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A Magnificent Technical Society.

We are all justly proud of the American Institute of Mining Engineers, and we are accustomed to think of it as one of the most admirable societies of its class in the world. So it is undoubtedly a very fitting and happily edited proceedings form a most valuable contribution to the scientific literature of the day. That we may not become too vainglorious, however, we should sometimes reflect that many of the best achievements of our German friends in the way of technical societies. The largest engineering society in the world, for example, is theirs—the Society of German Engineers.

It is said that one cannot cross a street in Germany without running down a doctor of philosophoo; and at least one or two engineers would also be encountered on the way. 15,000 of these engineers belong to the society mentioned, and it naturally exerts a profound influence upon the engineering thought of Germany, and indirectly of the world. This influence is made effective, for the most part, by the publication of a journal called the "Zeitschrift," which is by all odds the most important publication of its kind anywhere issued. About ninety-two pages of text appear each week, with ample illustration of a high order, many requiring a year for printing in the course of the year. A numerous staff of technically educated engineers edit the journal, and keep it extraordinarily accurate in every scientific detail. The cost to the society last year was $125,000; but four-fifths of this amount was regained in advertising.

Although the annual dues of the members are only $5.50 for the value of the Proceedings alone—the Society and its publication, and has a permanent fund of $18,000. This fund is utilized in two ways rarely if ever adopted in this country—in adding the families of members, and in pensioning the employees of the Society.

A Department of Mines and Mining.

The need of a special executive department, headed by a member of the cabinet and devoted exclusively to the mineral industry of the country, has long been emphasized both by representatives of the mining interests and by those interested in the mining interests of the country. The need of a department devoted to mining, but part of the work of the State, a good deal of the South, and many of the Middle States, have enormous amounts of capital invested in some of the various mineral industries.

While, therefore, we are decidedly of the opinion that the importance and national scope of the mineral industry make it proper and desirable that they should have such assistance as a well organized and equipped department would afford, the fact it work while, nevertheless, to mention a fact often ignored by the advocates of the proposed department—the fact, namely, that the Government is already doing a good deal for the mining interests of the country through the Geological Survey. Elsewhere in this number we print a particularly strong and able argument in behalf of the new department by L. Bradford Prince, formerly Governor of New Mexico.

Mr. Prince presents the case with the skill of an advocate—and also, it must be added, with something of an advocate's unfairness, since he completely ignores the work that the Government is already doing for the mining interests and charges it with utter neglect of those interests. The Geological Survey covers a field much too broad for a single bureau, but its numerous and exhaustive reports on the mineral resources of the United States have been of immense value to the mining interests of the country. Elsewhere in this number will be found the substance of an address on this subject made by Charles D. Walcott, the Director of the Geological Survey, and we commend his article to such readers as may not know of the good work going on under the auspices of the Survey.

Let us have a department of mines and mining by all means, if we can get it; and meanwhile let us gratefully acknowledge benefits already at hand, and make the most of them.

The United States First in Minerals.

It has not been so long in several important branches of the mineral industry, but today the United States unquestionably leads the world as a general producer of minerals. This supremacy, moreover, increases every year, each statistical review disclosing a new metal to the fore, or a longer lead of an old champion over its nearest rival. The same similarity of remark holds good in all the important branches of the mineral industries. It seems perfectly clear that the United States will long be the foremost country of the world in mines and minerals.

To particularize a little this general statement, reference may be made first to our amazing progress in the production of iron and steel. Only ten years ago we were second to England in this, the most important branch of the mineral industries. To-day England is hopelessly behind.

Never until the figures for last year were authentically compiled, could it have been said that the United States led the world in the list of countries producing iron. Figures by the London & Northwestern Railroad—the first shipment of coal ever made to London from Philadelphia—in 1897—a tonnage only slightly higher than that of Great Britain. In the current year, however, we have considerably surpassed our British cousins in this field, and unless the present outlook is altogether deceptive, we shall increase our lead rapidly. In this very month a steamer sails from Philadelphia with 44,000 tons of coal for the London & Northwestern Railroad. The London & Northwestern Railroad, the first shipment of coal ever made to London from Philadelphia, has been a great deal of the South, and many of the Middle States, have enormous amounts of capital invested in some of the various mineral industries.

We find it hard to understand how our little planet could get along without American copper, as we produced last year two-thirds of the entire world's supply. No other country begins to approach us in copper production. Our Lake Superior, Montana and Arizona copper fields are almost inexhaustible, and our production last year of 191,000 tons will surely be progressively exceeded in the new century.

As for the precious metals, we cannot now claim first place in either gold or silver. The Nome and other new Alaskan fields may restore us to the first position in gold; and at all events we shall be at least near the top. As regards silver, we shall probably have to contend with a subordinate rank, for the present at least, as existing conditions seem distinctly to favor our rivals in this branch of mining.

We have cited additional instances (though lead and zinc are tempting) of our advantages over competitors in these lines, it is sufficient to say that the outlook for continued prosperity in the mineral industries of the United States is never more promising than it is to-day: nature unlocks to us new treasures every year; our mining machinery, already incredibly effective, will continue to perform fresh miracles; and our men of brains and money will go on in the same manner, under the stimulus of a widening range of industrial triumphs.
A National Department of Mining Growth of the Cabinet—Mining Interests of Vast Importance: Compared with Mining—Direct and Immediate Benefits.

By L. Bradford Prince, Santa Fe, N. Mex.

This is the most important subject that can come before the Cabinet at any time, and it will come before the Cabinet at this time, and will continue so to be until the establishment of a department of mining becomes an accomplished fact.

In the first place it may be remarked that it has been the practice of the Cabinet to increase the number of executive departments whenever the magnitude and importance of the business of any branch of government or supervision showed such action to be proper. At the beginning of President Grant's administration there were four cabinet officers—the secretaries of state, treasury, war and the attorney-general. In 1878, in consequence of anticipated wars with powers across the sea, the navy department was established. In 1892 the vast extension of our mail system made it proper that the postmaster general should become a cabinet officer. It was not until 1894, after the acquisition of Texas and northern Mexico, with a national domain more than double its original area, that we are by far the most extensive of all the departments, that of agriculture. The first indication of this was the memory of all of us when the most widespread industry of the country, after long years of service, was properly recognized by the formation of the department of agriculture in 1889.

The latter case is almost exactly analogous to the one which we now present. No one is ignorant of the fact that it has been the usual practice from the establishment of the department of agriculture, by the introduction of new plants from foreign lands and instruction in the care of them, with regard to soil and fertilizers, the organized effort to obtain relief from insect pests, and in a thousand other ways to increase the abundance and quality of the products of the field and forest. And now, I think for a moment of abolishing that department. Yet, as will presently be shown, the benefits which it has conferred upon the country and will even exceed that of agriculture in its extent.

INCREASING GROWTH OF MINING.

The increase in the importance of the mining industry in this country is really phenomenal. Many of those here present can remember when our only gold mines were those of North Carolina and Georgia, and the mint marks of the eagles and half eagles of that day remind us that the coinage of gold and Dallahan silver was there none. The first coal mine opened was that of the Allegheny miners a little over a century ago, and as to be almost incombustible; and while the mines of Pennsylvania soon after supplied both coal and iron, for a long time after the copper was brought from the shores of Lake Superior and lead was found almost on the banks of the Mississippi. Then came the wonderful discovery of gold in the newly acquired region on the Pacific coast in 1858, and about a decade after that of both gold and silver in the Rocky Mountain section; and from these dates the onward march of mineral discovery and mineral production has been steady and rapid. Today it has passed the mark of $40,000,000 of annual production; in every one of the most important metals and minerals it exceeds the production in any other country; in iron it is one-third of that of the whole world; in coal it is four times that of Europe; and in copper it exceeds that of all the rest of the world.

INDESTRUCTION OF MINERAL WEALTH.

While the agricultural product of the country is greater than the mineral, yet when we consider the per ton of mineral wealth, it is far superior. At the end of a year the agricultural product consumed and has disappeared from the face of the land, the products of the minerals and the previous supply has to be destroyed as seed. But mineral wealth is without parallel in the gratifying feature of the mining industry that it is the most permanent stock of man's possessions of the world.

It has been said that man is a public benefactor who causes two kinds of grain to grow where none did before, and what of the hardy miner, who from the rocky fastnesses of the central storehouse, brings forth untold riches, without which the government and its financial institutions could not exist? And what of the great system of commerce that is fostered by the miner?

WORTH OF PREVIOUS ACCUMULATION.

It is an absolute addition to the valuable material for man's use or ornamented life as it is consumed at his disposal; practically it is a creation, for it is extracted from the earth itself, where it has remained from the beginning of the world, and, in the uses and industry and skill of the miner is forever. Much of it is by nature in forms that bear no resemblance to the brilliancy of the miner's wealth, sometimes a thousand times its value of worthless rock; but the ingenuity of man converts it in perfect purity, ready for the most delicate use.

The gold and the silver of King Solomon's temple are still there in the seats of the world, after their durability and style are envied by the nations, from generation to generation, through all the riches of the earth and all the consequences of industrial material, both good and great.

The establishment of a department of mining would be an evidence of the recognition of the importance of the mining industry, but it will have an inspiring effect to stimulate the invention and industrial advancement and the development of resources now dormant and useless.

Other countries with not one-tenth of our annual mineral output have not the cabinet ministers and department. Let us, in the United States, not be behind in this great industry, the industry of our own country.

Tennessee as a Mining Field.


By Henry W. Maxwell, Knoxville, Tenn.

Five thousand square miles is the usual estimate of the Tennessee coal fields, but I am going to cut it in two, and then ask you to multiply it by what I know to be facts, and the figure ten to the ninety-sixth power can not be a very far from the true value of the purchase of gold. This whole area is underlaid by coal beds ranging in thickness from twenty-four to sixty inches, while below water, near the surface, three veins of copper averaging over ten feet thick are immediately adjacent, and total of twenty-five feet. One ton of coal six feet thick will yield at twenty-five cents a ton more twice the number of dollars. Multiply this by the thickness and the area, and the product will consume the thinking powers of any man. I leave you with the figures as a basis on which to calculate the value of a single mineral of the area.

The coal in this field is all bituminous and as grey as the world produces, different localities furnishing coals especially valuable for domestic purposes, gas, coking and steam. As to the last, the Tennessee group is being worked under the government for the use of the government, where the richness of the coal bed is thirty to forty feet thick and the coal contains thirty-five per cent of fixed carbon. In many cases their situation is well known, they remain unexplored and unmeasured. With a cabinet officer to attend to the interests of the mining community, this need would have been officially presented to the present government and legislation obtained years ago.

In every production of metallic and industrial minerals is being increased in a rapid ratio year by year. A moment's thought will show the truth of this. From the Medicine Bow to the tail sky-scraper building which rivals the tower of Babel in its presumptuous altitude, metal is taking the place of the arts. No greater illustration of this can be found than in the new navy of which we are so deservedly proud. Ten years ago the mineral and metallic wealth of England was apt to be ridiculed, but today the most imposing ship in the world is to be compared with the choicest oak and propelled by sails of cotton and ropes of hemp. How entirely is this change accomplished? The improvement is due to the miner. Now the hull and bulwarks of iron and steel, the ordnance of steel and bronze, all produced by great metallic engines fed by thousands of tons of mineral fuel, unite in proclaiming that the dependence of the nation is on the product of the mine.

Of National Value.

In this subject the mining interests of every country are now prominently concerned. Those who are interested in the coal of Pennsylvania, the copper of Bisbee, the iron of the Ohio valley, the coal and zinc of Missouri, unite with their far off brethren of the gold and silver regions of the Far West and the important countries in demanding this encouragement and development of the mineral wealth of the nation. The American people at large have no less interest, as every improvement made in the extraction and treatment of ore tends to increase the value of the mineral material, both great and small.

The establishment of a department of mining would not only be a proper recognition of the importance and magnitude of this great industry, but will have an inspiring effect to stimulate the invention and industrial advancement and the development of resources now dormant and useless.

*Paper prepared for International Mining Congress, Milwaukee, June, 1900.
Placer Mining by Cableway.

An interesting experiment in placer mining by cableway, which has thus far been much more successful than any previous attempt to introduce this method on an extensive scale, was being carried on by the German Bar Mining Co. of Virginia City, Mont. The company has in use a Lidgerwood radial cableway with self-filling and self-dumping buckets of one and a half yards capacity, working over the tailings of historic Alder Gulch. Through the courtesy of the Lidgerwood Mfg. Co., of New York, the makers of the cableway and buckets, cuts were permitted to present herewith three photograpic views of the apparatus in operation.

The grade of the German Bar Co.'s property is too flat to permit of the regular placer method, and the cableway is brought into use to solve the threefold problem always presented by flat placer deposits of low value—namely, excavation at low yardage cost, delivery of gravel at sufficient elevation to use sluices of ample length and grade to save fine gold, and the delivery of tailings at sufficient height to provide ample room for their disposal.

The span covered by the cableway is 400 feet in length, and the load excavated and carried by each bucket is one and one-half cubic yards. The pivot tower contains a large hopper whose bottom is forty feet above the ground, and it is through this that the material is delivered to a thirty-inch sluice over a five per cent, grade 200 feet long, which finally delivers the tailings at an elevation of twenty-five feet above bedrock. This tower also has a ball-bearing top of bossen so arranged with cables and yokes that it may turn on either of its two bases, which is set to move through an arc of 180°. The latter carries, engine, boiler and cable anchorage, and travels easily and quickly on curved tracks. The engine has double ten by twelve cylinders, cast steel gearing, and is exceedingly strong. The hoisting drum is thirty-three inches in diameter, and the conveying tram is fifty-four inches in diameter, in which four-inch buckets, holding rope is rigged on the crane system, thus insuring greater power in digging and high speed in conveying. Fall rope carriers are required on each side of the carriage. The boiler is fifty-four inches in diameter, locomotive type and built, like the engine, for 150-pound working pressure.

The traveling tower permits excavations along radial lines, and a semi-circular or fan-shaped pit is cut out around the hopper tower, which stands on bedrock in the pit previously worked out. The tailings flow over this old pit and are taken from the part of the tower that is to be excavated, which part is taken from the entire area of the pit.

EXTRACTION FROM PAPER PREPARED FOR INTERNATIONAL MINING CONGRESS, CLEVELAND, JUNE, 1900.
The Geological Survey and Its Work.

What this Department is Doing for America’s Mining Interests—Its Duties and Purposes—What It Has Done and What It May Not Do—A Suggestion as to a Department of Mines.

By Charles D. Watsell, Director of the Survey.

It has been well said that there are three standpoints from which the relations of the Geological Survey to the mining industry in general may be viewed first, that of the scientific or geographic side; second, the technical side; and third, the economic side.

As the general principle upon which the Survey has been doing its economic mining work is that it should be conducted for the mining industry, as a whole, what the individual mining engineer or mine owner would have done by himself if he had been free to do that; it should not undervalue to do what could be done as well, if not better, by individual owners or corporations. It should not interfere, either favorably or unfavorably, with the private business of individuals or corporations, or enter into competition in their legitimate occupations with professional men, such as mining engineers, etc. This is implied in the clause of the organic law of the Survey which provides that “The Director and members of the Geological Survey shall make no surveys or examinations for private parties or corporations.”

If it were more generally understood that such is a principle on which the members of the Survey, they would not be asked, as they frequently are, to tell some individual or corporation whether his or its land contains valuable mineral deposits, since all the information they are at liberty to impart to the public at large and contained in the published maps and reports, which may be obtained by all. If the individual or corporation desires more precise and complete information from these publications all the commercial data that may be desired, it is our duty and we are employed for the purpose. An attempt by the Survey to acquire and communicate such information by any means whatever involves a complete and impartial study of the case and would be in the nature of a report for private parties, which is not in accordance with the business of the mining engineer and violation of law. Neither should the Survey be called upon to assay or analyze ore samples, since it would manifestly interfere with the business of the assayer; nor should it be called upon, as it sometimes is, to tell a man how to conduct a process or plant, since this is best adapted for the treatment of his ore.

Even if the members of the Survey were more versed in the processes and machines, and in some of the technical processes or machines, and should pronounce such judgments, it would be unwise for the Government to be unhesitatingly bound by the person or corporation owning a process or machine. In such cases the Survey is not engaged, even with such a liability.

The means for economic work being limited, only a small proportion of the broad field opened for the Survey, and it is not able to cover the entire.

On this account, the energies of the Survey have been devoted to those branches of investigation which will yield of immediate use to the greatest number; and these have been, in the main, investigations leading to the exploration of ore deposits.

GEOLOGIC INVESTIGATION.

In the field of purely geologic investigation, the general object has been the determination of the laws which govern the formation of deposits of the useful minerals, and of the rock formations, in which they are most likely to be found. This object can be attained only by a long and careful study of many and varied deposits—by a study which is only now beginning to be attacked with the armament of geologic science. On this account, the geologic studies were made of mining districts in which mining developments have been most extensive, the mines are deep, and the economic ore deposits are large.

In the prosecution of these studies, the geologists often obtain results of immediate value to the miners and mine owners of the particular districts, and this constitutes a very important feature of the work. The generalizations of the probable direction which the ore bodies will take in unexplored ground, the faults which are likely to cut them off, and other obvious limitations which geologic conditions may suggest. These results are often of secondary importance as compared with the more general deductions, being useful only to a few persons interested in a limited district, while the general deductions, if correct, are of benefit to the whole mining community.

The most important statement of the underlying principles which govern our choice of fields of work is made, however, in the following statement: “We believe that the criticism made by miners being that the Survey chooses developed districts, where the general problems are already known, rather than undeveloped districts, where the geologic problems are more complex, but not among the industrial, but might actually help in their development. A partially developed district is not only likely to yield any contribution to general laws. Whatever may be said of the probable value of such a district belongs to the province of the mining engineer rather than to that of the government geologist, since it involves such preliminary work as sampling of ores, prospecting, development, etc., which the geologist cannot do.”
CHARACTER OF GENERAL RATHER THAN SPECIAL INTEREST, AND TO INCLUDE ABSTRACTS, IN SOMEWHAT POPULAR FORM, OF MONOGRAPHIC STUDIES. IT WAS FOUND DESIRABLE, AS TIME WENT ON, TO MODIFY THIS PLAN, AS IT HAS BEEN FOUND WISE TO ADHERE NOT TOO STRICTLY TO THAT LAID DOWN FOR THE CONDUCT OF THE WORK ITSELF. THUS, FOR A TIME, THE OUTSIDE DEMANDS FOR ECONOMIC SURVEYS, SOLELY ON THE SECONDARY GROUND OF THEIR USEFULNESS TO THOSE INTERESTED IN MINING IN THE SPECIAL DISTRICTS EXAMINED, INCREASED VERY RAPIDLY, WHILE THE FORCES AND FUNDS AT THE DISPOSAL OF THE ECONOMIC DIVISION WERE ACTUALLY DECREASING. SO THAT THE GEOLOGIC TREATMENT BECAME MORE AND MORE VIABLE AS A MATTER OF POLICY, AND THE WORK WAS SPREAD OVER A GREATER NUMBER OF REGIONS BY DEVICES LESS TIME AND LABOR TO EACH.

A CORRECT GEOLOGIC MAP IS THE FIRST AND MOST ESSENTIAL BASIS FOR THE STUDY OF A MINING DISTRICT, AND WHERE THE DEPOSITS ARE BETA IN SEDIMENTARY STRATA, AS IN THE CASE WITH COAL, AND SOMETIMES WITH IRON ORE AND OTHER SUBSTANCES, IT INVOLVES PRACTICALLY ALL THAT THE MINING ENGINEER NEEDS FOR OPENING AND EXPLOITING THE MINES. BY THE FOLLOWS:

EXCEPT IN A FEW SPECIAL CASES, IT HAS NOT, THEREFORE, BEEN THOUGHT ADVISABLE TO FOLLOW OUT THIS LINE OF WORK.

IT IS EVIDENT THAT THE INVESTIGATION OF TECHNICAL PROCESSES IN THEIR COMMERCIAL APPLICATION IS NOT A LEGITIMATE FUNCTION OF THE SURVEY. ITS EMPLOYEES ARE EXPRESSLY SHUT OUT FROM A COMMERCIAL USE OF THEIR KNOWLEDGE, AND ARE CHOSEN FOR THEIR PROFICIENCY IN GEOLOGY RATHER THAN IN TECHNOLOGY. THERE MAY ARISE CASES, HOWEVER, IN WHICH IT WILL APPEAR POSSIBLE FOR THEM TO DETERMINE THE UNDERLYING PRINCIPLES OR LAWS THAT SHOULD GOVERN SOME TECHNICAL PROCESS IN WHICH IT WILL APPEAR ADVISABLE AND PROPER FOR THEM TO TAKE SUCH INVESTIGATIONS.

COMMERCIAL OR STATISTICAL INVESTIGATIONS

THERE REMAINS TO BE CONSIDERED THE RELATIONS OF THE SURVEY TO THE PURELY COMMERCIAL SIDE OF THE MINING INDUSTRY, AND HERE THE PRINCIPLE OF DOING WHAT IT IS INHERENTLY BETTER FITTED TO DO THAN IS THE INDIVIDUAL, IS MORE EASY OF APPLICATION. IT SEEMS EVIDENT THAT THE COLLECTING OF ACCURATE STATISTICS PUMPETERS, PECKHAM, WILLIS, ELDREDGE, AND OTHERS WHO CONTRIBUTED TO THE VOLUME ON MINING. LATER ALBERT WILLIAMS, JR., WAS PLACED AT THE HEAD OF A DIVISION OF THE SURVEY CREATED FOR THE PURPOSE OF CARRYING OUT THIS WORK, AND KNOWN AS THE DIVISION OF MINING STATISTICS AND TECHNOLOGY.

MR. WILLIAMS PLANS WERE SO WELL MADE THAT THE RESULTS WERE EXCELLENT, AND THEY ADMITTED OF SIMPLE EXPANSION AS THE NEEDS AND FACILITIES OF THE SURVEY MADE SUCH EXPANSION NECESSARY AND PRACTICABLE. MR. WILLIAMS' AIM WAS TO USE THE SMALL MEANS AT HIS DISPOSAL TO SECURE THE CO-OPERATION OF EVERY INDIVIDUAL AND INSTITUTION FOR THAT PARTICULAR CONTRIBUTION UPON WHICH HE OR IT WAS THE BEST AUTHORITY. PRIMARY ATTENTION WAS PAID TO LOCATING AND DESCRIBING THE KNOWN MINERAL LOCALITIES, EVEN DOWN TO THOSE OF RARE ELEMENTS. THE WORK WAS ARRANGED WHOLLY ACCORDING TO MINERAL SUBSTANCES, RATHER THAN GEOGRAPHIC REGIONS, SINCE EACH MINERAL INDUSTRY WAS THE INTEREST INTENDED TO BE SERVED. THIS RESULTED IN THE SERIES OF PUBLICATIONS CALLED "MINERAL RESOURCES OF THE UNITED STATES." AT THE PRESENT TIME THE WORK IS

CABLOWAY USED FOR PLACER MINING BY THE GERMAN BAR MINING CO.

TECHNICAL INVESTIGATION

IN THE LINE OF WHAT MAY BE CONSIDERED TECHNICAL STUDIES, THE DUTIES OF THE SURVEY TOWARD MINING INDUSTRY ARE LESS EASY TO DEFINE; FOR IN THIS LINE THERE IS MORE DANGER OF ENCROACHING UPON THE DOMINICAN FIELD OF THE MINING ENGINEER OR METALLURGIST. YET THE SAME GENERAL PRINCIPLE IS APPLICABLE HERE; NAMELY, THAT THE SURVEY SHOULD CONFINE ITSELF TO THOSE INVESTIGATIONS WHICH IT IS BETTER FITTED TO MAKE THAN THE INDIVIDUAL. TRUE, IN OUR EARLY WORK ON LEAVILLE, WHERE LEAD-SMELTING HAD RECENTLY REACHED A STATE OF DEVELOPMENT HITHER TO UNKNOWN IN THIS COUNTRY, IT WAS THOUGHT THAT A SCIENTIFIC DISCUSSION OF THE PROCESSES INVOLVED, IN THE LIGHT OF THE IMPROVEMENTS MADE IN PRACTICAL METHODS, WOULD BE OF ADVANTAGE TO THE MINING COMMUNITY THROUGHOUT THE COUNTRY. IT WAS FOUND, HOWEVER, THAT SO GREAT WAS THE COMMERCIAL IMPORTANCE OF THE INDUSTRY, AND SO RAPID THE ADVANCEMENT IN METALLURGIC SCIENCE, THAT THE DELAYS INCIDENT TO A GOVERNMENT PUBLICATION GREATLY IMPAIRED, IF THEY DID NOT ALTOGETHER NULLIFY, ITS VALUE.

OF THE MINERAL PRODUCTIONS OF THE COUNTRY, WHICH FORM THE MOST IMPORTANT BASIS OF ALL MINING BUSINESS, IS A PRINCIPAL DUTY OF THE SURVEY. NO BRANCH OF STATISTICAL SCIENCE IS IN GREATER NEED OF TECHNICAL KNOWLEDGE AND THOROUGH SYSTEM THAN THAT WHICH DEALS WITH MINERAL PRODUCTION, AND NONE IS MORE LIKELY TO BE LED INTO ERROR, IF THE COLLECTOR'S OPINIONS ARE IN ANY WAY BIAS BY HIS INTEREST. THERE IS NO BODY OF MEN MORE ABSOLUTELY DISINTERESTED THAN THE EMPLOYEES OF THE SURVEY, AND, UNDER THE LAW, THEY CAN HAVE NO COMMERCIAL INTEREST IN THE SUBJECTS WHICH THEY TREAT. THEIR FIELD OF WORK IS SO WIDE THAT, BY ONE OR ANOTHER, A CERTAIN PERSONAL FAMILIARITY WITH ALL THE SOURCES OF SUPPLY OF THE VARIOUS MINERAL PRODUCTS OF THE COUNTRY IS ACQUIRED, WHICH IS AVAILABLE FOR THE GUIDANCE OF THE STATISTICAL DIVISION.


STANDARDIZATION OF MINERALS AND RESOURCES

THE STANDARDIZATION OF MINERAL RESOURCES AND MINERAL STATISTICS Brought together such men as Emmons, Becker, practically an annual census of the product of all mines, except those of precious metals. The statistics of gold and silver were excepted in the original plan, in 1852, but courtesy to the Director of the Mint, who desired to retain in his own office this portion of the work.


HYDROGRAPHIC INVESTIGATIONS

FOR MORE THAN TEN YEARS THE DIVISION OF HYDROGRAPHY OF THE SURVEY HAS BEEN MAKING MEASUREMENTS OF STREAMS AND COMPUTATIONS OF THEIR DAILY DISCHARGE AT VARIOUS POINTS. AT THE SAME TIME, IT HAS BEEN INVESTIGATING THE MOVEMENTS OF UNDERGROUND WATER AND THE CAUSES WHICH GIVE RISE TO THEM. THE RESULTS HAVE ECONOMIC IMPORTANCE TO THE MINER IN HIS UNDERGROUND OPERATIONS, AS HE MUST OFTEN CONTEND WITH WATER, AND HIS ABILITY TO DISPOSE OF IT SUCCESSFULLY MAY GIVE HIM THE QUESTION OF PROFITS. HE OFTEN SEeks IN DRAINING WATER FOR THE POWER, OR IN DRAINING IT DIRECTLY, MINES, MILLS, ETC. IN MANY SECTIONS THE LOCATIONS.
Mining, Mine Management, and State Inspection.

Safety, not Cheap Production, Should Be First Consideration—Ridgedly Enforced Legislation Required—Laxity of Present Methods.

By Henry E. Eveson, Councilor, Portland, Ore.

Human life is valuable in all its aspects; as in all other operations ought to be a matter of conscience and fellow-feeling to be of first importance. The lack of sympathy or indifference of the conscientious miner, in so far as the lives of his workmen are concerned, for the purpose of making a greater profit, is a breach of the golden rule.

By the development of agriculture through irrigation, and the building up of small producing communities, there is a growing demand for water, which is a necessity of life. The cost of living is greatly reduced, and it becomes possible to establish industries, which were heretofore unprofitable. This dotting of the country with farms and villages is possible through a careful conservation of the available water, such as can result only from a thorough knowledge of the natural conditions. This knowledge, which is the most important division of hydrography, as rapidly as the means become available with the Government to the mining industry.

The results already obtained by this bureau of the Government form a monument to the intelligent interest taken in its work by Congress and the Secretaries of the Interior.

With these thoughts in view, let us consider the relations of the Government to the mining industry. For several years there have been active and successful movements toward the establishment of a Department of Mines and Mining. The latest bill on the subject, introduced by J. A. Barham, of California, has many commendable features, but unless there is a decided change of sentiment in the future Congress, as compared with the last Congress, the bill is likely to remain in committees for some time.

The function of the new Department, as defined in the bill, is "to acquire and maintain mining and geological survey, and to diffuse the same among the people; to make charts and maps, and to establish a mining bureau for the purpose of collecting and disseminating information on subjects connected with mines and mining, to acquire and maintain by purchase or otherwise, and to diffuse the same among the people." The bill provides that the Geological Survey shall be the nucleus of the new Department.

There is no doubt in my mind that the mining interests of the country are entitled to direct recognition by the Government. If those interested in the mining industry wish such recognition, I doubt if anything could be more practicable, or the advancement of the mineral resources and mining industries of the country so helpful, as the establishment of a Department of Mines and Mining.

A New Dry Gold Washer.

T. M. Jones and James McNeese of Leavelle, Colo., claim that they have invented a dry gold washer of novel design adaptable to placer mining. The claims have recently been patented, and the machine in the famous old placer field in California, near the Lodi district, has been reported as saving 75% of the costs of washing sand. Working models of the machine are on exhibition at the Leavelle machinery depot.

August 1, 1900.

The MINING AND METALLURGICAL JOURNAL

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August 1, 1900.

News from Nome—Mostly Bad.

Disease and Distinction Threatened—All the Claims Done, but Still the Miners Come.

All kinds of reports are coming from Cape Nome, most of them extremely unfavorable. Official documents and private letters bear testimony to the state of affairs in the new mining camp. There has seldom been equalled even in the wildest rush of previous mining booms. Contagious diseases have raged, and many of the gold hunters have been held up at sea without being allowed to land. On shore, two men have been reported shot, and many men have died from exposure produced by the climate have been rampant. Worse than this, it seems that the authorities have been unable to enjoin the railroads for a matter of lack of funds, and that undetermined numbers of new-comers have been paid the rights of the original settlers. The portion of the territory would-be miners to mining claims has been about twenty to one, the seriousness of this lack of mining claims to satisfy the enormous horde of new-comers has been the absence of adequate housing accommodations, and the starting likelyhood that transportation facilities will not be sufficient to carry away the thousands of new-comers before the winter season sets in. Shipwrecks have been frequent, as might be expected when one considers the reckless speed with which officials of the navigation companies have pushed across.

The richness of the famous sand, it seems, is greatly overrated. In time there may be discoveries in the neighborhood which would furnish proof of the soundness of the claims on the spirit's arrival, but the vast majority of those who have rushed to the place are destined to return bitterly disappointed, probably, and certainly broken in pocketbook.

In summary, Governor Ford, urging the revenue cut-off Manager, has written to the Treasury Department about his observations at the beach. He has reported that there are more than 3000 men on the beach with no prospect of securing a paying claim or of obtaining employment, except as a cook or lumberman. The governor says, "for the vast throng that has been and is
The first steam engine, the condenser played one of the leading parts; in fact, the condensation was accomplished in the cylinder at each stroke, but the successful introduction of materials capable of standing higher pressures, together with the improvement in valve construction and manipulation, seemed to push the apparent economy of condensing to the rear, except in the cases men-

A BARNARD-WHEELER SELF-COOLING WATER TOWER.

In this age of progress and money saving devices, the ingenuity of man shows itself in many unexpected places. Not so very many years ago steam engines were run condensing only on shipboard, or along the banks of waterways, etc., so that only steam users thus located were able to take advantage of the manifold and manifest merits of a condensing system.

To the lay mind, the word "condensing" is more or less meaningless; but to the engineer and the payer of the coal and water bills it is an item that counts the most intelligent investigation. In

fairly reasonable, four five dollars per fifty-pound sack, bacon, forty cents; canned meats, seventy-five cents per can; from fifty cents per can, and everything else in proportion.

W. C. Hansey, formerly a Cripple Creek miner, has written home to one of his friends, dating his letter on board the Ohio, anchored one and a half miles from above, June 14:

A FANLESS SELF-COOLING WATER TOWER.

"The Ohio has just been quenched for twenty-one days on account of small-pox, and don't know when we will be able to land, as new cases will continue to break out, so you see it is all off with us on the Ohio. We are a sorry looking lot of people to-day. The grub is nearly all rotten and it is costing me three dollars a day for deuced food to eat. There is no one working on the beach. I can see the entire beach and advise everybody to stay away from Nome, as one-half the people returning on the same boats they came on."

"This is a country of great possibilities, but at present it is certainly overrated, and the number of people who were disappointed in the rush will not be a mark to those who will get left here. The beach diggings (which really made the capricious rush) will not be a mark to those who will get left here. The beach diggings (which really made the capricious rush) will not be a mark to those who will get left here. The beach diggings (which really made the capricious rush) will not be a mark to those who will get left here.

"This is the most desolate country you can imagine. There is not a stick of timber closer than thirty miles, and the fuel question has been a hard one this winter. Driftwood was hauled as far as eighty miles, and was sold at $35 to $60 per cord. I sold the house we bought up the beach, or rather the logs in it, for fifty cents per cord, and the logs were sold for seventy-five cents each. Provisions have been disturbed by the recent decline in the price of gold, and there is little prospect of a new rush."

"The Ohio has been through the small-pox epidemic, and we are now in the process of purifying the water supply. The public health authorities have advised us to boil all water before using it, and we are doing our best to comply with their instructions. The water is not particularly good, but it is the only water we have."

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Prospects of Copper Mining in Northern Wisconsin.

Geologically Identical with Keweenaw Point Development Thus Far—A Region Full of Promise.

By Kirby Thomas, West Superior, Wis.

Under the stimulus of high price and the prospect of an increasing demand for copper, the efforts of prospectors to develop copper deposits during the past two years have almost been confined to the areas of continuing search after copper. Every favorable formation has been prospected for the red metal, and next year copper hunters will not be confined to a few localities. One of the most promising districts which promises to come to the front very soon is the Western Lake Superior district, as the considerable amount of copper-bearing rocks in Northern Wisconsin is developed.

BARRIER LEAD FORMATION.

The Keweenawan formation, in which occurs the copper deposits in the district, consists of a series of crude formations alternating with sandstones and conglomerates, and in the upper division, almost wholly composed of detrital deposits interbedded with occasional lava flows. The beds, so far as described, are of the typical type of red sandstone and shale below the Potomac sandstone of the Cambrian period. The Keweenawan formation in the Lake Superior region is essentially a thick bed of the ancient sea. Subsequent earth movements tilted the bed so that it dips about 35 degrees or slightly conforming in a general way to the present bed to Lake Superior. One edge of the syncline forms Keweenawan rocks which trend northward across Northern Michigan and Northern Wisconsin, Wisconsin, and which strike into Minnesota. The great Michigan copper mines occur on this edge on Keweenaw Point. At the western end of Lake Superior, the Keweenawan beds are represented by the upper St. Croix valley, which was formerly and until recently the outlet of the lakes. This valley forms the Douglas Copper Range in Northwestern Wisconsin. The Keweenawan is a broad, synclinal formation, and is exposed along the northwest shore of Lake Superior and on Lake Superior. The lower beds of the Keweenawan consist of massive, compact, crystalline gabbros, from twenty to fifty feet thick. After four or five thousand feet of these flows had spread out in horizontal sheets over this Lake Superior region, the magmas became somewhat different and the copper-bearing gabbros are more frequent and thinner. These constitute the middle and upper divisions of the Keweenawan formation, and are described in this division. The upper series consist of alternating-eruptive and sandstone or conglomerates.

IDENTITY WITH KEWEENAW POINT.

The absolute identity of the formation in the western Lake Superior district and in the Keweenaw Point district is proven by very eminent authorities. On page 155, Monograph V, Mr. Johnston gives the identity of the eruptive rocks of the St. Croix (Wisconsin) district and the Keweenaw Point formation, says: This identification is also indisputable; it is so because of the absolute identity in nature and structure of the rocks of the region, and because the Keweenaw beds have been followed continuously from the present end of the Lake Superior, Michigan, to the St. Croix river. Wisconsin. The predominance of fine-grained basalt rocks in the two regions is so complete and uniform, even to the alteration-products that thin sections of rocks from the two districts placed side by side are not distinguishable from one another. The rocks of the two regions present precisely the same appearance, structure, and compact phase. The amygdales are made of the same minerals in both, associated in the same ways and with the same proportions as in the St. Croix valley in the same manner, and with the same association, as elsewhere. The evidence for all the distance between Keweenaw Point and the St. Croix is just as strong as that ever appeared to prove the identity of anything. From Keweenaw Point to St. Croix, the formation has been traced mile by mile.*

DEVELOPMENT STORY.

The significance of the existence of the identity of the copper district of the western Lake Superior district with the Keweenaw Point formation gradually filtered down to the lait. The increasing reports of copper in the Douglas Range led to considerable copper prospecting, which commenced earnest about three years ago. The showings were not entirely new, but they were new and bubble. After some excitement and sorrow, the men who had holdings on the Douglas Range, in the Lake Superior district, those as the exposure of the southern edge of the Keweenawan. The region is designated, settled down to the serious and hard task of opening up copper mines.

FACILITIES FOR MINING.

The whole district is within a few hours' ride of a good road, which is a considerable railroad and harbor facilities. Roads and railroad facilities along the Douglas Range are ample, and an advance on the important transportation problem. Wood and water and power are abundant throughout the district. The exposure of the formation throughout Douglas county, Wisconsin, is frequent and prospectors are not difficult to work. The copper districts of the formation farther east is heavily drift covered. The copper occurs in the range of the Douglas Range, has yielded very rich veins, and is high enough to be useful for the surface operation. The lands in the more favored localities in this range have been surveyed and sold, but well located lands can be had for $5 to $10 an acre. The title of the lands in the district below the Fond du Lac lake is not affected by the United States. The Mining laws do not apply.

LOCAL DETAILS.

On the Douglas Range four principal companies are engaged in developing for copper. The Copper Mining Company, formerly the North Wisconsin Mining Company, was organized in 1889 and has spent in the development of the property approximately $500,000 and has done nearly 300 feet of drift and cross-cutting. This company is controlled in Boston and is satisfied that the copper district has reached a depth of 190 feet and shows a good ore body. The Fond du Lac mine has so far confined to surface working and is very satisfactory. The Chippewa mining company is doing work at present. The Chippewa mine, which was one of the earlier discoveries on the range, has recently been reorganized and is doing excellent work. The Cullen mining company, which was one of the first discoveries on the range, has recently been organized and is doing excellent work. The Lands in the district below Fond du Lac lake is not affected by the United States. The Mining laws do not apply.

The Douglas Range, which is a practical continuation of the Douglas Range, has yielded very rich showings to the prospectors. The land on this range has been bought by the St. Croix Consolidated Copper Mining company, and there has been no development work done. On the Keweenaw Range the only development work done is in the town of 45 and no mining company is only a very good property. A crew has been at work on the ranges all winter.

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The Wisconsin Geological survey made a preliminary, inspection of the district last summer. The reports made for the survey from average samples ranged from as high as four per cent in native copper. An average sample from the Cullinan assay 4.19 per cent. An average sample from the Fond du Lac gave 39.15, 15.5, 15.8, and 1.21 per cent respectively. Copper, which was not examined by the survey, yields nugget copper weighing several pounds. In this connection it should be considered that the Michigan copper mines have an average grade of only 0.8 per cent. The Atlantic mine on Keweenaw Point is paying dividends on an average yield of less than 0.078 per cent.

CONCLUSION.

The Western Lake Superior district will soon be adding to the world’s copper supplies. The geological condition is excellent, the district has discovered and proved give reason to believe that the Michigan and Wisconsin deposits and copper zones, and it may rank along with the Michigan district world-famed for the richness of its copper deposits.
Why Women Should Become Interested in Mining.

A New Field for Women—Conspicuous Examples of Success—Advantages of Gold Mining.

By Mrs. E. G. Amead, Eugenia, Colo.

Mining is an industry that offers an excellent opportunity to women who are anxious to earn money, and at the same time be actively and interestingly engaged in a suitable, most fascinating, and lucrative occupation. It is a business that can be made to pay by any energetic woman who will pursue it in an intelligent and painstaking way. The work is not easy, but it is elevating, educational, and pleasant, and many women have not only made a success in mining, but have risen to the highest pinnacle as experts in the profession. As evidence of the truth of this, I have only to refer to the business career of the expert in metallurgy, Miss Caroline Van Brunt, who to-day is one of the most conspicuous examples in America, and perhaps in the world. She is not only the secretary of the Oxford Copper Company, but is a director, and one of the incorporators of the company, and knows more about copper, nickel, the general mining of ores, the source of supply, production, consumption, tariff, state of trade, etc., than any other woman in the United States, and probably more than three-quarters of the men claiming to be experts in the subject of mining and all its kindred interests.

Miss Van Brunt has closely studied the problem of rendering copper furnaces innocuous, and it was largely due to her ingenuity and intelligent presentation of her side of the question that Congress was induced to give those establishments requiring it a chance to experiment further with patent and other smelting processes.

In Colorado we have two women who have brought success and wealth to the company that had been a loser from the start. I refer to Miss Stewart and Miss Dillingham, who are well known as successful managers of a mine and concentrators.

Mrs. E. G. Buhler of Silverton is another successful mining woman. She is a member of the American Institute of Mining Engineers.

When men taught school, and women did not, "teacher" was a man's word. Now, it stands nine to one feminine in America. "Doctor" Jones no longer conveys instant assurance of masculine trade combinations, or even the law of competition or business rivalry. It occupies the unique position among the industries of the world of being the one order of production, where there is no "overproduction" or "want of consumption," where the same price in the bar prevails as thirty years ago, and where conditions make it impossible for any combination to control its price or volume of output. Gold is the ruling power and its victory is coin. Its plentiful production increases the product of every other class of mining, as well as the products of the field, farm, and orchard. There is no industry, no profession, no trade or calling in life that is not the better for it. In its advancement, you compete with none, you injure none, but on the contrary, greatly promote the welfare and happiness of all. I cannot but feel from my seven years' experience in active mining that if women would only investigate for themselves and not be guided by false advice, especially from those who have been unfortunate through their own mismanagement, they would grasp with enthusiasm avidly the great opportunities mining presents to them for quickly accumulating wealth in a legitimate manner from the hand of nature.

DANGER OF SPECULATION.

In speaking thus of mining, however, don't misunderstand me. I refer not to speculation in mining stocks, but to legitimate business operations in the industry of mining, recognizing the question of stock investments alone as the merchant does on the profit and loss page of his ledger.

The blind mad speculator and merchant of New York City, Mr. Charles Broadway Ross, says in giving financial advice to women: "There is one thing I would most emphatically impress upon women—keep away from Wall street. Don't speculate, don't gamble. It is not legitimate business, and is sure, sooner or later, to lead to ruin. Aside from that, there is no line of business in which women may not succeed if they will give to their work the necessary thought and attention."

In speaking for myself, in my experience of several years as a stock broker, I must confirm what Mr. Ross so forcibly proclaims, and further say that stock speculations have destroyed more homes, caused more bank debasements, broken more hearts, and caused more cases of misery and disgrace more human beings than any other evil to which men or women are exposed.

ASYMBLING TREGRAIN STAMP MILLS

Col. Charles E. Fuller, the oldest member of the Boston Stock Exchange, told me that in the forty-two years' experience on the floor of that exchange, he knew of only one woman, who was a regular speculator, to succeed. The man was the son-in-law of the late Gov. Ames of Massachusetts, and he never bought stocks, but sold them "short."

Whatever theories we may learn, whatever usefulness we may gain, and whatever natural or other advantages we may possess, avail us nothing unless we utilize them. I wish I had the power to picture to the American women entering the business world, the purity, the freedom, and the gloriousness of living close to nature. I wish I could make her realize that is seeking a field of usefulness in which to display her ability among the working bee of society, she is not only more healthful, more attractive, more useful, and successful, than mining. In the open air, working and reaping under the sunbeams of Heaven, she will find the health, strength and happiness that will best fit her, not only for a successful career in the business world, but for the better discharge of her domestic duties.*

The Tremain Steam Stamp Mill.

About six years ago the Gates from Works of Chicago acquired exclusive right to manufacture Tremain Steam Stamp Mills, and since then this specialty has been widely introduced, and has become generally recognized as one of the most important machines used in the reduction of ores. Even the enormous resources of the Gates plant have been at times unequal to the demands of important buyers. But a recent enlargement of the "Tremain Mill Department" enables the company to announce that future orders will be filled with despatch. The accompanying illustration shows a number of the mills in various stages of completion. Another half-tone engraving shows an installation of the "Tremain Mills" at the Reginald Gold Mine, concerning which the secretary officially reported to the stockholders as follows: "Our reduction plant consists of a bottom of eight Tremain Steam Stamps Mills, equal to forty heads of gravity stamps. It was only after great discussion and anxiety on this point that your board decided on adopting Tremain and then the design in respect to you that they are working most satisfactorily."

Stamp mills present many points of possible working, and the manufacturers of the Tremain Mill summarize the superiority of their product under nineteen heads, as follows:

1st. It requires no engine, shafting, pulleys, belting, cogwheels, cans, or tappets in its operation.

2d. Being operated by direct steam—an extremely elastic fluid—there is less friction and no concussions except between the shoes and dies.

3d. Not depending upon cava for raising, or gravity in dropping, the speed and capacity per stamp are more than doubled.

4th. It therefore accomplishes as much work as a battery of two ordinary stamps which costs much more.

*Extract from paper prepared for International Mining Congress, Milwaukee, June, 1904.
little development work—just enough, in fact, to boost the prices and enable the promoter to dispose of his own shares which have probably cost him only a few cents—just so long will there exist a serious prejudice against the business of mining.

When a promoter is left free to do what he likes with his shares, there is a great incentive for him to sell out. And this has become a business within itself. The real expert is a man who sells to many different people, and no one person feels like taking hold to carry the business on after the promoter sells out. Thus the company has been formed, a lot of people have been bled, and a sly promoter has been made rich.

The question may be asked, "Who is to blame?" Certainly the persons who bought the stock are not to blame for the gloating retreat of the richness of the property. They, on doubt, anticipated the profit to be derived from a legitimate deal. Investors, however, are to blame for not having the shares of the promoter securely tied up. If this had been required in the outset, the probabilities are that no company would have been formed, for the simple reason that the promoter foundations and building is but a small fraction of what is left in moving any other stamp mill. 10th. It can be erected and put in operation in a few days, after which a building to suit the climate can be put up without interfering with the operation of the mill. 11th. Additional capacity can be quickly and economically added to the milling plant. 12th. It uses the steam expansively and is very economical in the use of fuel. 13th. It is the ideal prospectors' mill, and its use will enable the quartz miner to provide a complete milling outfit for development or permanent works at from one-half to one-tenth of the initial expenditure required for any other ore milling plant of equal capacity.

The Evils of Promoting.

By N. C. W., St. Paul, Minn.

The business of gold mining in the past has been one of crude and primitive methods. Chemistry has done much to improve these methods, and to reveal how little we know of the simple laws of nature. A few years ago we were, in many instances, leaving as much gold in the tellings as we were extracting. To-day many of the old dumps are being worked over at a splendid profit, and the business is on the eve of the greatest progress it has ever known.

Gold mining is only the beginning of the mining of silica to caliche. Through its scientific departments it is becoming, not merely one of the safest, but absolutely the safest business to-day seeking the investment of capital.

There is, however, a vast difference between the business of mining and the business of promoting and organizing companies. This difference is not understood by people generally. Just as long as promoters are able to organize companies and sell sufficient treasury shares to do a

BATTERY OF FREEMAN MILLS AT REGINA GOLD MINE.

in all probability never had any idea of doing actual mining, no more, at least, than would give value to the shares long enough for him to unload. A real live promoter can get out the finest prospectus, giving the most wonderful account of the richness of his property (whether he has any property or not) and make it so plain that people seem to fall over themselves to buy his shares. This is, in fact, the reason why a legitimate enterprise often goes begging: an honest man will tell only the truth about his property, and when his prospectus is compared with that of the imaginative promoter, it seems very tame.

I hope to see the day when it will be impossible for any man to organize a company and slip through the meshes of justice after he has robbed a lot of innocent though ignorant shareholders. This will not be accomplished by enacting laws to curb the dishonest tactics of the polished promoter, but by an educational crusade upon the part of investors, who armed with the facts, will not be defrauded.

In organizing a company for the purpose of engaging in the business of mining, there is but one rule that should be strictly followed, and that is this: The investors should see to it that there is no possible way for a promoter to make a dollar except through the development of the property owned. If stock is issued to him, it should be securely held by some reliable trustees under a contract that absolutely prohibits any dealing with the company, and if the deposit is disposed of sufficient treasury shares to place it upon a basis absolutely self-sustaining, and, in fact, until the company is ready to begin the payment of dividends.

Why should an honest man object to this plan? Does the investor who purchases treasury shares have anything like the same privilege? Is he not, in fact, playing the same game as the promoter, if he sells out, covering at the expense of the investor?

Mines and Minerals of Southern Wisconsin.

Early History—Forms of Lead and Pyrite.

Galen and Trenton Limestone—Two Commercial Chances.

By Richard Kennedy, Highland, Wis.

Prior to the year 1815 little is known of the business in the region. That early date the Indians possessed a number of furnaces which they managed in their unsatisfactory manner.

The lead trade began to attract attention in 1822, and Mr. Jas. Johnson, a government contractor for the army, made a treaty with the Indians and obtained permission to work the mines. He let in other parties, and one firm named Stare made eight trips from St. Louis to Prairie du Chien, visiting the lead mines at Galena and at one time owned seventy tons of lead. Julian Da Hugue explored the lead region of the Upper Missisquoi, in 1819, and in 1822 and 1823 made eight trips from St. Louis to Prairie du Chien, visiting the lead mines at Galena and at one time owned seventy tons of lead. Julian Da Hugue explored the lead region of the Upper Missisquoi, in 1819, and in 1822 and 1823 made eight trips from St. Louis to Prairie du Chien, visiting the lead mines at Galena and at one time owned seventy tons of lead.

This was followed by a great rush of miners to Galena, something similar to the California excitement in '49.

STRUCTURE OF LEAD AND PYRITE.

Lead and galena is a simple compound of lead and sulphur in the ratio of 4.6 to 13.4. It is rarely free from foreign substances, but in this region attains a high purity, and is the highest grade of soft lead. All galena is more or less silver-bearing, but the Wisconsin lead is almost free from that metallic which crystallizes in its fundamental form, the cube, and also in the octahedral form. The corners of the cube are often truncated by the faces of the octahedron, thus producing a combination of the two forms. The cubes are often large and clustered and are thus graphically designated as "cog minerals." The smaller cubes are called "dice mineral." An interesting crystalline form of the mineral is known as reticulated galena. The faces of the crystal are not solid, but are formed of alternate flat and curved spaces that resemble, or at least parts of iron to 53.3 parts of sulphur and has a bright, brassy color and metallic luster. It crystallizes in the isometric system and takes a number of modified forms. Usually it appears in aggregates where the forms of several individual crystals are cemented by one another. The crystals are often flat and present a crust-like appearance.

In selecting a home for metallic ores and useful minerals, nature generally chooses one which bears deposits of sulphur or iron, or violent dynamic action. In the ore fields of southwestern Wisconsin and the adjacent territories, the dynamic agencies are abundant. Faults and dislocations are entirely absent, the only irregularities being the undulations of the strata which are the result of changes from the normal dip. The main lead-bearing formation consists of a stratum of magnesio limestone between 200 and 250 feet thick, lying nearly horizontal and forming the topmost rock throughout Wisconsin, and is known as the Galena limestone. When somewhat decomposed it assumes a crystalline granular form and often presents a banded appearance.

GEOLOGY OF THE REGION.

The great majority of the lodes assume an east and west direction, while a number take a nearly north and south course. The systems are...
SULPHURIC ACID POSSIBILITIES.

The lead and zinc district of Wisconsin comprises an area fifty miles long by thirty miles wide, and contains innumerable mines, the proportion of which are not yet developed. These range in the northeast and southwest direction. In addition to this 38 per cent of all the lead in sulphuric acid, making the supply almost inexhaustible.

In 1880, 55,000 tons of sulphuric acid supplied the demands of the United States. In 1882, 120,000 tons were required for different purposes in the same country. Of this amount 532 was used in the manufacture of butter, lemon juice, olive oil, and other products. The remaining 35 per cent was used in the arts of calico dyeing, iron and steel manufacturing, and many other purposes.

Sulphuric acid is the basis of all chemistry, and many and varied are its uses. But 10 per cent of the raw material used in the manufacture of this amount of acid was obtained in the United States. The remaining 90 per cent was imported from foreign countries. During the past few years larger quantities of iron pyrite have been used, and in a short time it is to be hoped that the United States will furnish the raw material for the manufacture of its own acid.

Hand in hand with the manufacturing of sulphuric acid is the making of fertilizing material, and it is a well-known fact that calcium is a necessary element for the growth of all cereals. Gypsum or calcium sulphate is used for that purpose in Michigan and in Iowa. In the blue limestone of the Trenton group the lead and zinc are recovered at the present time, and the residual purer of limestone, which is the high grade phosphate fertilizer of the South, is not used for its original purpose but is treated with sulphuric acid, will make a fertilizer that in the near future will meet the great demand for agricultural purposes.

The Mining Congress at Milwaukee.

The sessions of the International Congress at Milwaukee were held from June 19 to 22. In many respects the session was not what it should have been or what its promoters had intended to make it. A number of causes contributed to the failure of the sessions, the most of which were less harmonious than they might have been, owing to the interests of the various state delegations, and much time was lost in quibbling over unimportant matters, while the more important subjects of consideration received less treatment than they deserved.

B. F. Montgomery, of Colorado Springs, called the congress to order at 2:30 o’clock on the afternoon of Tuesday, June 19. The programme originally planned was not carried out in all respects, and the sessions were continued throughout the week. The evenings were given up to excursions and social gatherings, and interesting visits were made to the big shops of the Edward F. Allis Co. Abstracts from the best papers read at the congress appear elsewhere in this issue. It is a matter for regret that several of the speakers who had been advertised were unable to appear. At the Thursday session a discussion arose as to the representation to which various states were entitled in the congress. There was also talk about the establishment of a permanent organization.

The proceedings of the congress furnished conclusive proof in the minds of most of the delegates that a more permanent organization must be formed if the institution is to accomplish any considerable good for the mining interests of the country.

At the closing session, held on Friday, Boise City, Idaho, was selected as the meeting place for next year, and the following officers were chosen: President, L. Bradford Prince, Santa Fe, N. Mex.; vice-president, A. T. Ewing, Idaho; secretary, H. M. Ryan, Colorado; treasurer, Mrs. E. C. Atwood, Colorado Springs. Executive Committee: J. W. N. O’Hara, H. Haskell, H. C. James, Mnt.; Judge Iloe E. Oron, Dighton, Kan.; permanent organization.

A permanent organization was carried by the adoption of a report from a committee appointed to consider the subject. No provision was made, however, for the annual meeting of representatives, which will be taken toward this end before next year’s meeting. The report provided that the name of the organization should remain the International Mining Congress, with its objects—the fostering of fraternal relations among those engaged in mining and kindred pursuits, the advancement of mining interests, the improvement of mining laws, and similar aims. The membership is to be made up of representatives appointed by state executives and authorized organizations, and of individuals interested in mining, who shall pay the annual dues of $5.

Queen & Co. of Philadelphia, Pa., were successful bidders recently for several nautical instruments for which prices were asked by the United States Naval Department, securing the orders for three instruments for use at the League Island Navy Yard.

The Thriving Town of Bisbee.

Bisbee is now enjoying the period of the most thriving prosperity. C. H. Tyler, a resident of the town, was recently quoted on this subject, saying "The 1,369 miners employed in Bisbee receive in the neighborhood of $159,000 a month in wages. This large amount of money released in circulation every thirty days means something to a town of 5,000 or 7,000 people such as Bisbee is. The Lowell mine and the South Bisbee Mining Co. are getting good copper leads. Carumet and Hedea, owners of the Lake Superior property, who recently paid $699,000, so it is said, for some of Martin Costello's property, are likewise going to do a good business. Bisbee copper goes as low as seven cents per pound. The big mine is the Copper Queen, owned by Phelps, Dodge & Co. This property has about 165 miles of tunnel and 100 miles of railroad underground. It is estimated that the company has enough ore in sight for the next fifty years, which is a big thing in itself. The beautiful feature of the underground work was the opening of several caves. In one of these the Masonic conclave for Arizona was held several years ago. The natural interior arrangement of the cave made it an ideal place for secret lodge work, the beauties of the ceremonies being heightened by the electrical illumination arranged especially for the occasion."

The New Hendy Hoister.

The Hendy Machine Works of San Francisco, Cal., is at present making a number of sales of its new and superior design 8×12 double-cylinder single drum hoists. Through the courtesy of the company, we are enabled to present herewith an illustration of this hoist. The hoist has certain features of construction to which the builders are able to trace the reputation these engines have secured in the short time they have been on the market. The hoist is mounted on a solid steel base with standboard for the operator. The engine is reversible, link motion, and the drum is fitted with port breaks, which are sure, quick and safe in operation. Their compactness in design and the substantial and strong construction is particularly commendable. For severe and continued service, experience has shown them to be unequalled.

The columnar indicator is also a feature of the hoist, altering the manufacturers will furnish dial indicators if preferred. Clutch pinions are furnished as the purchaser may desire. The pinions are helical steel, thereby obviating vibra-
tion and at the same time lessening the likelihood of breakage. A better idea of the engine car can be obtained by a glance at the figure. The boiler as designed is 35 x 10 hoist, 55 HP.; Diameter of drum, thirty-two inches, excepting the filling flange; length of drum between flanges, twenty-four inches; diameter of drum between flanges, ten inches; height of boiler, five feet four inches; weight of boiler, single rope, usual size, 3,000 pounds; approximate shipping weight, 3,000 pounds; approximate railway weight, 8,500 pounds.

Roller engines of from five to seven inch cylinders, having cut gears and pinions can also be seen at the workrooms of the Joshua Hendy Machinists' Union. The layout also shows a large variety of double drum hoists.

The Cleveland-Cliffs Golden Anniversary.

On July 14 the Cleveland-Cliffs Co., of Ishpeming, Mich., celebrated the fifteenth anniversary of the commencement of its mining operations. The occasion was made a holiday in the mines. The exercises served to bring out much interesting historical matter about this interesting mine, which is the only one in the Michigan district that reduces any portion of its ore locally. The old Pioneer furnace, operated by the company, was the first iron from the Lake Superior region in 1856. The furnace was operated until the new stack was ready in Gladstone in 1866. The furnace has a capacity of 7,000 tons of iron daily, and besides the iron, the company operates a chemical plant for the production of quantities of wood alcohol and gray acetate of lime.

The company's original pay roll showed seventy-seven names. The pay roll for June, 1919, shows 1,200 names of men who had worked throughout the month. The old books showed that the average wages of the men in 1856 was $1 a day. In 1888, the average was $1.50. In June of this year, the average wage was doubled, that of the fifties. The company owns a handsome group of valuable homes, which are occupied by its employees, and it has a reputation for being especially watchful over the interests of its men and their families.


Judge Ross' Oil Land Decision.

An erroneous impression has been created by the publication of a statement, not long since, concerning Judge Ross' decision in the United States Circuit Court regarding the location of a tract of government land by parties holding scrip, and seeking to repudiate the mining claim by other parties. The decision has been construed as declaring that scrip land claims are not valid, but the decision is not to this effect. The case in question was that of the Olive Land and Development Co. vs. William H. Olinstead and others. It was alleged by the complainants that the ore discovered by their predecessor, J. H. Johnston, who obtained it through ownership of a mineral claim, was for a time after his death, turned and secretly claimed in the name of La Potente Mining Co. On May 1, 1899, prior to May 22, 1900, had conveyed the claim to the defendant, for $500, and in the Circuit Court, in passing upon the arguments, stated that as the case was the first of its kind to come before the courts with any likelihood of a decision, and as the case would probably be used hereafter as a precedent, and to further as much as possible the valuable industry, he had given the matter much thought and had advanced it upon the calendar in the belief that it was possible for the court to decide the case.

The court affirmed: "The settling upon the land as an agricultural claim was sufficient to hold it, even though later others should come along and have their claim recognized by the government, so far as to become a mineral claim without the filing of any claim and make the latter subject to the claim for the settlement of the land as a mineral claim."

There is nothing in the text of the court's opinion to support the idea that scrip land claims take precedence over mineral land claims. If the conditions had been reversed, and the state of the claim had been reversed, probably bringing forth the statement that mineral claims take precedence over scrip land claims.

A decree was entered in favor of the complainants, with, however, a provision to the effect that should the land department of the government at any time after the issuance of a patent for the selected tract, determine that the land was not vacant and open to settlement at the time of its selection, the operation of the decree should thereupon cease.

It must be understood that if a mineral claim is valid and all of the requirements of law are complied with, no scrip claim can supersede it. Scrip cannot select mineral land as the states, but it must be shown and proven that it is mineral land before one can prevent the scrappers from selecting any piece of land, and in fact, before one can claim it as mineral land and hold it against a previous decision of the same court an oil well must be sunk and oil will be set upon the ground before it can be held as petroleum placer mining ground. Scrip claims or other indications do not count.

An Automatic Lubricator.

We show herewith, through the courtesy of the makers, a cut of a lubricator designed to be attached to any reciprocating or oscillating part of engines, or machinery requiring constant and reliable lubrication as the crossheads, connecting rods or eccentric strips of engines, pumps, and air compressors, where a permanent and regular feed is essential. If a pump be under any load, or at any other part to which it is attached, in motion, and no feeding or loss can occur after the motion ceases.

The base of the lubricator is screwed firmly into the port to be lubricated in the usual way. The body is attached to the base by the union nut or enlarged ring at the top. When this is unscrewed the upper part is all taken off, together, the barrel is filled with a lubricant, the top applied and screwed, and the added dropper is indicated by the presence of the one opening for the pipe of the other side, the pipe attached to the lubricator may be made to take from one to six or more teeth of the boiler, with the barrels once scrip land claims.

The Year With Calumet and Hecla.

The Calumet and Hecla Mining Co. has just issued its annual report. As usual, the document is interesting as a matter of business. The Calumet and Hecla is in a most prosperous state of affairs in this famous mine. The production figures for the last five years are impressive. In 1914, the mine produced 6,000,000 tons of fine copper; 1,500,000 dollars in silver. In 1915, 4,500,000 tons of fine copper; 1,000,000 dollars in silver. In 1916, 3,000,000 tons of fine copper; 750,000 dollars in silver. In 1917, 1,500,000 tons of fine copper; 500,000 dollars in silver. In 1918, 1,000,000 tons of fine copper; 250,000 dollars in silver.

There have been paid during the past fiscal year for the employees of the Calumet and Hecla $2,200,000, which is equivalent to a payment of $8 per head per month. In the previous year, continued to push the openings underground both in the conglomerate and in the agglomerate. It is now in the process of completing a new opening at the south end of the mine. This opening is now complete, and the mine at the north end of the mine in the lower levels is not as rich as the upper levels, or in the central part of the mine, the quality of which has not changed.

The Calumet and Hecla have now reached a depth of over 1,200 feet in the No. 1 shaft, and have since last year opened No. 16 and 17 on the conglomerate, giving us a total of 2,600 feet on that belt. We have continued to dump agglomerate on the east end, and on the west end have built six additional buildings and have started the employment of new machinery to make the work easier.

The foundations for the new mill have been laid for an extension of the Hecla mill. It will contain six heads, and should treat 5,000 tons of agglomerate rock a day. It is equipped with a large boiler-house, and in addition to the boiler-house is equipped with two boilers, and the machine shop has been remodeled for better efficiency. The furnace is 32 feet long and 12 feet wide, with a capacity of 10,000 tons of ore. The water is supplied by a powerful water pump from a lake through a water main to the lake superior district. The results obtained thus far are satisfactory. The Hecla & Torch Lake Railroad has been extended to the head of Torch Lake, where we intend to erect a timber mill during the summer. We have purchased a large amount of ore and have been working on the completion of the railroad.

At the Lake Linden smelting works a new mineral is being mined. In addition to the boiler-house is equipped with two boilers, and the machine shop has been remodeled for better efficiency. The furnace is 32 feet long and 12 feet wide, with a capacity of 10,000 tons of ore. The water is supplied by a powerful water pump from a lake through a water main to the lake superior district. The results obtained thus far are satisfactory. The Hecla & Torch Lake Railroad has been extended to the head of Torch Lake, where we intend to erect a timber mill during the summer. We have purchased a large amount of ore and have been working on the completion of the railroad.

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The Cost of Calumet Copper.

A noticeable feature of the annual report of the Calumet and Hecla is the absence of specific information concerning the exact cost of production. This is a point upon which the Calumet and Hecla's officials are never very explicit in their statements. However, there has been an effort to put two and two together and determine the approximate amount of the cost of production in the report. It goes about Its little task in arithmetic in this way.

Interest always attaches to the cost of making Calumet copper. The report does not give information by which the financial status of the company can be determined. Gross or net receipts are not given, and no information is offered as to the amount of rock stamped out at the annual cost per pound. However, it can be approximated by averaging the price received during the year, deducting any increase in the surplus or paying any decrease, and dividing the remaining result by the pounds of copper produced.

According to the average price of copper received: The report states that the price of copper varied from 14.80 to 16.25 during the fiscal year ended April 30. The open market price for this period by months was as follows:

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<thead>
<tr>
<th>Month</th>
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Assuming that the Calumet received an average of 14.75 cents for its output last year, we have gross receipts of $7,012,600, divided equally $3,506,300 to the owners, $3,506,300 to the coupons paid, $5,242,300 to the stockholders, and $5,242,300 to the employees.

The Gold Fields of the Yaquis.

Charles Erickson and Harry Tharoldson, both of New York, who have been prospecting in the desert mountains for two or three years, have returned to the United States claiming that they have located the famous gold fields of the Yaqui Indians. When in Phoenix recently, they exhibited large quantities of gold taken from placers at some point along the southern side of the Sierra Madre Range, in the lower portion of Can- dual County, Arizona. They said that they were well paid for their labor, and that they are now working the mines.

The General Subject of the ore bounty is brought up by the report of the productive stage of the new iron fields of the Rainy district, which is being hasted by the extensions of the Ontario and Rainy River Railroad. As the time for producing comes near, these iron fields are beginning to wonder what they are to do with their ore. The Chronicle says:

"The problem here is in connection with this subject is the utilization of our own ores for the production of our own iron rather than to sell wholly or in part into the manufacture of articles which we use in any shape. For the iron shall be produced from our own raw material, and not from material imported from other countries. Our first step in establishing the iron works is to control the manufacture of those articles that we need, from a needle to a steel tool, then, having control of these articles, to launch out and compete in the markets of the world."

The Montana School of Mines.

The Montana School of Mines at Butte will begin its college year on the second Tuesday of September. A serious lack of funds has delayed the opening of the school for the present time, but it is now hoped that the institution can open and offer the courses of study which its organizers have carefully arranged. The location of the school in one of Montana's richest mining sections where many big works and mills are in practical operation gives it many advantages over many other institutions of its kind. The general Director of the school is Nathan R. Leonard, acting president, and professor of mathematics, recenty the professor of chemistry and metallurgy, a graduate of the Western University of Massachusetts; and the first year instructor in chemistry in the Case School of Applied Science in Cleveland, and two years later instructor in chemistry in the University of Michigan. Chas. H. Bowman, professor of mechanics and mining engineering, who has attained considerable distinction as a lecturer and inventor on
mechanics and engineering subjects; Dr. Alexander Winchell, professor of mechanics and mining engineering, a graduate of Harvard University, and an expert United States mining engineer; and Dr. John H.Attwood, expert in the chemical and mineralogical analysis of the mineral of the Government of the Parthenon.

SANTA FE ROUTE TO USE OIL AS FUEL: It is reported that the operators of the Atchison, Topeka & Santa Fe Road have decided that all locomotives can be converted to burn oil, and will prepare for the use of oil fuel. The road will consume about 720,000 barrels of oil a year, which, at an average price of $200 more or less as oil in California, all engines operated between Barstow and San Diego, and would consume annually an amount of oil.

The company finds oil cheaper than coal, especially as it owns its own oil-fields.

Latest Mining Decisions, specially prepared for THE MINING AND METALLURGICAL JOURNAL.

The place of an expatriation in a mine, and its cause, and what, if any, negligence the owner is guilty of, are questions for the jury, when evidence offered requires their submission to the jury. Deserunt v. Milwaukee Railroad Co., 41 Fed. Rep., No. 86. 1

The duty of a mine owner as to ventilation of his mine is a general one that is made imperative by the act of Congress of March 3, 1893, and the consequence of neglecting it cannot be made the basis of unreasonable damage or strict liability. Deserunt v. Celilo Coal Railroad Company, 29 Idaho, 567. Under Rev. St. U. S. c. 2299, requiring the discovery of a vein or lode within a quarter claim before any rights or interests can be acquired therein. It is enough to entitle the dissemoner to protect his mining rights if ore or metallic rock is found in place sufficient to warrant a prudent man in spending time and money on it, though it may be discovered only in infrequent quantities. Muldrick et al. v. Brown et al., 61 Pac. Rep. (Ok). 423.

Instructions as to the duty of a mine owner with respect to ventilation of the mine and keeping it clear from standing gas are erroneous, where they are incorrect. Use of ventilation or other instructions that they tend to confusion and misapprehension, and when they make their duty relative instead of absolute, as required by the act of Congress of March 3, 1893, making the test what a reasonable person would do. Instead of the command of the statute. Deserunt v. Celilo Coal Co., 22 Idaho, 567. Under Rev. St. U. S. c. 2299, requiring the discovery of a vein or lode within a quarter claim before any rights or interests can be acquired therein. It is enough to entitle the dissemoner to protect his mining rights if ore or metallic rock is found in place sufficient to warrant a prudent man in spending time and money on it, though it may be discovered only in infrequent quantities. Muldrick et al. v. Brown et al., 61 Pac. Rep. (Ok). 423.

TRADE NEWS.

Edw. Helen of Railraid, York county, Pa., is in the market for steel rails, tracks, shafting, and pulleys.

The Standard Gold Mining Co. of Doholongo, Co., will sell a 135-stamp mill. H. D. Ingersoll is manager.

P. E. Finzel and Ellis Merrill of Oakland, Md., have organized a company to develop gold and silver properties near Lomacoma, Md.

Zinc properties near Knoxville, Tenn., are to be developed by J. E. Lutz, J. C. White and others. A $250,000 smelter will be erected.

J. A. Robertson of Monterey, Mex., is reported to have organized a company, with a capital of $1,000,000, for the erection of a smelting plant at Monterey.

It is reported that M. Guggenheim's Sons, whose head office is at 30 Broad Street, New York City, contemplate making extensive additions to their zinc concentrating and smelting plants at Monterey, Mex.

The American Steel & Wire Co. is planning to erect a large mill in the Mountain States. The complete works will constitute the largest steel and wire mill in the world, and will give employment to about 10,000 men.

AMONG THE ENGINEERS.

M. B. Philips of Los Angeles, Cal., has been to Denver on mining business.

H. M. Kimmon of Denver, Colo., has undertaken a commission in the Comstock mining district in Arizona.

Courtenay de Kalb of New York has been in Helena, Mont., looking up a number of properties in the Rimini district and preparing a report upon them.

Professor E. C. Linderman of Denver, Colo., has completed an examination of the Toledo Avenue Co.'s properties in the Comstock mining district and has pronounced the property one of the best in the district.

PERSONAL.

President Chas. S. Guthrie of the American Steel & Wire Co., is on an extended trip through Europe.

Edward Van Vernon of Los Angeles, Cal., has resigned his position as chief inspector of the charge of a quartz mill for a mining company.

A. J. Perceval of Spokane, Wash., has been in New York, n.e., and is organizing a syndicate to operate Washington mining properties.

C. G. CARRIERS of Colville, Wash., has been engaged to survey and direct the course of development on the Black Jack mine on Gold Hill, north of Myers Falls.

Benton Orbison, for five years superintendent of a Chicago mining house, has been given the appointment of foreman of the American Steel Castings Co. at its Alliance, Ohio, plant.

R. E. Barkley, a Salt Lake City mining opera- tor, has gone to Chihuahua, Mexico, to perfect his title to several recently acquired mining claims in the Chihuahua district in the Sierra Madre, and he has visited the firm of Crowell & Fock, chemists and metallurgists of Cleveland, Ohio, to obtain information to be of great interest to his new property near Richmond, Va.

Herbert A. Blackston of Boston has been in the field for the Cambria Mining Co., of which he is a stockholder. This company has bought the Cross-Cut and Hatchell mines in the Winnemucca district.

Captain E. E. Rogers of Cleveland, Ohio, one of the principal owners of the Manso mine near Pearsall City, Ida, has recently been in the mine examining the property and watching the installation of a new 5-stamp mill and 40 HP. boiler.

Leslie B. Bendig, manager and general superintendent of the Alexander Copper Mining Co. of West Virginia, has been in Sil- ver City, N. Mex., and has secured valuable deposits.

The names of T. H. Bixler and W. G. W. Badeau are now made public at the Wyoming-Pacific City Mining Co., of which he is a stockholder.

The mining of Seattle, Wash, and A. F. Judd and J. L. Morrill of Los Angeles, have been at Fort Ewing, Alaska, in search of valuable prop- erties. They represent a number of capitalists who contemplate organizing a company for the development of the southeaston-ore properties.

President Charles M. Schawb of the Carnegie Steel Co. has announced that he intends to put up a building in Pittsburg for the A. J. Joseph Prom- torate and Industrial School. In addition to erecting the building, Mr. Schawb will regularly pay the salaries of all the institution.

W. R. Keys, president of the California State Mining Bureau, recently went to Resiland, B. C., and is to study mining properties. Part of the work of Mr. Keys is to give expert testimony in the law suit be- tween the Iron Mark Co. and the Central Star Co., which will be tried in September. David B. Buckley of Denver, Colo., will also act for the Iron Mark Co. in the suit.

C. Rhodes, manager of the New Zealand Mining Co. of New Zealand, has been in Utah and other Western States studying miners in the ad- ores of his mines. He has visited several branches of the American Smelting & Refining Co. and has seen the big operations of the Consolidated Kanan City Smelting & Refining Co. at Argentine, Kan.

J. A. MacDuff, formerly connected with the bridge and construction department of the Penn- sylvania Steel Works at Harrisburg, Pa., has suc- cessfully in mining information from Shanghai, China, that he is safe and in good health. Misses was reported a few weeks ago that he had been killed by the Boxers. He is an instructor at the Chinese University at Tien-Tsin.

CORRESPONDENCE.

CALIFORNIA.

(From Our Special Correspondent.)

Randsburg, Cal., July 19, 1899.

Work has commenced of the new Dolerite at Goler on the Yellow Aster well. J. J. Brown received the first oil. The gunner has announced the company to arrive, and the pipe is all laid to the main at Randsburg, which it is understood, will be increased to 100 stamps. It is now thirty stamps.

The new Randsburg Exploration Company, which has 600 employees at work, expect to employ in various responsible positions, are prospectors, drillers, and other employees, to mine and expect to mill not less than 100 tons of ore during the month of August. In milling this ore they will try the new process which is only used in China. When the coal proves all right it will be used at the Goler pump as a regular diet.

A large number of mining and milling companies are being bought and talked of, and the indications are that there will be a vast increase in mining activity the coming season.
MINNESOTA.

(From Our Special Correspondent.)

NEEDLES, July 18, 1899.

The increased capacity in the Yellow Aster and twenty-five smaller producers, with cheap local coal and plenty of clean water is bound to give an important lift to the development and prospecting, which will be earnest and successful.

A large tonnage of ore being indulged in as to the location of a number of proposed through railroads. When and where one will be built will be for the F. & P. and the other lines, if any, several years ago.

Considerable ore is being shipped and milled at Barre, the entire cost of shipping and milling combined being but $2.75 a ton.

Sangamon is leading a sale of their enormous properties between here and Borax Lake through Doyce Bros., of Los Angeles.

MISION.

(From Our Special Correspondent.)

NEEDLES, July 10, 1899.

Needles is fast becoming a mining center. The river is now navigable for ninety miles above Needles to the Gulf of Arizona territory, and when the Government appropriations that have been secured are utilized, navigation will extend northward much further. The whole length of the river passes through one of the richest mineral belts in the Union. Santa Fe4 has invested the entire amount of its capital in mining, and the company will do all that is possible to promote mining and industry in this district.

The river steamer Cochran, of 120 tons capacity, has been busyly engaged transporting mining machinery and supplies between the various mining camps, and its prospects are very flattering for a greatly increased business.

MICHIGAN.

(From Our Special Correspondent.)

BUTTE, July 21, 1899.

Developments at the Champion mine have been most satisfactory and the wisdom of the managers in the fullness of time has already demonstrated. All four shafts will be equipped. Before many months have elapsed, we should see the Champion mine in full blast. The company is in a position to supply rock for one or two heads of stamps which will be available for the company’s use until its own mill can be constructed. The Champion may be built by reference to the mouth of Grass Rat river, seven miles north of the Atlantic and U.S. A branch of the Copper Range road will be run out to the Champion mine.

The Copper Range road has made arrangements by which it will operate the Atlantic and Lake Superior Mining Co. mines from the mouth of the Michigan River south of the Atlantic and U.S. A branch of the Copper Range road will be run out to the Champion mine.

MISSOURI.

(From Our Special Correspondent.)

BUTTE, July 21, 1899.

Continued improvement is announced in the zinc ore market, and prices are advanced. All grades of ore are advancing $1 a ton during the week except fancy grades, which brought, in the preceding week, $35 to $40 a ton in the mine. The price was again paid for all the ore produced at the Independence mine near Joplin. The Eagle mine, in the Monongahela range, has added force from 100 to 300 men, and will remain comparatively inactive until next year.

Ten men were killed a few days ago in the Clark mine by an explosion of dynamite in a drift. The mine is the property of the American Steel & Wire Co. and had begun to ship for three weeks before the accident.

WASHINGTON.

(From Our Special Correspondent.)

SEATTLE, Wash., July 20, 1899.

The report of the Puget Sound Fish Commission, made at Seattle, for the fiscal year ending June 30, shows that in that time 6,000 deposits were made aggregating $2,600,326,53. This is more than double the amount received for the year ending June 30, 1898, when deposits numbered 4,249 and represented $960,962.54.

The deposits by months in the past year were respectively: January, 6, 002; February, 9,567; March, 12,465; April, 4,196; May, 10,845; June, 14,019; July, 8,465.

The amount with the largest deposits was last August and the smallest last May. Since June 30, deposits amounting to one and one-half million dollars, as against four and a quarter for July, 1898. It was expected that the receipts for July would reach $6,000,000.
ONTARIO.

(From Our Special Correspondent.)


The mining activity at Sault Ste. Marie is continuing at a high rate, and the present rate of shipments will be maintained throughout the year. A number of new mines are being developed, and the beginning of the season will be delayed until the spring. The most important of these is the Sault Ste. Marie, owned by the Kingston and Toronto Mining Company.

On July 15 the first ore of copper was shipped from the new mine, and the company expects to ship 2,500 tons daily.

The mining district of Sault Ste. Marie is now a busy place, with over twenty mines in operation. The town is rapidly growing, and the population is expected to reach 10,000 by the end of the year.

ALASKA.

Valuable mining properties near Yakutat have been located by a California company. The property consists of 20 claims, and the company has already invested $50,000 in the property.

The claims are situated in the vicinity of Yakutat, and the company plans to develop them on a large scale. The company has already purchased a large amount of machinery and equipment, and plans to begin mining operations immediately.

The mineral deposit is a rich one, and the company expects to recover over $200,000 in gold and silver within the first year.

The mining district is a busy place, with over ten companies operating in the area. The population is expected to reach 5,000 by the end of the year.

ARIZONA.

Charles E. Udall is managing the Mowrey Copper Company's mine in the Old Havasupai district, in the Arizona mountains. The company is working a large property, and plans to develop it on a large scale.

The mining district is a rich one, and the company expects to recover over $500,000 in copper and silver within the first year.

The mining district is a busy place, with over ten companies operating in the area. The population is expected to reach 5,000 by the end of the year.

COLORADO.

The Forest City Co., at Empire, has been mining for the past three years, and is now ready to start operations. The company has already invested $25,000 in the property, and plans to recover over $100,000 in gold and silver within the first year.

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CALIFORNIA.

U. Vater of Victor has just completed a five-stamp mill with eight cyanide tanks and several concentrators. The plant will soon be in operation.

The mining district is a busy place, with over ten companies operating in the area. The population is expected to reach 5,000 by the end of the year.

GENERAL NEWS

ALABAMA.

H. C. and W. B. Reynolds of Hinton will soon begin the development of 10,000 acres of coal land in the area.

H. S. Jenkins and others of Montgomery have acquired the McDonald mine near Carbon Hill. The mine is situated on the Railroad, and is expected to be developed on a large scale.

Coal mines in Winston county will be opened in the near future by the Delmar Mining Co. of Decatur.

The Sloss mine No. 1, at Birmingham, was damaged by fire. The mine is now being worked, and is expected to be in full production by the end of the year.

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315

yielded ore that ran as high as ten ounces to the ton. The officers of the Union Gold Mining Co. of Colorado Springs express considerable satisfaction over their new venture, which has just been begun. Development for the past year showed 2,918 feet of drifting, 1,349 feet of cross-cutting, and 39 feet of stoping in the region of the Pike's Peak vein, 1,207 feet. Total receipts for the year were $57,526.03, and the total net profit was $9,097.10.

W. R. Foley has purchased the Keystone at Cripple Creek mining district, has begun a new shaft house to replace the one destroyed by fire a few weeks ago, and the shaft is now down to a depth of 270 feet, and the cross-cut, being driven from the 256-foot level, is showing most excellent results.

The Nevada Gold Mining Co., operating on the top of Strata mountain, in the Cripple Creek district, has begun a new shaft house to replace the one destroyed by fire a few weeks ago. The shaft is now down to a depth of 270 feet, and the cross-cut, being driven from the 256-foot level, is showing most excellent results.

MICHIGAN

A net profit of $10,000 for the shareholders of $10 a share is shown by the books of the Tamarack Mining Co. for the first six months of this year, after deducting $5,750.00 in construction charges on the shaft and all other bills paid. If the company can secure the same average price for ore as in the years preceding, the total net profit should be $12 a share for the year, or total of $32.

The engineers expect to reach the Calumet saddle by the end of the year. The shaft, 300 feet sink, is yet to be developed, and the management does not count on hoisting rock from this shaft until next July, although a large increase in production is anticipated.

The lease of the Volunteer mine at Palmer by the Cleveland Cliffs Iron Co. was not renewed at its expiration on June 30, because the principal, Mr. Russell A. Ainger, declined to extend the lease, having decided not to have the mine operated longer on royalty. It is expected that the fee owner will work the mine themselves as soon as favorable.

Oto M. Davidson, of Commonweal, Wis., has closed negotiations for the purchase of the Bennet mine for his company, Oglesby, Norton & Co., of Cleveland, O. Captain G. L. Woodworth has been engaged in charge of the property. The mine is almost ready for production, but work will not be rushed until the rock is able to be handled. Mitchell & Powell, of Marquette, have secured the contract for removing, crushing, and loading the ore on a car at the Helen mine. They have a force of about thirty men at work. They have set up a No. 8 ore breaker, bought of the Great Western, and have 200-HP, engine. They are looking for 300 laborers to form day and night gangs.

MINNESOTA

It is now expected that the Mahoning mine at Hibbing will make a record output of 1,900,000 tons of ore this year. This pit covers thirty-three acres, and in some places the ore bed has a depth of 60 feet. Two benches are at work, and both benches are working at the present time, and neither of them has been cleaned out. The first bench is irregular in depth, but the second bench covers three-hundred acres, and is from this that most of this season's product will be taken.

Captain Harry Roberts, of Duluth, has bought a one-third interest in the Pay mine, situated just north of Virginia, Minn. The other two-thirds are held by Mr. H. C. Sholes, of St. Paul.

The owners of the Spruce and Cloquet mine at Eveleth, in the Union district, and the Kimberly, near Virginia, have made contracts by which all their ores will be handled by the Duluth, Mesabi and Northern Railroad.

MONTANA

Stories of wonderful discoveries come from a mine near Hamilton, owned by the Diamond, Christopher Muller and his son, Henry, formerly of Champion, Mich., own the property. On one visit to Helena they collected $3,000 from the smelter as the proceeds of four tons of ore. The ore is in narrow seams, sometimes dwindling to a quarter inch in width, and it is a valuable and rich that they are almost virgin gold. The small amount of quartz in the vein is in strips and nuggets assaying 15 an ounce.

The bond and lease of the Justice mine at Rimington, owned by Ewen and Livingston Co. (from Davis, Bushett and Hadad). A shaft will be sunk at once, and work will be vigorously pushed. The mine, which at present shows an ore chute averaging six feet wide. The ore is rich enough to make this site will make it handsomely.

The Galt Mining Co. held its annual meeting at Nelson last week, and the following officers were elected: W. J. Oehms, of Nelson, president; F. C. Brown, secretary auditor; F. T. Brown, F. J. Keenan and Thomas, of Nelson, directors. The company is preparing to put the 20-stamp mill now at the Iowa mine at Quartzburg in operation, and it is expected that the value has been wasted by the past treatment of the ore. The metal that is ground very fine, it is found, gives the best results. The War Eagle Co. will put in a new chlorination process in which electricity is used, and this will be helpful to the company's owners.

The Helena Independent is authority for the statement that the Coeur d'Alene Co. of Idaho has recently made a clean-up amounting to $800 in bullion after a few days' run. After a year or two of experiments with this process, the owners say that they are now treating ore running only $14 a ton and still make a clear profit of 52% a ton.

NEVADA

A persistent rumor is in circulation that John W. Mackay has bought the Silver Peak mine. Although the story is denied officially, there seems to be a good deal of information to the belief that Mr. Mackay will soon be the owner of the famous mine. He has been in the vicinity and sampled the mines, and is fully aware of their richness.

There is still at the Silver Star mine, in sodavale, has been running on Bounce ore. The owners are opening up the stopes, cutting out stations and driving a new shaft 800 feet, and it looks like a mine of a high order. This mine, which is believed to be the most valuable in the district.

NEW MEXICO

Although the Edison experimental placer plant at Desillas is not actually in operation, the prospectors connected with it can be induced to say anything about its operations. Above the works a high fence has been erected, to serve as a check upon the curiosity of visitors.

A big strike is reported at Rosedate, one of the old camps of Socorro. The strike was made in the Whitecap mountain. The ore is 80% silver and is excellent.

A new gold mine has been made by John Hunter in the Hunter group, in Shingle canyon. The formation is granite and is an area of about thirty acres, of the mile and iron ore so general in the district.

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OREGON

J. C. Aiken and H. W. Miller, of Roseburg, and others, are developing the Umpqua group of mines in the Roseburg mining district, which are associated with them are J. M. Drennen and W. F. Burlison, well-known miners of the Sumpter district.

SOUTH DAKOTA

The Cook & Parlier cyanide plant at the mouth of the Big Horn is now bringing results, and recently made a clean-up amounting to $800 in bullion after a few days' run. After a year or two of experiments with this process, the owners say that they are now treating ore running only $14 a ton and still make a clear profit of 52% a ton.
The ore is from the Omega mine at Terraville. The success of this establishment is a most sig-
ificant step for the mining industry in this region. The mine is located in Summit, Pen-
ington county, is owned by J. C. Sherman, and raises his placer gravel by an endless con-
veyor, which enables him to handle several hun-
dred tons of gravel per hour. Four inches wide, the gravel will run fifty cents a cubic yard.

John Harlan, general manager of the Portland mine at Cripple Creek, Colo., H. O. Quast, of Cripple Creek, and Mr. F. J. Hill, from Denver, are expected to inspect the celebrated Blue Lode copper property with the intention of taking a hand in the development. Copper and gold developments west of Rochford, in Pennington county, are under development by the American Gold & Copper Mining Co. and the Black Hills Copper Co. Each company has already obtained considerable interest in its respective property. The interest of the West is great, as several hundreds of acres of mining ground through which well-defined verticals of copper and gold are exposed. Shafting 500 feet deep will be sunk by each company.

The Big Hill mine, 7 miles southeast of Custer county has been sold to Denver parties for $30,000. The mine has been closed for nearly twenty years. When it was last operated, a bare beginning was made with meager results.

Northwest of Custer is the North Star, which Eugene W. Nettles, of Spear, has about 500 acres of ore sufficient for shaft sinking at $3.50 per foot. This is 500 feet on an east-west strike of rich ore. In several localities silverite ore has been found.

Another purchase reported is that of the Grand Junction mine by Montana miners. From the 150-foot shaft, 670 feet deep, 800 tons of ore have been shipped, eighty-one feet to the hanging wall, and west sixty feet in ore. It is said that this is the largest body of high-grade ore ever discovered in the hills, the price of the ore being reasonably low, rivaling the Homestake in Lawrence county.

UTAH

The expense incurred by the erection of a new 300-ton smelter of the Bingham Mining Co. will be paid from treasury cash and from the proceed of $150,000, 7 per cent debenture notes. The outlook for the Bingham property is considered excellent. Underground developments are all that could be desired, and the work on the new smelter is being pushed in a most satisfactory manner.

It is rumored that the owners of the Johnny mine are considering the possibility of transferring their property to a London company. Frank Wills and others who are interested in the Johnny mine have been seen at the smelter, which is said to be $300,000 or more. Victor M. Clement, representing a London syndicate, has been at work in the district. Mr. Clement claims that the Johnny has already exposed ores to the value of about $50,000, and he expresses the confidence that the ore chute is continuous.

During the last two months the new aerial tramway between the Mammoth mine and mill will be built. Surveys for the tramway were made by B. G. Gillies. The tramway will have a car-
rying capacity of 800 pounds to a bucket, and 250 buckets a day. The distance from the mine to the mill is 4,800 feet, and the difference in eleva-
tion is 350 feet. It is estimated that the work will cost $100,000, but the company is of the opinion that the ore is worth at least $150,000. The tramway will be pushed out on the east side of the mine, and the ore will be hauled to the mill by a conveyor.

Smelting & Refining Co., in Utah, will be located at Murray, Utah, about 15 miles from Salt Lake City. The mill will be built to handle 600 tons of ore per day, and will be completed immediately, to be followed by the breaking of ground for the foundry, and it is intended that the works will be in full operation within a year.

The Humbing recently marketed a carload of ore in Salt Lake City which brought $2.50 per cent. copper, $6 in gold and $4 in silver. There is a rumor that the mine is rich in silver, and that the company is ready to ship.

The Silver Shield, of Bingham, Utah, has been sold to the owners of the Silver Crown, of ore carrying about thirty-five to forty per cent. copper, thirty to forty per cent. copper, silver and silver.

It seems to be settled that the United States Mining Co. are to have a big smelter at Bingham.

The findings made by the expert who recently ex-
amined the property show that a good profit can be made from the ore. The company expects to have ore of 50 per cent. gold and 40 per cent. silver in the ore. The property is expected to be in operation before next spring.

WASHINGTON

The twenty-third district vein has been struck in the Palmer Mountain tunnel, in the Okanogan district. The last strike shows gold ore assaying from 30 to 45 per cent. of gold and silver, yet it is not stated if the vein has been definitely determined. Other veins passed through were from three to five feet wide, giving values of from $4 to $10 in gold and silver. The operators will extend the tunnel clear through the moun-
tain. Mr. Walker will postpone drilling until the tunnel is finished.

The tunnel on the property of the Rosalia Min-
ing Co., on Juno Mountain, has been driven in excellent ore. W. R. Ward is the superintendent. He recently said that the tunnel had a depth of over forty feet, and that the face is in good ore similar to that which assays in the shaft from $12 to $15 per ton. The vein is from fifty to sixty feet in width, part of the vein is two-beneath-four inches on the floor, and twelve inches at the roof. A large body of high-grade ore has been discov-
ered on the Black Jack, which is located on Gold-
field hill, two miles south of Wally's Falls. Although this property has been prospected and developed for some time, no paying body was found until the last week of July. The mining district is located in a gold mining area.

Eastern capitalists, represented by Herbert B. Moore, of New York, have just purchased the property of the California group of O'Brien creek, in the Republic district. The properties will be operated by the California Consolidated Gold Mining Co.

C. W. Thompson, president of the Washing-
ton Gold Mining Co., at Tacoma, Wash., has issued a circular letter dated July 1 and ad-
dressed to the company's stockholders. He says that since cross-cutting the fifteen-foot vein, the engineers have driven fifty feet to the Surprise vein, which has been continuously showing an unabridged fissure from the mouth of the tunnel. The character of the ore in the mine, Mr. Thomp-
son says, is getting better all the time. Valuable ore is constantly being added to the dump, and the survey for an electric road is now in prog-
ress.

Dr. E. Pittock of Spokane, has decided to rush development work on the Hardrockable group, which is owned by the company of which he is president. This group consists of four claims and adjoins Free Claim group on Silver creek, seven miles from Sump-
ter.

The manager of the Quartz mine at Republic has purchased a diamond drill outfit which he will use for exploratory work. The ledge through the quartz does not permit of tun-
eling to a great depth, and it is supposed that the work will be done mainly by vertical shafting. The ore is reported to be of high grade.

The reports from Battle Lake state that the richest strike yet made is from the Lone Fisherman mine, where a depth of six feet the vein has been opened and shows copper ore of high grade. There is much excitement in Battle Lake, and it is said, is a solid mass of mineral. The owners be-
lieve they have considerable high grade ore.

Reports from Battle Lake state that there is a silver deposit on the Jackson and the Mill Creek, about five miles west of the town. On the Mill Creek, three experienced miners who have been pros-
pecting in the vicinity for several weeks. They report large quantities of silver.

BRITISH COLUMBIA

At an extraordinary general meeting of the Rathmines Mining Co., Ltd., recently held in Roseland, it was decided by a unanimous vote to reconstruct the company under the name of the Rathmines Mines, Ltd. The company has a stock of $760,000, divided into $2,000,000 shares of a par value of ten dollars. The capital of the company was expected to be in operation before next spring.

Grand Forks has recently been excited over the remarkable showings of free gold reported from the Crow Valley district. The property is owned by Mr. G. A. Fraser and Henry Ellis, of Grand Forks. The work of Mr. and Mrs. Fraser, of the Grand Forks, has been entered into the mining field at Nelson, by acquiring through T. G. Proctor a bond on the Ophir mine, situated on the Crow Valley. The bond is reported to P. J. Henry to sink the present shaft fifty feet. Cross-cutting will be begun as soon as work is finished, with the purpose of establishing the main lead. The ore is of friable, free-milling character. Mr. Proctor has also leased the Drum-
mer property for another syndicate, and extensive preparations will immediately begin on this property.

A company known as the Emily Edith Mines, Ltd., has been organized to operate the Emily Edith mine near New Denver. The chairman of the company is Beaumont Leather of London. Other officers include W. B. Smith, W. P. Wensley and H. B. Ratcliffe. Chas. E. Hope will be local manager, and J. D. Kendall consulting engi-
ngr., whose capitalization is the largest of which will be held by Englishmen, is $76,000. It has been definitely decided to increase greatly the capitalization of the company because of the increased production of the Le Roy No. 2, and the expected output of the Le Roy No. 3. The present capacity of the smelter is 600 tons. New batteries of boilers have been ordered at the smelter, and a new engine is also ordered. The new plant will double the present capacity of the establish-
ment. It is hoped that it will be ready for use before the middle of September, and in the meanwhile the company will operate the existing pro-
perities which cannot be accommodated at North-
port, is sent to Trail. Of the properties of the British company, London capitalists, has an option on the property owned by Fletcher Bros., within three miles of the Kalo city railway, at Kalamalka, the ex-
amining the property and making several promising assays. Mr. Powlman started for London with a bag of samples, and he is expecting to inform the Fletcher Bros., in a short time by cable whether the option will be taken.

MEXICO

There is much interest in Hermosillo and there-
abouts over the reports of the discovery of a clay deposit of unknown extent in the Penin-
sula of Lower California. The new mining dis-
trict is far removed from settlements and by no means easy to access, but it is reported that the district consists of an area of about 250,000 acres of placer gravel, though more definite confirmation of this report will be depended on before there is any very great movement of population toward the area.

Adam P. Handford, of Quincy, Ill., is in Chihu-
hapsa, Chihuahua, engaged in the development of a big copper claim. A rich copper belt has been located in the Sierra Madres, near Carreras, Chihuahua, San Juan, Juarez, and a number of other and considerable gold. A title to the property has been purchased by R. L. Urlich, of Utah, who will or-
ganize a company.

A new company has been formed to work a copper claim located on the Colorado, John L. Melford, a representative of the company, says that they have a three-foot vein with ore running from 15 to 20 per cent. copper, and a thick deposit of silver to the ton.

It is considered likely that in the near future there will be two large smelters at Torreon. One will be built, it is believed, by Torreon, Saltillo and Santiago, and the other is likely to be built by Robert S. Towne, president of the Campana Metallurgica Mines.

An English company, represented by Pollard & Foster, has acquired an interest in the San Raymon mine, in the Ocamaca district, in western Chihuahua. This mine has for sixteen years been worked by Lewis Harriford, who now
IRON AND STEEL

THE CARNEGIE FARM YARDS: The Carnegie Co. is extending the freight yards of its Homestead works to provide storage for 2,000 additional freight cars. This development will make the company the most extensive private freight yards east of the Mississippi. Many of the biggest railroad companies have larger yards.

STEEL BARGES FOR THE MONONGAHELA: Jones & Laughlin, Ltd., of Pittsburgh, are to have a new fleet of steel barges to be used in carrying coal, coke and iron ore on the Monongahela. The barges will be towed with cargoes of slag in the bow and loaded with coal in the stern. The company on their return trips will carry coal and limestone to the company's works.

A RECOVERY: The net loss of $2,500,000 distributed to the employees of the Edgar Thomson Steel Works of the Carnegie Steel Co. at Braddock, Pa., has been recognized as the first major victory of the steel industry in recent years. The history of the plant. The workers are getting the benefit of the increased price of steel rails and an increase in the price of coke, which was at the rate of $35 a ton. A year ago the men were paid $20.40.

QUIET TIMES AT BELLEFONTE: The big furnaces at Bellefonte, Pa., operated by the Empire Steel & Coke Co. and the Bellefonte Furnace Co., are closed down at present. No date is set for the opening of the former, while the latter will remain closed indefinitely. The ore bins in 1,000,000 tons. These furnaces have a capacity of 1,000 tons a day and are the only three furnaces in the vicinity are idle and 400 men are out of work.

WAITE'S AIR LIFT: The American Steel & Wire Co. has resumed operations on its big wire mill at Waukegan after a long shutdown, caused by last fall's fire. The number of men at work was small at first, but will be greatly enlarged. One mill at the rolling mill which was shut down in December opened today, and another will be in operation in the near future. The steel mill will be in full operation by the end of the month.

AMERICA'S LARGEST HOME-MADE FREIGHTER: The "American," the largest ocean freight steamer ever built in this country, was launched at the Black Ball Line, in Baltimore, July 14. The American is 425 feet over all, fifty-one feet beam and thirty-four feet six inches draft. Her gross tonnage is 5,896 tons. She will have two masts and two derricks, seven water-tight holdheads and three decks, and will be driven by a vertical triple-expansion engine. She is being made for the American Hawaiian Line.

TAUNTON'S FIRST ELECTRIC LOCOMOTIVE: On July 7 the Taunton Locomotive Mfg. Co. shipped the first electric (current) electric locomotive. The machine was for the Whitin Mfg. Co. of Whitinsville, Mass. The Taunton Co. has been building electric locomotives with power furnished by storage batteries. The new locomotive will be used for freight cars in the Whitin yard, and it is thought that it will be much cheaper than the ordinary steam for the same service.

BRAEBURN STEEL CO.: This company, at Braeburn, Pa., have been busy in building up the nearly finished steel mill, and have completed the erection of the bridge which spans the Schuylkill River. The plant is being run on full time at present, and steel plate, bars, sheets and bars are being shipped. The plant is constructed on a most economical basis, and is so arranged that all raw material is brought in at one end and finally leaves the building through the other end in finished form without rehandling.

HOPPERS TO ENGLAND: The English iron market has not shown the same decline that our overproduction has precipitated, and there is little slackening in the demand for pig iron at Birmingham and Sheffield. Many English manufacturers think the present disparity in prices continues, substantial shipments of American iron will undoubtedly be made today to American and English merchant, who recently negotiated in person on this side with some of our iron masters, is said to have made inquiries and the number is considerable.

TESTS OF RUSSELL'S ARMOR PLATE: On the proving grounds of the Bethlehem Steel Co., the first test of Russell's armor plate being made there for many months ago. The plate tested was the Krupp process plate, curved for use as the turrett armor of the Russian battleship "Czar." The plate is made of Cramp. Four 25-pound projectiles were fired from an 8-inch gun at ranges ranging from 1,061 to 2,938 feet, second, and the greatest penetration noted in the plate was two and one-half inches and the least one and one-half inches.

BUSY TIMES AHEAD FOR LAKE SUPERIOR: Iron Ore of Ishpeming, Mich., says, While there is considerable talk of curtailment in the iron mines of the Lake Superior district, there will be twenty million tons of ore sent from lake ports and by all-cargo rail lines at the rate of nearly forty per cent ahead of a similar period last year. There has been a tying up of some of the big iron mines in the area, the high lake rate has brought in some of the vessels which have been out of the ore-carrying trade for a season or more which are to be sold as barley, that such conditions will not last indefinitely, and that the boats will be able to handle all the ore the consumers will need until the spring of 1907, and that the future will be bright.

A CHEERFUL VIEW FOR THE FUTURE: Rogers, Brown & Co., whose marked letters on public iron cannot be recognized as among the most confident on the subject from week to week, say in their latest report: This is a good time to be optimistic. There is a number of favorable factors of enormous proportions; they are well known, but have been persistently ignored. Some day we will look at them, we will discover that our wheat crop after all will bring more money to the country than the last year's, that the corn and cotton crops will sell for more than ever, and that there is no stopping our colossal growth of exports. That, after six months of imagined depression, our railroad earnings and bank clearances (speculation aside) are still the greatest in the world. We are building, developing our vast resources and using iron as before.

ALABAMA EAGER TO RESUME OPERATIONS: A late dispatch from Birmingham says: The iron business is still very quiet, with no hope for immediate improvement. The furnaces men believe that the bottom figure has been reached, but they are in doubt as to the time. The export movement, also, is improving, a little, some good orders to be delivered in the very near future. Nothing definite is given out as yet concerning the rolling mills of the Republic Iron & Steel Co., as to when they will resume operations in this section. The news that the Republic Co. had signed the scale for their mills in the Pittsburg district gave the people hereabouts some hope that the same would soon be the fact here, but so far nothing definite to report. The repair work on furnaces in this district is being kept up, and there are a number of men who will shortly be in condition to be fired up when the operators desire.

STEEL MILL, AIRLORD TIRS: With the heavier rails, larger engines and cars, and other severe conditions of service now imposed on railroad steel, it is said that the replacement of the old wooden sleeper with something more in keeping with modern times. The question being promptly answered by a majority of engineers still favor wood without regard to condition. The experiment is going on with steel ties, and some expert railroad managers are already convinced that the new ties are the preferable favor. One such tie in actual use today on the Huntington and Broad Top Ry. (Pennsylvania) is reported to be worth three dollars, whereas the same ties, three years ago, cost more than $3. In large quantities, these ties were formerly made at less cost than less than this. Advocates of the ties contend that it keeps the track more securely and persistently in line and surface, and at the same time cuts down the cost of devices.
The company will build a rail- road to connect the operations of the branch of the Southern Pacific with the coal fields.

WOOD REPORTS FROM RANDSBURG, CAL.: It is said in Randsburg, Cal., that the coal beds fifteen miles west of that place are showing indications of development. Shorty after work was commenced on the deposits, the washing of the seams resulted in the extraction of 30,000 tons of coal in 12 months. Although this is considered as an encouraging beginning, it is said that the coal is not of a quality that is desirable for high-grade coal.

In the weeks ahead, the company plans to continue development of the seams and to increase production through improved mining methods. The company is optimistic about the future of the mine, but remains cautious about the potential for rapid growth.

NEW INCORPORATIONS

The following companies have been incorporated in the state of Missouri:

- SANGO MINING CO., St. Louis, Missouri. The company was founded in 1890 by a group of local investors to develop coal deposits in the area.
- NORWOOD MINING CO., Carterville, Missouri. The company was established in 1895 to exploit coal reserves in the southern part of the state.
- WYOMING MINING & MILLING CO., Grandy, Wyoming. This company was incorporated in 1896 to mine and mill coal in the Wyoming area.
- FOX MINING CO., Mauston, Wisconsin. The company was founded in 1897 to mine coal in the Mauston district.
- DRAGH MINING CO., Akron, Ohio. This company was established in 1898 to mine coal in the Akron area.
- TIPPECANOE COAL CO., Cleveland, Ohio. The company was incorporated in 1899 to mine coal in the Cleveland area.
- PERRY OIL CO., Lima, Ohio. The company was founded in 1900 to produce oil and gas in the Lima area.
- NICE COAL CO., Big Run, Ohio. The company was established in 1901 to mine coal in the Big Run area.
- OHIO & KENTUCKY LEAD MINING CO., Columbus, Ohio. This company was incorporated in 1902 to mine lead in the Columbus area.
- THE VICTOR OIL, GAS & MINING CO., Mount Victor, Ohio. The company was founded in 1903 to produce oil and gas in the Mount Victor area.

The incorporation of these companies marks a significant milestone in the mining industry of Missouri. Each company brings a unique set of resources and expertise to the field, contributing to the growth and development of the state's mining sector.
MINING STOCK QUOTATIONS IN VARIOUS MARKETS

Maurice Sanderson writes from Aix la Chapelle that he has had an interview with Henri Coopman, a coal broker in Verviers, Belgium, who purchases annually 200,000 tons of coal, and who expresses an opinion that he has been able to deliver American coal to Antwerp, Belgium.

The Bituminous branch of the industry is reasonably prosperous, though the conditions are not uniformly good. The George’s Creek strike still holds its slow upward along the market, so that clearly in sight. Clearfield coal commands about $2.50 per ton on New York Harbor ports.

The production of Coke continues to fall off, and the price keeps steady with production. Foundry coke sells for $2.25-$2.50, and furnace for $2.75 and even less. No marked change for the better is expected until general conditions in the iron market improve.

DIVIDENDS DECLARED

The Daily West Mining Co. has announced its regular quarterly dividend of twenty-five cents a share, payable July 16. This means a disbursement of $75,000 during the current quarter, and out to its stockholders since the first of the present year, and $120,000 since October.

A semi-annual dividend of three and one-half cents per share, preferred stock, payable July 26, is announced by the Huntington & Broadtop Mountain Railroad & Coal Co.

The Pittsburg Coal Co., of Pittsburgh, Pa., has declared a dividend of one and three-quarters per cent on preferred stock, payable July 25.

The stockholders of the Pueblo Smelting & Refining Co. have received a final dividend of $2.75 a share, bringing the total distribution to stockholders in the winding up of the company's affairs, to $121.25.

The Boston & Montana Copper Mining Co. declared a dividend of 14, which brought the total dividend distributions of the company up to $15,725,000. The directors are expected to declare another dividend of at least $3 a share in November, making 40 for the year 1900.

DEMAND FOR COAL IN BELGIUM: Consul Brundage writes from Aix la Chapelle that he has had an interview with Henri Coopman, a coal broker in Verviers, Belgium, who purchases annually 200,000 tons of coal, and who expresses an opinion that he has been able to deliver American coal to Antwerp, Belgium.

Consul Brundage says that agents of bituminous coal, semi-bituminous coal, and coke seekers from foreign markets should at once correspond with him, quoting prices and analyses.
WANTED

Advertisements of this class containing not more than five lines are inserted for not exceeding three months in any year, free of charge, for all paid-up annual subscribers. Other than above, 20 cents a line. Advertisements not accepted for less than one month.

A SAYS MILLERS to correspond with us in regard to Minerals and Crystal Groups for Cabinets. Best prices paid for fine cabinet specimens. ROY HOPPING, 1294th Ave., N. Y.

WANTED—Position as superintendent by pushing and up-to-date mining engineer, who understands all branches of mining and milling gold ores. Has his own assay outfit, and would be willing in a small mine to do the assaying and surveying. Address: D. P. A., Mining and Metallurgical Journal Office.

CHEMIST, age 31, with University training and excellent references, desires position with mine or smelting works. Address: J. W. FELL, Ashville, N. C.

AN EXPERIENCED assayer and bullion refiner with the best of references, several years' experience, and a university training, desires employment with some mining company. HAROLD FRENCH, Los Angeles Office, M. & M. Journal.

EXPERT hydraulic and steam engineer, experienced in transmission of power by electricity, desires position. Colorado or Montana preferred. Address: E. C., Mining and Metallurgical Journal.

FOR SALE

A MINING engineer, with camping and assay outfit, would be glad to join a prospecting party on reasonable terms. Address, PROSPECT, Mining and Metallurgical Journal Office.

WANTED: PARTNER or Co. to open coal mine near RANDSBURG. Tres veins, the third being nine feet, four feet solid coal, 101 feet from surface. Two first veins opened with shaft. 1,600 acres discovered along the rim of field. F. H. HEALD, Randburg, Cal.

ENGINEER and Metallurgist of long experience, fearless, energetic, trustworthy, seeks position; managing, erecting, operating or developing. Speaks French, German, Spanish and excellent Chinese. Exceptional testimonials. Will go anywhere. Address, MINERIO, Mining and Metallurgical Journal Office.

FOR SALE

REMAIN Two-Steam Mills at Tucson, Arizona. 15-HP. Boiler Pump, and everything complete, set up ready for work. In excellent condition; used less than six months. Address: DREDGING MINING MACHINERY CO., Kansas City, Mo.

A LARGE Gold deposit. Will average $10.00 fine gold. Sufficient for Clyde process. Twelve miles from railroad, in Arizona. Terms reasonable. Address: M. P. DURRELL, El Paso, Texas.

FOR SALE—Manganese—An immense deposit of high-grade manganese ore; close to S. P. R. R., and but a few miles from the Pacific Coast R. R., which connects with Port Harford, where large vessels can enter. Address: Box 20, San Luis Obispo, Cal.

230 ACREs of patented land in one of the richest localities in California for gold mining. It is quartz property, can be worked by tunnels. Has plenty free timber; clear water. Three miles from railroad. This is a bargain. Address: Box 209, Placerville, California.


COAL LANDS FOR SALE CHEAP—10,000 acres best coal land in Westmoreland County, Pa., convenient to water and railroad. Three openings already made. Particulars upon application. SAMUEL BARDENKIRCHER, 767 Hillside Ave., Cleveland, O.

PENNSYLVANIA COAL LAND FOR SALE—20,000 acres within 18 miles of Pittsburgh, on river and rail. Veneer to seven feet. All mine openings would be self-draining. Detailed description furnished. SAMUEL BARDENKIRCHER, 767 Hillside Ave., Cleveland, O.

FOR SALE—Near Birmingham, Ala., a large iron mine. Iron hematite ore. 25-foot vein; average 85 per cent. Also fine vein of silver and copper. For particulars, address G. W. WRIGHT, Crosshead, Texas.

INDLY NOTICE

...our...

Book Announcements

ON PAGE XXIII.

BUYERS' GUIDE

Our Buyers' Guide is arranged to assist those who expect to purchase machinery or supplies in the mining business in finding the right manufacturer and exactly the address of the leading dealers. A special copy addressed to this paper will bring you the catalogues of manufacturers arranged under every classification.

AIR COMPRESSORS

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Kearney & Trecker Co., Chicago, III.
H. W. Mansfield, Colorado, III.
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Plattsboro Mining Machinery, W. F. alsch, Chicago, III.
Ball & Langeland, 8th & Larg Co., Chicago, Ill.
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Fairbanks, Morse & Co.

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Announcement

To My Friends in the Mining World:

I take pleasure in announcing to you that I have opened an office as Consulting Mining Engineer, at 225 Byrne Building, Los Angeles, Cal.

My work and study of the Geology of Southern California, and especially of the Oil Formations and Industry, for the past ten years will enable me to assist and advise, if you wish to make investments in Oil or Mines in Southern California.

On any stock or land which I advise you to purchase you can depend that I have made a personal examination of the lands of the companies, and have investigated the character and standing of the officers and directors, and consider them in my class.

When you are in Los Angeles I will be pleased to see you, and if you cannot visit Los Angeles write me for any information pertaining to Mining, Mining Engineering, Mining and Oil Investments and Stocks.

I am in a position to secure any of the Oil or Mining Stocks at the lowest prices, and will make purchases for you of any stock you may wish.

J. F. MILNER, M.E.
California Vigorit Powder Co.
MANUFACTURERS OF...
Dynamite High Explosives and "Vigorit Low" Blasting Powder
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For Concentrates, Lime, Slag Rock and Clay.
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"IMPULSE" WATER WHEEL
The latest and best Water Wheel, the "Impulse." Used by the best engineers and pronounced the best.
Highest Efficiency. Best Mechanical Construction.
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For Drying Everything Mechanically
Concentrates, ores, coal, bricks, clay, etc.
No Steam is used
Hundreds in Operation

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For Mining Purposes
OPERATED BY
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Reports on Mining and other Properties.
Proprietors of Weekly Anglo-American, a first-class Advertising Medium. Established 9 Years.

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or some other kind of a mine that you intend to equip with machinery, but do not know where to get the best machinery cheapest, or what kind of machinery is best suited to your proposition and your pocket-book. If so, write us, for it is our business to give just such information—in our reading pages usually—but cheerfully by letter if you are in a hurry.
THE MINING AND METALLURGICAL JOURNAL

OUR Water Purifying Chemicals need no introduction to Mining Engineers, to whom we take pleasure in announcing that we have recently removed to a new and much larger factory. The capacity of all of our departments has been increased, and we will hereafter analyze free of charge all samples of boiler scale sent us.
GEO. W. LORrD,
238 to 2420 N. Ninth St.,
A valuable book on Water sent on application.

Improved Bone Ash.
This 100% better than Bone Ash now being used; will absorb more lead, will never crack or split in the stoves, can be dropped before or after using without breaking. Can be cut, molded and used at once; no drying required. Excessive heat has no effect on them. Will stand shipping for distances. It takes up none of the precious metals in melting. Copper and gold quicker. Sent under a positive guarantee or money refunded. Now being used by all smelters and assayers who have tried it.
Price of Improved Bone Ash, $60.00 per ton; $8.50 per 100 lbs.; or manufactured Copels, $1.50 per hundred.
CUMMINGS & SWEARS, Sole Mfrs.
10 Stevenson Street
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For Sale by Justinian Caire Co., 521-523 Market Street
Dealers in Assay Goods and Mining Supplies
The Johnston Patented Pipe Wrench
Our 24-Inch Wrench is the Best Tool of its kind in the World
A STRICTLY HIGH-GRADE TOOL—DROP-FORGED—WARRANTED

We Carry in Stock:
Lathes, Shapers, Planers, Drill Presses and Iron Working Machinery of all kinds.
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Estey Wire Works Co.
Manufacturers of Every Variety of Wire Cloths of Brass, Copper, Iron, Galvanize, and Steel Wire of all meshes and grades. For Mining, Milling and all other purposes.
65 Fulton Street, New York

Eastern Prices
Improved Facilities, Finest Work, Lowest Prices.

Perforated Sheet Metals
For Fours and Rice Mills, Grain Separators, Shaker Screens, Gravel and Cement, Stamp Batteries, Iron, Steel, Russian Iron, American Planch, Zinc, Copper and Brass Screens, for all uses.
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The Cleveland Mining and Stock Exchange Co.
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The Gold Medal Fuse Cutter and Cap Crimper (Combined)
Fastens Cap and Fuse firmly and water-tight. Result, no misfires.

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P. & B. Roofing put up in Rolls to lay 200 square feet, with Paint and Nails. Absolutely Acid and Alkali Proof.
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The New Standard CONCENTRATOR

establises a

NEW STANDARD FOR
CONCENTRATING ORES.

It effects a larger saving of mineral.

It requires less attention, has greater range of adjustment, and requires a less amount of water.

It is the lightest running Concentrator ever made, requiring less than one-quarter horse power.

THE NEW STANDARD CONCENTRATOR has fewer working parts than any other ore concentrator.

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