving a fine,
white ash. It gives much heat, and was used
ever since in the Corwin's fireplace, where it gave
general satisfaction, and was declared by the
chief engineer to be equal to any of the Pacific
Coast coal. It outcrops on the beach, and you
may see the fascinating diagrams in the cliffs
you sail by.

The crow-bill ducks breed on the Lisburn
cliffs in countless thousands, and their forms pop-
er the air and sea above them. And the other sea-bird
which swarm here seem to feed
largely on the anadolls, a flat, brown worm as
long as one's finger, and a little red-jelly-like pol-
lywg, which is the connecting link between
vegetable and invertebrate life. The sea here is at
times alive with these "bugs" (as the whaling
captains call them), and you cannot dip up
but a bucketful of sea water without finding it in
them. At times, too, it is gray with small jelly-
fish, on which, as well as the aforementioned creatures,
the whales which frequent these waters feed. As
you pass eastward from Lisburne the limestone
disappears, and is replaced by sandstone and con-
glomerate, in which the coal appears again and in
larger veins. There are bluffs in the vicinity of
Cape Sabine where the veils flow one another
an hundred feet apart, or less, stripping the perpen-
dicular face of the cliff. And marking the
hilltop with ridges where they run inland, at
an acute angle with the coast line. The hills, in-
deed, are full of coal, and the ground squirrels,
which are plentiful here, dig it from the ground
where they have lined it in homes with black
mounds. You may trace the outcroppings of
coal by these alone for miles. This squirrel
is very like the gray squirrel of the States, excep-
that he is bolder. The dip of all strata here is
inland and westerly, and all outcropping of coal
ceases a half mile or so back from the beach.
Mr. Packard prospected inland for a distance of
twelve miles, just back of the finest beach property, and
found nothing but sandstone. Very likely it is
there, but the changed direction of the strata-
rection prevents it from appearing.

Whether it is there inland or not there is coal
enough in sight in the cliffs of Cape Sabine to
supply northern Alaska for a thousand years.
In places it overhangs the sea, and, with the wear-
ing of the summer waves and winter ice-foes, it
is undermined and falls to the surf. Hundreds of
tons of good coal can be seen, held up on the
beach there now for merely the trouble of picking it up.
With much labor and rigging of tackle we hoisted
one of these bums, weighing a ton and a half,
from the beach, but it could not be taken
south for exhibition purposes. Other
and larger chunks we were obliged to break up.
This location is known on the charts as the
Corwin coal mine; the Corwin, when in the Government
service, discovered it to be coal-bearing along in
the vicinity; and obtained claims, but the place was
then entirely out of the world, and
little notice was taken of the fact. Indeed,
the extent and value of the coal were not at
all understood. About the same time, also,
Mr. Packard noted a vein of small
ten miles to the eastward and obtained coal from it.
This location is marked on the charts as the
Thetas mine, and we found there a weather-beaten
pick and shovel, which had evidently been used in
getting the coal.

A REMARKABLE VEIN.

Not far from this point is one of the most re-
markable veins in the whole region. It runs
from the sea, and is noticeable in the shallow
water as a black ridge sixty feet wide, from
which you can break lumps of coal with a pick or bar.
The strata here is pretty nearly perpendicular, so
this represents the approximate real width of
the vein, which runs under the beach sand into the
tundra and extends inland. A little work with a
shovel lays this vein bare on the beach, and you
may there quarry as much coal as you please
with as little labor almost as would be needed
to get it from a coal-bin. Further east than this
there is little coal, although the natives say there
are deposits 100 miles to the range.

This coal deposit was carefully prospected and
the bulk of it located by different members of the
party, fourteen quarter-sections in all being taken
up. For this land theholders will be obliged to
pay the Government $10 an acre. It is well worth
it, however, for the chances are that Nome and
similar Northern camps will in the future draw
largely from this region for its supply of coal, which sold at Nome is hopelessly high.

The Corwin took on a hundred tons of this coal
for the trip back, assisted by eight or ten families
of Eskimos, who came along the coast in their
hunting unmans, bound up the Pimtasa River. They
handled pick and shovel intelligently, and worked
well and with good nature. The coal measures of the
far North may solve the problem of an easier and more
civilized life for the Eskimo. He needs help in
some way, for game is leaving him, and he is los-
ing the arts and means of livelihood of his fathers.


Why Americans are Picked Out to Be Supreme—New Opportunities for Our Exporters—Germany Facing Disadvantages at Home—America's Advantages Here and Abroad.

By Frank H. Mason, Consul-General at Berlin.

The recent drop in the price of American iron
and steel has produced a general feeling of apprehension among the iron masters and holders of
industrial securities in Germany and Great Brit-
ain.

Thoughtful and well-informed men in both
countries, noting the gigantic strides with which
the mining and handling of ores and coal and the
production of coke, pig iron, and steel, were being
developed in the United States, were, therefore, fore-
seeing an active home demand having been satisfied,
the European iron markets would have to meet the
attack of an American surplus, manufactured under
every advantage of cheap, abundant mate-
rials, low freightage, and the highest, most effec-
tive substitution of machinery for human labor—
conditions which would enable the Americans,
when the time came, to export coal from one mine
without impairment of a large and profitable output.

Partly as a feeder to test the approach of this
critical conjecture, a German firm several months ago asked for proposals for the deliv-


of 100,000 tons of American pig iron. At that time the home demand in the United States was still active, and the American iron men replied by offering contracts for American pig iron at a price per ton free on board an American vessel, but leaving the important and difficult item of ocean freight to be figured out by the European importer. In consequence, there was no possibility of knowing whether ships for outward-bound east fairs are obtainable at an American port, or, if so, what rates are demanded. These early and indeterminate offers of American pig iron at a stated price per ton for delivery in Hamburg on the 1st of January, 1900, were not yet ready or eager to sell pig iron.

But toward the end of May the announcement came that a machine foundry at Prague had closed contracts for the delivery of 50,000 tons of American pig iron to be delivered at Hamburg for 72s. ($17.04) per ton between the date of the contract and the autumn close of navigation on the Elbe. When this was followed, a few days later, by a similar report from an American firm that had offered to sell a foundry in the Lower Rhine Province a large shipment of iron for 84 marks ($23.00) per ton in c.i.f. Amsterdam, it was recognized by German furnace men that the bargaining was beginning. American pig iron was in the market. What would it mean, with freight to Westphalia added, somewhere about 59 marks ($23.16) per ton delivered at the foundry, and this would be a price with which German pig iron could still fairly compete? In view of the competitive conditions that had been hastened to stiffen the declining steel market by the way of repressions in the expected American invasion had not yet begun. These, however, had succeeded in slowing up intelligent men to the fact that this offer meant nothing more nor less than that America is already in a position, notwithstanding the present high rates of freight, to deliver somewhere at a price that German furnace men charge to customers at their very doors. If, with a freight of $4 to $6.50 per ton, American iron can be landed at a Dutch, Belgian, or German seaport for $29 per ton, what will be the situation when Southern iron—coming as undercarriage in cotton ships from Norfolk, Mobile, or New Orleans, or brought in the great low-powered colliers that will yet be built—shall be carried from shore to shore at a rate of $2 per ton or less? With all the urgent home demand of last year, Germany exported 122,400 tons of pig iron, of which 104,435 tons, or 85 per cent., went to Belgium. Under the new conditions, that item of export is already as good as lost. Every intelligent expert in Germany knows that the high wages paid to American labor have had the natural effect of forcing the managers of American iron and mining industries to practice the utmost economy in that costly item and this has compelled the invention and employment of highly perfected machinery, against which even the far chesper labor of Europe can no longer compete on equal terms. When this is added the other fundamental advantages of exhausable deposits of ore, limestone, and coal, cheap transportation, and especially the many-faceted plants of large capacity and modern construction, it needs only a corresponding development of ocean transportation to place the future mastery of foreign markets securely in American hands. Says the London Statist: "Over and above all, the shadow of America is towering over the market."

GERMANY'S TROUBLES IN THE COAL MARKET.

The changing conditions in the iron and steel industries have brought into renewed importance the uncertainty of the coal market. With all the extraordinary efforts put forth by the German coal-mining syndicates during the past three months to increase their output and supply the urgent demands of consumers, coal is still not only dear, but scarce and difficult to obtain; and the trade journals which profess to treat the subject exhaustively generally agree that German consumers will have to pay high prices for coal and coke for a long time to come. This was bad enough during the flush times when iron and steel were selling for prices that enabled the steel and iron manufacturers to pay the cost of expensive raw materials; but with the metal market past its zenith and a general decline in prices not only inevitable, but already begun, the position of the iron and steel market becomes a serious element in the problem. Complaints and recriminations are heard against the coal and coke syndicates, which are accused of raising prices. But if the output of iron and steel is rapidly increased, the coal output so far below the requirements of consumption as to maintain the panic prices built up during a critical period, which is now past. So great is this demand that a few days ago, representatives of a number of boards of trade in the Rhine Province and Westphalia met at Cologne and, after a vigorous discussion, formulated an elaborate demand upon the coal syndicates, which had been invited to attend or take any part in the conference.

These demands covered important modifications in the conditions hitherto enforced by the syndicates in their sales to dealers and large consumers, and in their contracts for coal trade to be continued or reduced. The coal trade should be abandoned or seriously reduced and German coal kept at home. It was pointed out that, notwithstanding the necessities of the four months' strike in April, the exports of German coal had reached 6,999,112 tons, an increase of 699,523 tons over those of the corresponding period in 1899, whereas the usual imports from the Bohemian mining region had been seriously reduced by the strike of miners and the extortionate demands of the operators.

The force of such an argument as this could not be denied, and the syndicate managers have replied that their contracts for the coal supplies of the Romanian railways (60,000 tons per annum) would not be renewed, and that a similar contract with the railways of Sweden, which the syndicate a year ago made, a vigorous effort to secure, would be likewise given up at the end of the year. There is another five-year contract for gas coal with the city of Paris which will have to be fulfilled, but all other foreign contracts were for an unknown time only and expired at expiration. Hitherto, the syndicates have had a rule to sell not less than 500 carloads of coal to one purchaser, and this operated to force small consumers to buy through brokers or middlemen. At the demand of the meeting at Cologne, this minimum limit has been reduced to 250 carloads, which will permit an increased number of consumers to buy directly from the Syndicate.

THE ONE WEAK POINT.

These concessions are good so far as they go, but they can at best only serve to mitigate the difficulty, which is based upon the fundamental and stubborn fact that the consumption of coal in Germany, Russia, Austria, Italy, and France has been increasing year by year, and that the consumption of these countries, that as mines grow deeper and wages and cost of living increase, the expenses of mining and transportation, and the cost of producing the coal has increased. With the exception of the iron industries, shipbuilding, and other branches of manufacture, coal operators everywhere have naturally sought the opportunity to make greater profits, and in order to do so as long as the demand for fuel continues. The one controlling force which consumers have in their hands is increased imports. The coal syndicates regulate practically the entire domestic supply and are too much managed to be swayed by any argument that does not appeal to their interests. As the prices of finished products decline, the necessity for cheaper raw materials—notably coal and pig iron—will become more urgent, and this necessity will continue to present an opportunity for American exporters. Whether a wiser, more far-sighted policy might not dictate that these materials should be worked up at home and only the ultimate finished products exported, of course, another matter. Whether in the case of coal, will remain masters of the field. It remains to be seen whether they will strengthen their one weak point—ocean tonnage under their own flag, and place the commanding role to which they are entitled.

A General Rise in Prices.

It will be surprising if the extraordinary increase in gold production should occur in the near future; if it does not occur in a general advance in prices. The production of the Yukon and Alaskan fields is already directly affecting the money markets of the world. English supremacy in South Africa will sensibly reduce the cost of mining there, will make possible the development of new regions to undo two years of gold output and increase the general output of the region. Some time will be required for the working out of these causes, but within two or three years the world's production of gold will be greater than that of the past three years. The cost of mining it somewhat reduced, the supply for the money markets increasingly ample, the stimulus to trade correspondingly marked, and in the natural sequence will be a general rise in prices.

British Columbia's Mining Activity.

Writing from Vancouver under the date of September 19, United States Consul Dudley gives an interesting outline of a recent visit to the eastern portion of British Columbia and its mining sections. The Le Roi mine, says he, ships three train loads of ore each day to its smelter at Northport, Wash.; a body of much richer ore has been recently discovered, and engineers report that $10,000,000 worth is in sight. The smelter at Northport has recently doubled its capacity and works twenty-four hours every day, and is still unable to handle the output from the mine, the same may be said of the smelter at Trail, which handles the ore of lower grade. Mr. Dudley continues:

A branch of the Canadian Pacific from Robson to Midway, about 100 miles long, has just been opened, and a new smelter has been erected at Grand Forks. At Moyie City, near the Crows Nest Pass (on a new line of the Canadian Pacific, which has been opened less than two years), I found a very large concentrating plant, and it is claimed that the shipments from the lead and silver mines at Moyie are larger than from any other single mine on the continent.

At Fernie are extensive mines of the best possible quality of bituminous coal, which now turn out 1,100 tons each day. Three hundred and twelve coke ovens were at work and 110 more in process of construction. About 290 tons are being turned out per day, and the manager says the output will be doubled in the next three months. A train load of coal is shipped west and south from Fernie each day to supply the Great Northern Railway, and another train load of coke is sent to the same destination.

From the Slocan district, ores containing a very large percentage of lead or "wet ores," as they are called, are shipped to different smelters in British Columbia and the United States, and even as far as Chile, to be used in fluxing the dry ores found in those districts.
THE MINING AND METALLURGICAL JOURNAL

November 15, 1900

LATEST MINING DECISIONS.

Specially Prepared for THE MINING AND METALLURGICAL JOURNAL.

Complainant and defendants were joint owners of a group of mining claims, and defendants were owners of an adjoining claim. A tunnel had been run through the group owned jointly, for the purpose of working that property; and defendants remained in possession of the property owned by them, and the use of the tunnel by defendants was the exclusive possession of the complainant. Held that the complainant was entitled to an injunction, with damages, preventing the entry of the complainant's property into the tunnel.

TWIN SISTERS GOLD MINING CO. v. MALCHY.

The Twin Sisters Gold Mining Co. of Centerville, Idaho, E. J. Blain superintendent, will erect a 100-ton concentrator.

TRADE NEWS.

The M. C. Bullock Mfg. Co. of Chicago has issued a most attractive announcement of its success at the Chicago Fair in receiving a premium for its diamond drills. The Bullock drill was the only diamond driving machine exhibited on the Fair exposition. The Bullock drills received three medals at the Chicago Fair in 1893 and they have always been a great favorite.

The Joseph Dixon Crucible Co. of Jersey City, N. J., is introducing a new sight-feeding graphite lubricator. The lubricator may be used on all kinds of engines, simple, compound or triple expansion, and is patented on September 4, 1900, by Fred Gielow of Chicago.

PERSONAL.

W. H. Wells, manager of the California plant of the American Tin Plate Co., is, in the east on business connected with the company's affairs. L. H. Beasley has been appointed manager of the northern part of California to his home in Los Angeles. He will probably go north again soon. Baker Smith, the general manager of the East Helena smelter, having succeeded Charles W. Whiteley who is now at Salt Lake City.

W. Lewis Bell, of the Fulton Engine Works of Los Angeles, has been in Randsburg for the purpose of figuring out the new mill of the Yellow Aster Mining and Milling Co.

Paul Starrett of Moscow, Russia, is in the United States as the representative of a Russian technical society. His purpose is to study American methods of workshop construction.

E. H. Raag is now general manager of the Barstow Reduction Works at Barstow, San Bernardino county, Cal. It is proposed to keep this fine furnace running full time from today.

Frank Davis, formerly metallurgist of the Rawhide mine at Sonora, Tuolumne county, Calif., is now superintendent of the property of the Sonora, Mex., owned by the Sonora & Chicago Mining Co.

E. Sprague, well known for many years in publishing circles in Chicago, died on October 3 at his home, No. 2738 N. Hermogen Ave. For several years past he has been a representative of the Chicago representative of this paper and he has many acquaintances in Chicago and throughout the entire mining industry. He organized and was president of the National Traders Press Association, and was also at the same time president of the St. Louis Press Association. For a number of years he was the publisher and proprietor of the St. Louis Grocer and Grocery Manufacturer, and also of the St. Louis National Druggist.

THE BIRDCENA MINING CO. v. HOPP.

The Birdena mine at Campo Seco, Calaveras county, Calif., is to have a new hoist.

The place is a tunnel in the Hope property at Sonora, Tuolumne county, Calif.

At Carson, Calaveras county, Calif., the California-Ophir Co. will soon be erecting a 100-ton concentrator.

Coal mines near Dinapio, Tenn., will soon be developed by the Douglas Coal Co. at that place.

A hoist and mill will be erected by the Deender & Deender Co., at Nevada county, Cal.

New machinery is being installed at the Mt. Pleasant mine, near Grizzly Flat, El Dorado county, Calif.

The Golden West Mining Co. may need a new mill shortly for its property on Sonora, Tuolumne county, Calif.

The Twin Sisters Gold Mining Co. of Centerville, Idaho, E. J. Blain superintendent, will erect a 100-ton concentrator.

Power drills and a compressor are to be installed at the Castle Peak mines, near Bridgeport, Mono county, Calif.

A set of water wheels will be needed at the Sheep Ranch Gold Mining Co.'s property at Sheep Ranch, Calaveras county, Calif.

The Dewey mine, near Gazelle, Slavkov county, will soon erect a ten-stamp mill to handle the ore now being charged in the mill.

Chas. H. Holliday, of Richmond, Va., has with others organized the Spotsylvania Mining Co., which will develop the Spotsylvania mine in Virginia.

The Southern Car & Foundry Co. is repairing and overhauling its rolling mill at Anniston, Ala., and will soon have it in operation.

The Cherokee hydraulic mine at Cherokee, Butte county, Cal., will have an entirely new equipment.

L. J. Hower is the manager.

Additional machinery is being added to the concentrating plant of the Cambrian mine at Granite Hill, above Placerville, El Dorado county, Calif.

Fred Zeller is the manager of the Champion Mining Co.'s property at Nevada City, Cal., where a hoist and pumping plant are to be installed.

The thirty-ton cyanide plant of the Golconda Consolidated Mining Co. is ready to commence operations at Jordan, Mono county, Calif.

The Homestead Mining Co. of Camanche, Calaveras county, Calif., is putting in machinery. J. B. Towers of the Range, Calaveras county, is the superintendent.

A chlorination plant is to be erected at the St. Goarhild mine near North Columbia, Cal. B. M. Hobart, a member of the Crocker Mining Co., San Francisco, is the secretary.

Capt. J. R. De La Mar intends to install a 500-ton cyanide plant on his claim near Mar, Nevada, property. F. P. Swindler is the general superintendent.

E. McCormick, whose address is Singleton, via Luning, Nev., will superintend the erection of a 100-ton furnace for the Vulcan Copper Mining & Smelting Co.

A 100-ton concentrator will be erected at the North American mine near Baker City, Oregon, for the owners of the mine.

J. C. Heald, owner of the Montezuma Mine at Oakland, Wash., has the power and capital to install power drills and a compressor. J. F. Biellert is the superintendent.

The McCullough Copper Co., under the management of M. M. O'Gorman of Los Angeles, Cal., is about to increase the capacity of the machinery at its mines at Middlemarch, Ariz.

A cyanide plant and chlorination outfit is to be erected on the property of the Clinton Consolidated Gold Mining Co. at Jackson, Amador county, Cal. David Fisher is manager.

A 120-stamp mill will be erected at the North Star gold mine at Mokelumne Hill, Calaveras county, Cal., P. L. Shuman, Cal building, San Francisco, is the general manager.

It is reported that 100-stamp mills will be erected at the Golden Cross property at Hedges, San Diego county, Cal., and the 350-ton cyanide plant increment of the old plant at Middlemarch, Ariz.

The Keystone Consolidated Mining Co., W. A. Pritchard superintendent, at Amador City, Amador county, Cal., has a cyanide or chlorination plant upon its property.

A 150-ton concentrator is to be built upon the property of the North American Mining Co. at Baker City, Ore. Thomas Burke of Des Moines, lowa, is the mining engineer.

W. W. Robbins is manager of the Concord Gold Mining Co., whose property at Lighthouse, Oregon, has been sold to Mr. E. Parker, the general manager, has purchased the Henderson mine, in Missouri, and expects to equip it with new machinery.

The Dayton Mining & Milling Co. of Dayton, Ohio, is establishing a plant in Fort Dodge, Iowa, where a hoist and the erection of a mill and other machinery will be started.

The Dayton Mining & Milling Co. of Dayton, Ohio, is establishing a plant in Fort Dodge, Iowa, where a hoist and the erection of a mill and other machinery will be started.

The Riter-Conley Mfg. Co. of Pittsburg, Pa., will erect three new furnaces for the American Steel & Wire Co., and will also erect a new furnace for the Hous- semer mill will be started about the same time.

F. P. Singler, who has been at Knutsford, Utah, has gone to Salmon City, Idaho, and will probably give orders for the starting up of the mill on the property of the Salmon River Gold Mining Co.

E. T. Roy of Kingman, Ariz., has been in Phila- delphia, Pa., trying to arrange the sale of the Barlow group of mines at Chloride, Ariz. It is likely that an improved concentrator will be erected at once.

O. L. Shuman, Cal building, San Francisco, Calif., the general manager of the Champion Mining Co. at Mokelumne Hill, Calaveras county, Cal., upon whose property a twenty-stamp mill is being erected.

The Cornucopia mines of Oregon, owned by John E. Sears, of New York, but managed by the Oblong Consolidated Mining Co. of San Francisco, have twenty stamps added to the present mill, and a cyanide plant to treat tailings.

H. D. Ince is the owner of the Empire mine, on Groom creek, seven miles from Prescott, Ariz. He will increase the plant as fast as the mine requires, so rumors say that the battery will shortly be increased to thirty stamps.

The App Consolidated Gold Mining Co., W. H. Morley, president, of San Francisco, is erecting a Crocker Bldg., San Francisco, is installing a forty-stamp mill at the Rawhide and App mines at Jesse Town, Tuolumne county, Cal.

The Warden, Idaho, properties of the Empire State-Idaho Mining & Development Co., under the management of W. Clayton Miller, are to be thoroughly developed, a new mill erected and eighteen miles of mine constructed.

Considerable work is being done at the Key- stone, Amador county, Cal., W. A. Prichard is superintendent. He says they are sinking a new shaft, increasing the capacity of the present mill, and will erect a cyanide and a chlorination plant.

The McClintock & Marshall Construction Co. of Sacramento, P. A., has recently completed three shafts of land on Monessen on the Monongahela river. The construction work on these shafts will require a monthly capacity of 7,000 tons of finished material.

A. E. Case is manager of the Cornucopia mines of Oregon, owned by John E. Sears, of New York. The property is situated near Corau- copia, Ore., and twenty more stamps are to be added to the present mill, with a cyanide plant to treat the tailings.

A new hoist and concentrating mill are to be erected on the Silver King mine at Ketchum, Idaho, under the management of Knox Taylor. The property of the Hepburn Gold Mining Co. at Jackson, Amador county, Cal., will be equipped with a ten-stamp mill.

The addition of seventy stamps to the thirty- stamp mill of the Yellow Aster Mining & Milling Co.'s property at Randsburg, Kern county, Cal., is to be made and milling commenced by that excellent company. John Singleton of Los Angeles, Cal., is the general manager.

Capt. J. B. Hurd, owner of the Panama mine in Old Hat district, Kingman, Ariz., has sunk a double compartment shaft. He has a force at work, not only digging the dressing of the ground, but clearing and grading grounds for a large concentrating plant shortly to be erected.

The Kingman Consolidated Copper Co., Amador county, Cal., owned by the San Francisco & San Joaquin Valley Coal Co. are, to have a coal briquette plant erected on the property, and to erect a cyanide plant with the mine. B. M. Bradford, 325 Montgomery St, San Francisco, Calif., is the manager.

The Black Jack Mining Co. is a new corporation at Nogales, Ariz., organized for the purpose of...
prospecting and developing mining properties in the Patagonia and Santa Rita mountains. The Incas also have a large mine in which they have made great progress, and which may prove of great importance. The ore is from a large formation and carries free gold, indicating twenty to forty tons of gold to be recovered at a distance of about one hundred and fifty feet from the surface. The main shaft is extending deeper and deeper, and it is expected that a large amount of gold will be recovered from this place in the near future. The mining company is well equipped with modern machinery and is making good progress.

The National Gear Wheel & Foundry Co. at Allegany, Pa., has completed plans for the extension of its plant and has increased its capacity to meet the demand for large gears and other machinery. The company has also increased its output of cast-iron and cast-steel parts, and is now able to supply a large number of castings for various purposes.

Extensive improvements are being made at the Ore Hill Mine, which is one of the largest and most productive mines in the region. The mine is equipped with modern machinery and is making good progress. The ore is of high grade and is expected to yield a large amount of gold.

Arizona:

MEXICO:

The mining development of the state of Sonora is constantly on the increase. The mining companies are extending their operations, and new discoveries are being made every day. The mines are well equipped with modern machinery and are making good progress.

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ty stamps. The Bodie Tunnel mill has fifteen and the Carden ten, making a total of forty-five stamps.

At Citrus, Inyo county, the Mazurka Mining Co. has a mill and concentrator on its placer property in Mazurka canyon. About 600 feet will complete the tunnel to bedrock, which will then have 1,500 feet.

Barnes & Anderson are still at work putting up a mill on their new claims in Citrus. The mill is erected at Willow Springs, two miles from the mill.

David Fisher, manager of the Clinton Consolidated Gold Mining Co. of Jackson, Amador county, owner of the Hill Paugh mines, is about to erect a cyanide plant and replace the chlorination plant owned by this company. They have a four-stamp mill, but it is not large enough. There is a thirty-stamp mill, and ten concentrators are run by water power worked by the ores of these mines, employing forty men to keep them supplied. The shaft is to be deepened to 1,800 feet, it being now only 500 feet deep. There is also an 800-foot tunnel on the property.

A twenty-stamp mill will be erected at the North Star Gravel mine at Mokelumne Hill, Calaveras county, by P. L. Shuman is the general manager.

The Keystone Consolidated Mining Co., whose property is located in the vicinity of the above mentioned mill, is erecting a new mill at the same time. It is being shipped from the mines to the tunnel by the company.

The Smuggler Union Mining Co. has secured control of part of the waters passing over the principal Veil Falls in site of the mill will be at the Veil Falls, and will henceforth run its Pandora mills by this water. The mill will be erected on the falls. A new wire rope tramway is also being put up by the company from the mill to the tunnel. This new tramway will be operated by the company.

The Little Chief Mining Co. at Leadville, is constructing extensive surface improvements at the Little Chief mine. At the mill Gold Mining Co. in San Miguel county, one mile above Telluride, forty new stamps are being installed, thus increasing the capacity of the mine. The latest report from the Vindicator Consolidated Gold Mining Co. shows that the mine is now making 80 dollars per day. The net profit remaining after these expenditures is $46,243.

IDAHO.

A stamp mill of ten tons a day capacity has recently arrived for the Jupiter mine on Deer Creek, six miles north of Idaho City. John E. Kinkaid is the manager.

The ten-stamp mill at the Central Eureka mine, near Amador City, Amador county, is kept busy night and day in the development work on the Douglas mine, near Georgetown, El Dorado county, development work is in progress.

The Denver mine, near Georgetown, El Dorado county, development work is in progress.

The Tenmile mine, near Golden, Colorado, has been completed, and the mine will be ready to be put into operation at any time.

The two-stamp mill is running well and is expected to be ready to run on December 1. The Golden Star mill near the same place, is also ready to run the same time.

The Twin Sisters Gold Mining Co. owns property at Centerville, which is under the supervision of E. B. Moore and M. E. Brown.

The Golden Star mine is located on the property, and one of which is a 250-foot stamp. Steam power is used in running the mill, which is expected to be ready in five more stamps will be added to the mill in the near future.

The Golden King mine of mines near Mountain Home has a shaft 200 feet deep, and a tunnel 1,000 feet long. This shaft will be deepened to the 600-foot level by January 1.

The property belongs to the Crown Point Gold Mining Co. Ltd., and has twenty-five men employed under the superintendence of Daniel Reier.

The Silver King Mining & Milling Co., with C. H. Hardin as manager, are building a new mill and concentrating plant at Ketchum. They have already two concentrators running by steam. Work in the mill is to be completed in a few weeks.

The Empire State-Irado Mining & Development Co. have completed the mill and concentrator at their property at Wardner. The tunnel is to be extended 7,600 feet further in. A new mill and concentrator of 600 tons stamp capacity and a 250-ton stamp mill in Silver City are now in process of construction. The concentrator will have a capacity of 400 tons in twenty-five stamp-mills.

The Gladiolus, owned by the Alturas-Senate Mining Co., at Ketchum, is to be built by Watt, Taylor, the superintendent, has ten men employed extracting the ore. Gasoline is used as power. A tunnel is in 3,600 feet on this silver-lead property.

MICHIGAN.

The new No. 7 shaft at the Quincy property has been extended to 2,000 feet and work will be continued. The property has heretofore operated five heads of stamps. With the addition of the new stamps the mill will be crowded and the property will be worked to 3,000 feet. Work in the mill is to be commenced as soon as the new stamps are completed.

The Michigan Consolidated Mining Co. have extended their property to the north, and have purchased the property of a number of claims within the limits of the mill, forming a new property of 1,500 acres.

The company's cost of copper this year excluding construction charges will be in the neighborhood of eight cents per pound and it is expected to be sold at $10 per ton. The company's mill at the Fisk mill in the Hulsaker mine, West Hulsaker, is in operation, and a large amount of copper ore taken from this claim were satisfactory.

NEVADA.

F. P. Swindler, general superintendent of Capt. J. R. De La Mar's Nevada gold property, says that the mill is now in operation and is producing gold at a rate of $1,000 per day.
OREGON.

Work has been resumed on the old Ranger mine which has recently been bought by New York capitalists for $100,000. The ten-stamp mill is being put in order and the tonnage of ore is expected to be considerably increased.

Promising deposits of coal have been found in several places in Oregon. Some of the coal is anthracite and a number of these deposits have been found east of Baker City.

The Mining Journal has just made out the biggest strike in the history of the Silverton district. With a shaft down 200 feet a vein was uncovered, and the company expects to get eight tons of ore five feet in width and which shows values from $1 to $3,200 to the ton.

The North American Gold & Copper mine, owned by the North American Mining Company, near Baker City, has opened a 200-foot shaft in 100 feet. Steam is used for hoisting purposes. There are thirty-five men employed. The outlook at this property is excellent. A 160-ton concentrator is to be built.

John E. Searls of Oregon is the owner of the mining and he intends to work the property.

SOUTHDAKOTA.

It is estimated that the total output of coal from the Black Hills during the year 1900 will be about $1,000,000.

There are now in operation in the Black Hills 136 mines, of which 83 are worked by the Searls company and 33 are worked by other companies.

The Deadstock mine in the Black Trail district is mining ore at an expense of thirty-five cents per ton. The managers of the cyanide plant which treats the ore says that the gold is extracted for seventy-five cents per ton, making the total cost for mining and milling $1.10. The ore runs about $8 a ton in gold and is taken from a ledge which is 100 feet wide and which runs for several miles.

Lead now claims to be the most prosperous city in the Black Hills. The population is now about 2,000, and the expectation is that it will reach 5,000 by the end of the year.


COAL AND STEEL.

BRITISH INQUIRY FOR STEEL. Consul General Halsted writes from Birmingham, October 18, 1900, that he is in receipt of a communication from the British Steel Corporation, which contains an inquiry for American steel for making fenders, Siemens or Bessemer process, and requests the names of producers making high carbon steel of this sort.

FRENCH COAL AND IRON PRODUCTION. The Minister of Public Works for France has just published the statistics of the production of coal and iron in his country for the first six months of the current year.

The production of anthracite and bituminous coal was 16,568,850 tons of 1,000 kilograms (3,284,641 tons), as compared with 16,161,976 tons during the same period of 1899, an increase of 4,076,874 tons, or 25.99 per cent.

The production of iron ore was 257,712 tons in 1899, an increase of 55,038 tons, making a total production of iron ore for the first six months of 1899 of 16,525,873 tons, as compared with 16,292,783 tons in 1898, an increase of 146,090 tons for the first half of the year.

The annual consumption of coal in France is about 45,000,000 tons, of which 70,000,000 tons are imported, about 70,000,000 tons are brought from Great Britain and 3,000,000 tons from Belgium and Germany. It is estimated that miners of coal can solve the question of cheap ocean transportation of coal to French ports, they will have fine prospects for a large export.

The iron industry of France is still growing, having increased by 67 per cent, since 1878, with a total value of $65,000,000.

COAL AND COKE.

ANTHRACITE PRICES IN THIRTY-FIVE YEARS. A correspondent of the Evening Star of Washington, D. C., has prepared an interesting letter regarding coal prices, which is of some interest at the present time. He writes:

"In view of the fact that the price of coal is booming upward, and people are complaining of the high prices, I was struck by the fact, when I examined the data on the old price of coal, that the prices paid for coal the last years of the war and the rebirth of the city. According to the report, the average price of coal during the month of January was $64. January 5, 1855, four tons = $64 February 15, 1855, five tons = $64 October 21, 1855, four tons = $64 October 3, 1856, four tons = $64 October 12, 1856, eight tons = $70 December 20, 1857, two tons = $70 February 17, 1858, two tons = $70 January 19, 1872, two tons = $70"

"I was also interested in the fact that the government was for the first time in the history of coal and coke to find out the average price of coal for the first nine months of the year in the various cities of the country. The inquiries were made in ninety-five different cities, and the results showed that the price of coal in the various cities ranged from $3 to $15 per ton."
MINING STOCK QUOTATIONS IN VARIOUS MARKETS

Mining stocks multiply inessarily, and we cannot undertake to record them all. We keep, however, complete records of all mining stocks, wherever listed, and shall be glad to furnish information to which we have access, or to which certain mining stock quotations, upon request, and in many cases at the close of business on the day we go to press—two days before the date of issue.—Mining and Metallurgical Journal.

NEW INCORPORATIONS.

CALIFORNIA

DESSERT PROSPECTING DEVELOPMENT CO., Needles; $9,000, J. Denier.

SEPULVEDA CRUDE OIL CO., Los Angeles; $10,000; G. R. Parkinson.

CLOVER LEAF OIL CO., Palo Alto; $250,000; J. R. Shaw.

FORESTERS' & INVESTMENT CO., Los Angeles; $10,000; W. W. Wallbridge.

TWENTIETH CENTURY OIL CO., Fresno; $1,000,000; J. B. Roter.

NEW YORK IMPROVEMENT CO., Los Angeles; $75,000; J. Q. Dixon.

GROWTH OIL CO., Los Angeles; $250,000; C. F. Hill.

GERMAN-AMERICAN OIL CO., Los Angeles; $90,000,000; J. Reba.

SUNSET CENTER OIL & DEVELOPMENT CO., San Francisco; $900,000; J. Maglin.

CAPE HORN MINING CO., San Francisco; $200,000; H. H. Jennes.

SAN LORENZO OIL & MINING CO., Delano; $500,000; G. R. Goldman.

MONTEREY OIL & WATER CO., C. P. Nestor; $200,000; J. B. Taylor.

PASSATICO OIL & MINING CO., C. P. Nestor; $200,000; J. B. Taylor.

NEVADAOIL CO., Bakerfield; $350,000; L. H. Jastro.

WILLIAMS OIL & CO., Bakerfield; $250,000; M. W. Huber.

JACK PIMCO OIL & CO., San Francisco; $900,000; E. W. Lumpkins.

HOBBS & BACON, Auburn, Wash.; $50,000; E. C. Williams.

BIG HILL MINING CO., Canada Hill; $90,000; E. M. Armstrong, Woodland.

BOSTON CRUDE OIL DEVELOPMENT Co., San Francisco; L. P. CRM.

SOVEREIGN OIL Co., San Francisco; $900,000.

H. H. Blood.

BLUE DIAMOND OIL CO., Grass Valley; $100,000; G. W. Thomas.

AMERICAN OIL CO., Tehachapi; $400,000; R. Taylor.

PYRAMID OIL CO., Escondido; $500,000; C. B. Hartford.

RED BANK OIL CO., Fresno; $300,000; W. H. Phillips.

ROLLAY SUNSET OIL CO., Los Angeles; $90,000; C. G. Guild.

HAWATHA OIL CO., San Francisco; $1,000; C. Nets.

GREENBACK COPPER MINING CO., San Francisco; $500,000; L. Gageheim.

SUGAR PINE MINING CO., San Francisco; $400,000; H. Robb.

AUSTRALIAN SYNDICATE MINING CO., San Francisco; $600,000; A. Drayovich.

PASO ROBLES CONSOLIDATED OIL CO., Los Angeles; $250,000; F. W. Haynes.

CLAMMIT C O., Los Angeles; $90,000; L. A. Clammit.

ALICE MINING CO., Santa Clara; $10,000; J. A. Lovel.

SAN MIGUEL OIL & DEVELOPMENT CO., San Diego; $500,000; H. E. Nelles, Los Angeles.

CALIFORNIA LAND CO., Los Angeles; $10,000; J. B. McLaughlin.

COLORADO & CALIFORNIA OIL CO., Solma; $200,000; J. E. Whitson.

CORONA OIL & WATER CO., C. P. Nestor; $200,000; C. H. Hart.

WILLIETTA MINING & MILLING Co., San Francisco; $500,000; H. N. Stone.

C & S MILLING CO., Coalinga; $40,000; J. Wr.

BLACK HORSE COPPER CO., Los Angeles; $100,000; H. N. Stone, San Pedro.

LAND & DEVELOPMENT Co., Bakerfield; $10,000; M. H. Wawro.

COLORADO

SANTA FE RUTT MINING & MILLING Co., Georgetown; $10,000; E. Kranz.

FLORENCE RUTT MINING & MILLING Co., Florence; $50,000; E. R. Bingham.

NEW HAVEN & DENVER CONSOLIDATED MINING CO., Denver; $200,000; A. W. All.

BOSTON & DENVER CONSOLIDATED MINING & MILLING CO., Denver; $5,000,000; M. P. Dalton.

ANDESITE GOLD MINING & MILLING Co., Colorado Spring; $500,000; E. A. Mathe.

METAL MINERS' CORPORATION, Denver; $500,000; J. H. Eilen.

TOWNALE GOLD MINING & MILLING Co., Denver; $150,000; L. P. Cram.

RICHMOND MINING & MILLING Co., Denver; $9,000; C. B. Richmond.

BOSTON & CLEVELAND MINING & MILLING Co., Denver; $600,000; J. W. Weil.

BLACK QUEEN MINING CO. OF CHICAGO, Chicago; $1,000,000; A. McDermott.

DON PEDRO TUNNEL MINING & MILLING Co., Denver; $1,000,000; J. A. Maggard.

CLEVELAND DEEP TUNNEL MINING CO., Denver; $50,000; J. L. Van Sickel.

ALASKA GOLD MINING & LEASING Co., Denver; $100,000; I. Merrill.

COLORADO & SOUTHERN GOLD MINING Co., Fayette, Mo.; $1,000,000; A. Walford.

REGENCY MINING & REDUCTION Co., Hoppin, Kan.; $1,000,000; M. M. Dineen.

QUEEN CITY GOLD PLACER MINING Co., Fair Play; $50,000; H. J. Grembeck.

NEW HAVEN MINING Co., Hillsdale; $30,000; L. E. Keeler.

REPUBLIC CONSOLIDATED MINING & MILLING Co., Georgetown; $1,000,000; F. H. Collins.

BUCKHORN GOLD MINING & MILLING Co. OF WEST VIRGINIA, Colorado Springs; $150,000.

CAMP BIRD EXTENSION MINING Co., Ouray; $2,500,000; J. H. Robb.

OWL MOUNTAIN GOLD MINING Co., Cripple Creek; $1,000,000; W. G. Campbell, Colorado Springs.

UNITED MINES MINING Co., Willimington; Leadville; $750,000; E. E. Hill, Leadville.

DELAWARE

PONTIAC GOLD & COPPER MINING Co., Denver; $300,000; E. W. Peck.

PEACH BOTTOM COPPER Co., Wilmington; $3,000,000; T. F. McGarry, Grand Rapids, Mich.

COLUMBIA MINE & MINING Co., Denver; $100,000; W. J. Pick, Wilkesbarre.

COFFINVILLE DEVELOPMENT Co., Dover; $1,250,000; C. H. Welch, Athens, O.

UNITED STATES MINING Co., Wilmington; $600,000; G. P. Fary, San Francisco, Cal.

IOWA

STEVENS-TURNER COAL Co., Chicago; deal in coal, etc.

VINCENT MINING Co., Chicago; $250,000; F. E. Mat."
DOMINION COAL MINE CO., Danville, Ill. $70.00; F. P. H. H. 
IOWA.
KEYSTONE COAL & MINING CO., Des Moines, Iowa. $6.00; J. R. Haunh.
CHICAGO MINING & MILLING CO., Des Moines, Iowa. $6.00;
DIAMOND JOE COAL CO., Des Moines; $10.00; Mrs. J. Hamann.
MAINE.
COOL, ROB COAL CO., Portland; operating in oil lands. 
$10.00; E. F. Freeman, Boston.
CARMICHAEL REDUCTION CO., Portland; $20.00; J. M. Marth, East, Mass.
OLIVER HONEST.
NORTHERN ORE CO., Duluth; $50.00; W. E. Hall.
MISSISSIPPI.
MISSISSIPPI FOUNDAEY & MACHINERY CO., Jackson, Miss. $20.00; A. M. Coleman.
POWLER COAL & MILLING CO., Richmond, Va. $7.80; A. M. Powell.
BRINKLEY COAL CO., Kansas City, $8.00; V. M. Murphy.
CROWN PRINCE COAL MINE CO., Joplin; $100; W. E. Johnson, Waterloo, Iowa.
G. G. ZINC OXIDE CO., West Plains, Mo.: reduction and smelting ore and making zinc oxide; $10.00; C. L. Hoyne.
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ELKHORN TUNNEL & MINING CO., Omaha; $3.00; C. H. Gentle.
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NEW JERSEY CLAY MINING CO., Tuckerton; mine clay; $300.00; J. R. Catlin, Philadelphia, Pa.

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(Continued from page 64.)

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(Continued on page 61)
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