MENOMINEE RANGE HISTORY – IRON MINING – ARDIS FURNACE AND GALENA FURNACE

[Compiled and Transcribed by William J. Cummings]

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 12, Number 31 [Thursday, December 19, 1907], page 1, column 1

100 TON FURNACE

———

PLANS PREPARING FOR ERECTION IN IRON MOUNTAIN CITY.

———

Work Will Commence on Structure Early in New Year – Meeting of Capitalists in New York.

The Press can state authoritatively that Iron Mountain is to become a pig iron manufacturing center.

Architects are now engaged in making the plans for a blast furnace to be erected here.

The furnace is to be erected in the northern part of the city near Lake Antoine.

Work on the furnace will commence before the New Year is many weeks old.

It will have a capacity of one hundred tons of pig iron each twenty-four hours, and its erection – if all is well – will be followed by others of larger capacity.

But one furnace is sure!

It will be built along modern lines, permitting of great economy, and will smelt the low grade iron ores of the district.

An important meeting of capitalists interested in the furnace company is being held in New York city *[sic – City]* to-day *[sic – today]*.

The Press will give full information in later editions.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 12, Number 33 [Thursday, January 2, 1908], page 1, column 4

Work Commenced.

Work has commenced on the new blast furnace, mention of which was made in The Press two weeks ago. It will be erected on the old waterworks property, near Lake Antoine, and the stone pump-house will be utilized in the construction. The contract for the steel stack and other machinery has been let to the Prescott Iron Works, of Menominee. The furnace will be of one hundred ton capacity and will differ somewhat from furnaces now in operation. The ore for the furnace will be mined in the Randville district. John T. Jones is the leading spirit in the enterprise.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 12, Number 45 [Thursday, March 26, 1908], page 1, column 4

New Blast Furnace.

Contracts have been let for the necessary machinery for the new blast furnace now being erected in the first ward by John T. Jones and associates and some of the material is now arriving. The buildings and foundations are in readiness for the machinery, including the crusher plant, and it will be erected as rapidly as it can be assembled. Mr. Jones told The Press last Monday that he expected to have the furnace in operation early in July.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 12, Number 49 [Thursday, April 23, 1908], page 1, column 6

At the Furnace.

MENOMINEE RANGE HISTORY – IRON MINING – ARDIS FURNACE AND GALENA FURNACE

[Compiled and Transcribed by William J. Cummings]

The machinery for the new Jones blast furnace commenced arriving this week and will be erected with all speed possible. Work on the buildings is being rushed to completion. The concrete work was finished this week. There are thirty men and a number of teams at work. It is expected to have the entire plant finished in less than two months. Arrangements for the mining of ore will soon be made.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 4 [Thursday, June 18, 1908], page 1, column 3

FURNACE TO START

———

MR. JONES EXPECTS TO CHARGE STACK IN A FEW WEEKS.

———

Seven Patents Covering Methods of Treating Ores Secured – Success Beyond Unqustion *[sic]*.

The non-arrival of machinery has delayed the starting of the Jones blast furnace, but it is now expected to charge the stack early in August. Several carloads of machinery were received yesterday and the work of erection is progressing rapidly under the personal direction of Mr. Jones.

The people of Iron Mountain are deeply interested in the success of this enterprise and developments are eagerly awaited. Should Mr. Jones' methods of treating the low grade ores of the district prove successful as he anticipates, and The Press has every confidence in the inventor, it means that Iron Mountain will ultimately become an important iron and steel manufacturing center, with furnaces and mills employing hundreds of men.

Mr. Jones has been successful in securing patents upon all the machines and devices he will employ in making steel direct from the ores. The patents are seven in number, as following:

Dephosphorising ores.
Treating ore.
Ore smelting furnace.
Dephosphorising iron ore.
Treating iron ores.
Forming ingots.
Treating copper ores.

Mr. Jones has already demonstrated in a smaller furnace that his patents will be successful – that he can make steel billets direct from iron ore at a very low cost in comparison with the present methods of making pig iron.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 5 [Thursday, June 25, 1908], page 1, column 2

Power for Furnace.

George Irving, superintendent of the Iron Mountain Electric Light & Power company, left last Sunday evening for Chicago. While in the western metropolis he purchased the necessary equipment for the extension of the power line to the new furnace and the work of erection will commence forthwith. The purchase included over four miles of wires. The Electric company will supply the Furnace company with a current equal to one hundred and fifty horse power during the day time and fifty horse power at night.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13,

MENOMINEE RANGE HISTORY – IRON MINING – ARDIS FURNACE AND GALENA FURNACE

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Number 7 [Thursday, July 9, 1908], page 1, column 4

Attracts Visitors.

Felix A. Vogel, general manager of the mining interests of Ladenberg, Thalmann & Co., arrived in the city from New York city *[sic – City]* this morning. The object of his visit is to investigate the merits of the new furnace now being erected by John T. Jones. Another recent visitor was Charles J. Langhren, of Silver City, New Mexico, secretary of the Comanche Mining and Smelting company, and a gentleman representing large zinc mining interests in New Jersey.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 8 [Thursday, July 16, 1908], page 1, column 2

The Furnace.

The machinery for the new Jones furnace has been received and the work of erection is going forward rapidly. The pipe is now being lined and this work will be finished in short order. It is now expected by Mr. Jones and his assistants to have the furnace completed by the first of August. In the first run it is expected to smelt the lean ores from the Randville field, several hundred tons of which have already been mined.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 8 [Thursday, July 16, 1908], page 1, column 4

WISHES MR. JONES WELL.

———

Editor of Ishpeming Paper Pays Deserved Tribute to Popular Citizen.

Had the world listened to John Jones, of Iron Mountain, there might have been fortunes won from that range (Mesaba) by many people who now have no interest therein. Mr. Jones was one of the first to discover the real merit of that district, which he upheld in the fact of much opposition from many quarters. He did a lot of work stripping the surface at the Biwabik mine, the first to be given attention in that field, but he finally had to desist as had many others when the severe panic came which closed many mines and took many fortunes. Mr. Jones is now working upon a furnace which he believes will turn out steel directly from the ore, eliminating the expensive intermediate processes now observed. We hope he will win. He deserves to for all his hard work, his great faith and his never-ending exertions. He is making trials with his new invention at his home in Iron Mountain and many friends hope it will make him a millionaire. – Ishpeming Iron Ore.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 10 [Thursday, July 30, 1908], page 1, column 4

Found Good Ore.

The Jones furnace people have proven up a goodly deposit of iron ore about two miles east of Randville. At a depth of about seventy feet the drill cut a large body of fifty-seven per cent ore. This is covered by a blanket of lean ore running about thirty-seven per cent.

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Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 12 [Thursday, August 13, 1908], page 1, columns 2-4 with photo of Ardis Furnace

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 11 [Thursday, August 6, 1908], page 1, column 5

NEWEST RAILROAD

———

THE IRON MOUNTAIN SHORT LINE IS NOW BEING ORGANIZED.

———

To Build a Road from Section Thirty-One Over the Hill to the New Jones Smelting Furnace.

The Iron Mountain Short Line Railway.

This is the name selected for a railway corporation now in course of organization in this city.

It is expected that the articles of incorporation will be in readiness for filing with the proper authorities before the end of the week.

The organizers of the railway company re the capitalists interested in the erection of the Jones furnace for the smelting of ores.

The railroad will extend from abut the center of Section 31 to the furnace near Lake Antoine, a distance of about one mile, going over the hill to the east of the city.

Section 31 is controlled by the furnace interests and is known to contain immense deposits of low grade iron ore.

This is another spoke in the wheel which means the up-building of Iron Mountain as one of the most important and largest iron manufacturing centers in the country.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 14 [Thursday, August 27, 1908], page 1, column 6

The Furnace.

The smelter at the Ardis furnace has not been charged with ore as yet, but it is expected to make the first test within ten days. The test has been delayed by Mr. Jones in order to give the auxillery *[sic – auxiliary]* a thorough "try out." This has been done and some minor defects in the power plant are being remedied. Mr. Jones is taking no chances of a possible failure. He is confident of success.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 20 [Thursday, October 8, 1908], page 5, column 4

The Ardis Furnace.

It isn't to be wondered at that the experimental smelting plant of John T. Jones, of Iron Mountain, had a blow up that put it out of commission for a short time. Such accidents mark the introduction of nearly every new venture of this kind. The gas generator was not the proper kind, and went bad. This has no bearing upon the principles involved in the experiment, however, as stable gas machines can be had. It was one of the features not given careful attention, but it is one easily corrected. In all such new ventures there is apt to be weak spots in construction, but which may be remedied.

Naturally, there are many who believe the furnace will be a failure, and they talk of

thermal units and other things with much misgiving, but there are those who as firmly believe that they can be no failure, the inventor having surmounted every obstacle. Iron Ore *[mining trade newspaper]* sincerely hopes that Mr. Jones will prove his smelter to be all he hopes for. Should this be the result it will be a fine thing for him and associates and for the town of Iron Mountain, which would become a great manufacturing center. Mr. Jones, with his usual loyalty and energy*[,]* has promised that his home town will be made a hummer in case he makes good. According to his belief the lean ores will be given attention and can be treated at a fine profit with the market for iron much lower than the present quotes it. There are millions of tons of ore in this class in the Lake Superior country that can be had at a very low price, and the successful treatment of these grades would be of enormous benefit to the region. So all the district hopes that Mr. Jones will not be disappointed. – Iron Ore.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 21 [Thursday, October 15, 1908], page 1, columns 1-2

TEST SUCCESSFUL

———

ARDIS FURNACE PROVES THAT MR. JONES' SYSTEM IS CORRECT.

———

Step Process of Treating Ores That Will Revolutionize the World of Iron and of Steel.

Friday should have no terrors as a day of ill-luck in the future for the people of Iron Mountain.

Friday, October 9th, 1908, will always be a notable one in the history of Iron Mountain.

It marked the date of the first successful test of the Ardis furnace, the invention of John T. Jones, and the passing of Iron Mountain from a mere iron ore mining town – from a town practically without any parked prosperity or prospect of future greatness in view into the promised land of a prosperous manufacturing city.

It can be said that every expectation of the inventor was realized in the preliminary test. So successful was the test that all criticism has been silenced.

Mr. Jones' furnace does not make pig iron, as has been often stated in the public prints.

The system of treating ores covered by a dozen or more patents granted Mr. Jones is what he designates as the step process. It consists of first taking the oxygen and phosphorous out of the ore by running it through an ordinary cement kiln, leaving the silica, lime and earthy constituents still attached to the ore. A pure hematite ore contains seventy per cent of iron and thirty per cent of oxygen. If this class of ore is put through the tube the resultant metal would be absolutely pure, but as the earthy constituents in all ores will run from two to forty per cent. this is still with the iron sponge as it comes out of the tube. The temperature necessary to remove the oxygen is 1,400 degrees Ferenheit *[sic - Fahrenheit]*. The temperature necessary to fix the iron sponge so it will not reoxengize *[sic – re-oxygenize]* is 2,200 degrees F. The oxygen is taken out by the hydrogen and the hydrocarbon gases. This consists of the first step.

The second step consists in removing this mass of de-oxygenized ore in a mass

of about one ton to a Lauth *[sic]* balling furnace. The temperature in this furnace is raised to 3,200 degrees F (wielding heat). It is then removed to what is known in rolling mill practice as the hydraulic squeezer, which squeezes out the remaining slag and earthy constituents. This slag will contain about eighteen per cent of iron in the form of a silicate of iron. As the value of the iron unit in the low grade ores controlled by Mr. Jones are worth only about one cent a unit this loss is not a material one.

This ball is now squeezed into a bloom and rolled into a product which is called muck bar. This muck bar can be cut and piled and rolled into the ordinary bar iron or can be remelted in an open hearth furnace.

As the second step of the process is an oxygenizing one, the small sulphur *[sic – sulfur]* content, which may come into the sponge, can be eliminated in this furnace. In all cases the phosphorous content forms a combination with the hydrogen and passes off with the gases.

Mr. Jones is certain that, with his process, one ton of bituminous coal will deoxygenize ten tons of forty per cent iron ore. It will then take about six hundred pounds of coal to run the balling furnace to put this product to muck bar, a total of 1,250 pounds of coal. To be more explicit, 1,200 pounds of coal to make one ton of muck bar. In the present methods employed in making pig iron it requires 3,600 pounds of coal to the ton of ore. In the Jones method 1,200 pounds of coal to ten tons of ore.

The last run made at the furnace, last Friday evening, was ten tons of ore, and the expectations of Mr. Jones, as recorded in the above figures, were fully realized.

The first attempt to produce a proper gas by fluxing the ash in the coal was a failure. The run recorded was made on a temporary reconstruction of the gas kiln. Mr. Jones is now engaged in making the permanent gas producer and as soon as this work is completed the furnace will enter into commission.

The test established that, instead of taking four hours as was estimated in the preliminary plans for the furnace, the deoxygenizing occurs in from twenty to thirty minutes. The new light on the subject is that it is a condition of gases and temperature and not the time of four hours as estimated.

The field of operations for the Jones furnace is not confined to the treatment of iron ore alone. It can be applied equally as successfully to the low grade copper ores. It will metalize copper the same as iron. There are millions of tons of low grade copper ores in the southwestern states which can be treated successfully and cheaply. The Press understands that Mr. Jones and his associates, in addition to their holdings of iron lands, also control many thousands of acres of copper-bearing lands.

The Ardis furnace – named in honor of Mr. Jones' youngest daughter – was erected at an expense of about $75,000. It is the result of many years of study and experimentation. The system of treating the ores is covered by a dozen or more patents granted to Mr. Jones during the past year – after he had demonstrated in a smaller way that his theories were correct. The systems have been patented in all the foreign countries, many thousands of dollars having been expended in this direction. The furnace is destined to revolutionize the iron business of the world. This may sound very brave, but the test has established the truth of the statement.

The Ardis furnace has a capacity for manufacturing 500 tons of iron daily. A blast furnace, such as now used in the Pittsburg district, manufacturing an equal amount of pig iron, would cost from

$1,500,000 to $2,000,000 and would require several years to construct. And a blast furnace with a capacity equally that of the Ardis, would consume three times the amount of coal.

The possibilities of the Jones invention is *[sic – are]* almost beyond comprehension. And, too, it will metalize copper and other ores equally as successfully and cheaply as iron ore.

The Ardis furnace resembles in no particular the modern blast furnace. Instead of a "stack," rigid and perpendicular, it is a horizontal tube that rotates. The tube is 120 feet long and nine feet in diameter and elevated at one end. It is lined with fire brick. The ore is fed into the elevated end of the tube and as the tube revolves it slowly passes to the other end, from which it comes in the form of sponge iron.

That his home city shall derive every benefit possible from his invention is the determination of Mr. Jones. He is freely predicting a city of 50,000 inhabitants within a few years – a city containing steel manufacturing concerns of all kinds. Mr. Jones has already organized and incorporated a railroad to bring the lean ores from the hills in the east and south portion of the city to the furnace.

Mr. Jones and his associates have incorporated many mining companies. They have secured control of tens of thousands of acres of lands containing millions of tons of ore. The lands controlled are in Michigan, Wisconsin, Minnesota, far to the south in Texas, Alabama and North Carolina and in the Canadian provinces.

The people of Iron Mountain as a whole congratulate Mr. Jones upon the success of his invention. And the people as a whole will be "tickled to death" if it earnings *[sic – earns]* for him a fortune of Rockefeller dimensions!

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 22 [Thursday, October 22, 1908], page 4, columns 1-4 (photograph of the Ardis Furnace, Iron Mountain; photograph of John T. Jones, Inventor of Furnace)

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Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 23 [Thursday, October 29, 1908], page 1, column 2

The Furnace.

The Ardis furnace plant is to be enclosed with an immense steel building the contract for which will be let at once. The building will be the largest in the city. It will be over one hundred and twenty feet long and about forth feet in width and of unusually *[sic – unusual]* height. The erection of the building will permit the operation of the furnace during cold weather.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13,

Number 24 [Thursday, November 5, 1908], page 1, column 5

A BALLING FURNACE

———

JOHN T. JONES HAS ARRANGED FOR IMMEDIATD *[sic]* CONSTRUCTION.

———

Contract Was Let Yesterday to the Prescott Company; the New Furnace Costs $10,000.

John T. Jones informed The Press yesterday that he had let the contract for a balling furnace and construction work would commence at once.

The balling furnace is the second step in Mr. Jones' process of treating iron ores, recently fully described in The Press. The balling furnace treats the product of the first step furnace, recently satisfactorily tested, and prepares it for the squeezer. The product of the first furnace will in future references be designated as "sponge iron." The product of the second step furnace – the balling furnace – will be known as "muck balls." These balls will weigh from four hundred pounds to a ton each.

The contract for the balling furnace has been let to the Prescott Iron company, of Menominee, and it will represent an expenditure of about $10,000. It is a rotary furnace. It will be ten feet in diameter, and eight feet in length.

Work is now in hand in the way of erecting a temporary shelter at the Ardis furnace. The building will be eighty feet in length, thirty feet in width and twenty feet in height. It is the intention of Mr. Jones to operate the furnace throughout the winter. Two thousand tons of ore are now in stock at the furnace and arrangements have been made for an ample supply from mines controlled by Mr. Jones and his associates.

As was to be expected, the skeptic is still doing business in his comments anent *[about; regarding]* the furnace. The process is so revolutionary that the old blast furnace expert is loathe to admit the success of Mr. Jones' inventions. The same conditions have confronted all great inventions, particularly in the conservative steel trade, but the admission of success cannot be much longer postponed.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 25 [Thursday, November 12, 1908], page 1, columns 1-2

ADMITS POSSIBILITIES

———

Iron Trade Review Finally Devotes a Little Space to New Furnace.

(From Iron Range Review.)

The new "step process" of reducing metals from the ore, invented by John T. Jones, of Iron Mountain, has been much discussed. The following is the first information to be given out authoritatively concerning this process and the furnace that has been designed to carry it out. Up to this time, all of the operations of the furnace have been purely experimental both as regards the mechanical and chemical propositions to be worked out. These experiments have not involved the principles upon which the process is based but have had to do with the regulation of temperatures, speeds and gearing, and the character and operation of the gas producer. Now it is claimed that a sufficient tonnage of ore has been successfully put

through the furnace to establish the correctness of the principles involved, the economy and practicability of the process and the rate at which the product may be shipped.

The character and arrangement of the plant comprises principally a horizontal rotating furnace and a gas producer. The process consists of the reduction of the metallic oxides of any ores to the metal and applies therefore to copper or zinc oxides as well as iron. As applied to iron ore for the reduction of which this furnace was particularly designed, the process yields a product which may either be charged into an ordinary "balling" furnace and thence to the familiar squeezing rolls and blooming mill to be made into a muck bar, or it may be put into the open-hearth furnace, in place of scrap, to be manufactured into steel. The plant now erected and the operations so far carried out have to do only with the metallizing of the iron oxide. Beyond this step the operations are not new and have been successfully conducted for a long time. In the future of the project, it is expected to bring to this plant the other operations and ship, from the immediate vicinity of the ore mines, only the finished product. The commercial success of the undertaking therefore carries with it, if it materializes, very great possibilities.

The furnace consists of a steel tube 8 feet *[in]* diameter and 120 feet long, lined with fire brick and very similar to the ordinary cement kiln. It is mounted almost horizontally with a light inclination toward the discharge end to aid in the movement of the ores. The tube is equipped with two bearing rings and is supported on rollers mounted on concrete piers. A spur gear ring encircles it by means of which *[sic]* and a train of gears driven from an electric motor, the furnace is rotated at the rate of one revolution a minute. The ore is brought in on a railroad spur which parallels the furnace and is dumped form hopper bottom cars into the boot of an elevator which raises the ore into a head frame at one end of the furnace. Here it is discharged into a rotating screen with a one-quarter inch mesh. That which passes the screen is ready for charging into the furnace and the lumps are carried up to a crusher which breaks down to the same size. The ore thus prepared is charged into the kiln.

At the other end of the furnace the gas producer is erected. It is an ordinary water sealed gas producer using any kind of bituminous coal and evolving a rich hydro-carbon gas. The framework shown is simply a support for the charging device for the gas producer. This hydro carbon gas is admitted into the end of the kiln in excess. Air is admitted through a slip ring or bustle pipe which encircles the kiln close to this end. The mixture results in a combustion which produces the necessary heat in the kiln and the excess hydro-carbons reduce the oxide in the ore. The reactions are similar to those in the upper zones of the blast furnace except that the source of the carbon is different and, in the experiments so far, the temperatures have been about the same. It is understood, however, that some developments have operated to suggest a change in the temperature at which this reduction can be brought about.

The operation in this furnace does not go far enough to carburize the metal and the product is practically as free from carbon as was the ore.

The product in appearance is similar to some specimens of sintered blast furnace dust. It is hard and porous and when worked with a file shows clearly the metallic character of the sponge iron. In the product the metal is intimately associated with the gangue of the ore, largely silica. This is not affected by the process, but it has been found consistently that the phosphorus content is reduced in the operation. No

explanation of this phenomenon is attempted. While sulphur *[sic – sulfur]* is not at all troublesome in Lake Superior ores, it could be easily roasted out at the temperatures under which the kiln operates. The ores that has *[sic – have]* been used came from the Mitchell mine on the Marquette range. This is a high grade ore and the silica content of such ore would have not but little importance whether the product were *[sic – was]* used for making iron or steel. One of the possibilities which this process is expected to develop, however*[,]* is the use of low grade, high silica ores. This kind of ore running in the neighborhood of 40 per cent in iron and 30 per cent in silica abounds in the immediate vicinity of Iron Mountain, where the furnace is located, and a large percentage of the ores of the eastern end of the Menominee range are of like character. The promoters of this furnace have secured an interest in the ores of Randville district, a high silica territory only a few miles from Iron Mountain, so that the freight on the ore delivered at the furnace should be not over half of the rate now charged for hauling from the mines to Escanaba. The crushing of the ore also, for this furnace is no more than has to be done with a number of the ores from this district now, in shipping for blast furnace use.

With a large percentage of silica in the ore, however, there will be a corresponding percentage of this furnace product to be slagged off in the "balling" furnace. This will undoubtedly carry off some iron with it, just how much is a question, although this trouble would seem quite possible of remedy. Where the product to be used for charging into open-hearth furnaces, the silica will be most objectionable and the added cost of treatment either by a compound acid-basic operation or otherwise is problematical.

A comparison of costs can only be approximate and some if offered. It is estimated, however, that a ton of coal will reduce 10 tons of 40 per cent ore by this process, which is a coal cost of about 40 cents per ton of product. It should be possible to charge the ore into the furnace for 90 cents, this cost to include mining, royalty, transportation, crushing and handling. Allowing 50 cents for all other charges, it appears to be fair to estimate the cost of this product at less than $1.50 per ton. If this product can take the place in the manufacture of muck bar and steel that is claimed for it, it is very apparent that even at plants far removed from Iron Mountain, pig iron and scrap, respectively, can easily be supplanted in these processes.

In general, the "Ardis Furnace," which is the name given to it, will, according to the claims made for it, obviate the need of steel making pig iron and the blast furnace producing it, and it will by the further cheapening of steel manufacture, hasten the decline of the Bessemer converter. It will render unnecessary the decarburizing portions of all steel making processes and, most important, it will result in the restoration of wrought iron to common use.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 32 [Thursday, December 31, 1908], page 1, column 2

Visitors at Furnace.

A.W. Houston and M. Dreyfus, of Chicago, C.P. Barnett, of Covington, Va., and G.T. Thayer, of Charleston, W. Va., were visitor *[sic – visitors]* at the Ardis furnace last Tuesday. Mr. Houston is a former member of the executive committee of the Republic Iron & Steel company, and

Mr. Dreyfus, *[sic]* is interested in several Ohio steel manufacturing companies. The other gentlemen are also connected with the steel manufacturing business.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 37 [Thursday, February 4, 1909], page 1, column 2

Improvements at Furnace.

The new Ardis furnace will be closed down for the next four weeks pending some material changes in the way of improvements covered by additional patents recently secured by Mr. Jones. After the changes have been completed it is proposed to make larger and more extensive tests than have heretofore been made. Mr. Jones is greatly pleased over the result of the last test, which was made with 35 per cent iron ore. The control of the Bird mine at Crystal Falls and the Spur mine at Michigamme has been secured in addition to Jones *[sic – Jones']* interests at Randville and at Tollen's Spur in what is known as the Michigamme Mountain*[,]* a short distance from Channing. These are all lean ore propositions and will furnish ample material to supply the furnace.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 39 [Thursday, February 18, 1909], page 1, column 4

JONES BALLING FURNACE

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Machinery Being Received and Erection Progressing Rapidly.

The machinery for the Jones balling furnace is now being received and the work of erection is progressing rapidly. This furnace is known as the second step in the Jones method of producing steel billets from crude ore. Mr. Jones expects to have the furnace in shape for the first test in about two weeks.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 43 [Thursday, March 18, 1909], page 1, column 1

Satisfactory Test.

A very successful test on Randville ore was made at the Ardis furnace last Friday in the presence of a number of experts. The success of Mr. Jones' radical inventions was demonstrated to the satisfaction of the visitors. All that remains now to place the furnace in active operation is a few mechanical changes of minor importance.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 13, Number 45 [Thursday, April 1, 1909], page 6, column 1

TEST AT FURNACE

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The Run Last Tuesday the Most Successful; Flow Perfect.

The most successful test in the history of the Ardis furnace was made last Tuesday evening. A mixture of Randville and Mitchell ores was used in charging the tube and the metal flow was smooth and even.

It is believed that, with a few slight changes in the material used in lining the tube, results can be secured that will render unnecessary the erection of balling furnaces.

This, at least, is the opinion of a number of experts who witnessed the test, and Mr. Jones may decide to make the experiment.

The main thing, however, is the complete, unqualified success of the Ardis plant. It can be said that the expectations of Mr. Jones have been more than realized.

Among those who witnessed the test were Col. George French and A.W. Houston, of Chicago, former officials of the Republic Iron & Steel company; M. Dreyfus, who is connected officially with several steel manufacturing concerns, and George A. St. Clair, the well-known mining man of Duluth, who is interested in several of Mr. Jones' enterprises.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 14, Number 43 [Thursday, March 17, 1910], page 3, column 6

Sinking Shaft.

The Jones Iron Company is making good progress in the work of sinking a shaft in the Randville district. The shaft is ten by ten feet at the collar and will be sunk to a depth of one hundred feet. Ore within the bessemer *[sic – Bessemer]* grade was encountered at this depth with a diamond drill.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 14, Number 47 [Thursday, April 14, 1910], page 1, column 2

FURNACE RUNNING

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ARDIS FURNACE HAS BEEN IN OPERATION FOR SIX DAYS.

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Test Is Highly Satisfactory and the Fuel Cost Much Lower Than Inventor Jones Estimated.

The Ardis furnace of the Jones Iron company has been operated steadily day and night since last Thursday and the results obtained are all that the most enthusiastic believer in the invention could desire.

Low grade ores from the Traders is being metalized at a lower fuel cost that was anticipated by Mr. Jones.

The daily output of the furnace since operations were commenced is about 160 tons, and the plant will be kept in operation for an indefinite period. Other low grade ores will be tested during the present test.

It is expected to have the second step plant in operation within a short time. In this plant the silica will be removed from the product of the first step furnace by a squeezing method.

In the third step the Louth balling furnace – the invention of Bernard Louth, of Pittsburg, – will be employed. The product of this step is a muck ball rolled from metallic particles, and this ball, in the fourth step, is converted into a muck bar.

In the iron market to-day *[sic – today]* this muck bar will be worth $12.00 a ton more than pig iron.

The labor cost is fully twenty cents per ton less than in making pig iron, all the handling of the ore being automatic and by electricity.

Mr. Jones is of the opinion that he has finally reached the top of the mountain of difficulties with which he was confronted.

With a fuel cost much less than he had anticipated, with a lower labor cost and a world of low grade iron ore at his command, he has reason to feel that fortune has at

least succumbed to his persistent hammering.

The Press congratulates Inventor Jones. He has succeded *[sic – succeeded]* in the face of difficulties that would have swamped a man with much less courage. He has clung to the belief that he had an invention with which he could in time revolutionize the iron business in the face of contrary reports made by furnace experts sent here to examine and report upon his invention. Without an exception the reports were unfavorable.

But Mr. Jones knew he was on the right trail.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 14, Number 48 [Thursday, April 21, 1910], page 1, column 1

Menominee Visitors.

Iron Mountain received a call last Monday from a large delegation of Menominee business men *[sic – businessmen]* who were desirous of seeing the Ardis furnace in operation. Following is a partial list of the visitors: Mayor Emerson, F.J. Trudell, A.W. Blom, Frank Erdlitz, G.H. Haggerson, A.C. Wells, Postmaster Kern, Charles H. Jones, G.A. Blesch, W.W. Horman, A.A. Juttner, C.J. Hubbel and Loren L. Prescott. D.C. Prescott, of Chicago, was also a member of the party.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 14, Number 48 [Thursday, April 21, 1910], page 1, column 4

FURNACE HAS CLOSED.

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After Strenuos *[sic]* and Highly Successful Test of Two Weeks.

After a strenuous test of more than two weeks, running day and night, the first step furnace of the Jones Iron company suspended operations last Tuesday night.

The test was satisfactory to a degree. Every contention of Inventor Jones was established to the satisfaction of a large number of critically inclined experts who visited the plant during the test.

During the test several thousand tons of ore of all grades and from all the Michigan ranges were given a trial and in every case the flow from the tube was free and the results satisfactory.

An examination of the furnace proves the linings to be in good condition and the run could have been continued for an indefinite period.

The remaining steps in the Jones system will be developed at once. Now that the first step has been successfully developed, the remainder of the process is comparatively easy.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 14, Number 48 [Thursday, April 21, 1910], page 1, column 6

Furnace Expert Here.

T.J. Lovett and Edward R. Roe, of Chicago, were among the visitors at the Ardis furnace last Friday and Saturday. The former is an old furnaceman and is the inventor of a furnace for the extraction of metals by electricity. He is of the opinion that his furnace could successful *[sic – successfully]* handle the product of the first step furnace of the John T. Jones invention. It is probable that he will be given an opportunity to make a test in a furnace

which he has erected at Chicago. Mr. Lovett was unqualified in the declaration that the Jones invention was a complete success.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 14, Number 49 [Thursday, April 28,1910], page 8, column 1

PERSONAL MENTION

John T. Jones is confined to his home with a painful abcess *[sic – abscess]* in his right cheek. It was caused by a slight burn received at the furnace which was lacerated later. The abcess *[sic – abscess]* is responding to treatment and is now healing nicely.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 14, Number 51 [Thursday, May 12, 1910], page 1, column 5

At the Furnace.

Castings for the balling furnace – the second step in the invention of John T. Jones – are now being received here and it is expected to have the same in operation in about two weeks. The balling furnace, as we have stated, is not an experiment – it is simply a matter of mechanics. The success of the first step furnace insured the success of the entire invention. Mr. Jones has submitted samples of the product of the first furnace to some of the most competent experts in the country and the opinion is general that his invention will revolutionize the steel business of the world. The invention, these experts declare, not only makes available and valuable the low grade iron roes of which the Lake Superior regions has *[sic – have]* practically unlimited stores, but it means an immense saving in the coal stores of the country. Mr. Jones having demonstrated that, with his invention, he can secure the same results in the smelting of ore with a very small fraction of fuel consumed by the blast furnace of to-day *[sic – today]*. In the opinion of Mr. Jones and these disinterested experts, the invention means that, in the near future, the coal will come to the iron instead of the iron ore seeking the coal districts.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 15 [Thursday, September 1, 1910], page 8, column 6

Test Kloman Ore.

The Ardis furnace is being placed in shape for another run. It is proposed to make a trial run on the low grade ore from the Kloman mine in the Republic district and a shipment of 1,000 tons is now being received. The Kloman mine is now controlled by the members of the Jones family and should the test prove as satisfactory as it is anticipated it may lead to the development of the property on a large scale. Mr. Jones may also decide to build a furnace at the mine.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 19 [Thursday, September 29, 1910], page 1, column 5

Kloman Mine.

The St. Paul road has just finished the building of a spur track an eighth of a mile long to the above named property in the Republic district. A.G. Jones, who is in charge of the property, tells The Press that

the new concrete and steel engine and boiler-house has been finished and the plant of machinery is now in course of erection. A considerable body of ore has been opened up and a shipment of one thousand tons is soon to be made to the Ardis furnace in this city for testing purposes. If the testing proves as satisfactory as anticipated, the Kloman company will undoubtedly arrange for the immediate erection of a similar furnace at the mine. The Kloman property is now controlled by the Jones interests.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 19 [Thursday, September 29, 1910], page 1, column 5

Ardis Furnace.

John T. Jones has received the reports of Prof. Fred Crabtree and the other experts who conducted the experiments with the product of the Ardis furnace at the Carnegie Technical Institute at Pittsburg, Penn. The reports are more than confirmatory of the expectations of Mr. Jones notably in the matter of cost. Mr. Jones, *[sic]* is now engaged in erecting a cupola furnace similar to the one employed by Prof. Crabtree and he hopes to have the same in operation within the next few weeks. The furnace will have a capacity of about one hundred and sixty tons daily. The first test will be made with ore from the Kloman mine.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 21 [Thursday, October 13, 1910], page 1, column 4

A consignment of ore is being received at the Ardis furnace from the Kloman mine at Republic.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 21 [Thursday, October 13, 1910], page 1, column 5

Mr. and Mrs. John T. Jones and son Arthur are spending the week in Chicago.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 26 [Thursday, November 17, 1910], page 1, column 5

Furnace in Operation.

The Ardis furuace *[sic – furnace]* was fired up last Monday and is now smelting one thousand tons of ore from the Kloman mine. It is expected to have the new cupola furnace in operation to handle the product of the Ardis furnace within a week. The Kloman ore flows nicely in the Ardis furnace and is averaging about forty per cent. in iron content, much better than anticipated.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 28 [Thursday, December 1, 1910], page 2, column 4

Ardis Furnace.

A successful test of the Ardis furnace is reported from Iron Mountain. In the latest test far the best results have been obtained since the furnace was first built were achieved and they greatly surpassed the expectations even of the men interested in the enterprise. So much has been written about the Ardis furnace that it is pretty well understood what significance its

development to a point where it would be commercially practicable would have for the Lake Superior iron ranges. It would make available vast tonnages of ore of such low iron content that they cannot profitably be smelted by any of the processes now in use. Many mines not now available for production because their ores are poor would quickly become sources of supply for Ardis furnaces, and the heavy drain on the high grade ores would be eased. The promoters of the Ardis furnace have had the uphill fight that is usually encountered by men who strike out new lines. There has been no lack of scoffers and much difficulty about getting the support need for carrying on the expensive experiments. But there is no one who would begrudge them full success. On the contrary, it would be everywhere welcomed and hailed as a most significant achievment *[sic – achievement]*. It will be hoped that steady progress toward the carrying out of the fullest expectations of the inventor will be reported. – Mining Journal.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 31 [Thursday, December 22, 1910], page 1, columns 3-4

FURNACE EXPERTS

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ARDIS FURNACE IS THE MECCA OF MANY LEADING ENGINEERS.

———

Nearly Every Large Steel Corporation in the Country Represented; the Tests Convincing.

The Ardis furnace has been the Mecca for some of the leading steel and iron men of the United States during the week, nearly all the large corporations being represented in the gathering. Prominent among the visitors The Press noted the following named gentlemen:

Prof. Robert Crabtree, of Pittgburg *[sic – Pittsburg]*, Penn., head of the metallurgical department of the Carnegie Institute and chief furnace expert for the Jones & Laughlin Steel company.

A.H. Lee, of Buffalo, N.Y., vice-president of the Lackawanna Steel company, in charge of the furnace department.

First Vice-President Robinson, of the Illinois Steel company, the Chicago branch of the United States Steel corporation.

E.B. Cook, of Pottstown, Penn., president of the Warwick Iron & Steel company.

E.A. White, of Pittsburg, Penn., chief of the department of research of the Jones & Laughlin Steel company.

Fritz Kohlmeyer, of El Paso, Texas, owner of iron ore lands.

J.H. Kramer, of Cleveland, chief chemist for Pickands, Mather & Co.

George A. St. Clair and Richard Schell, of Duluth, who are financially interested with Mr. Jones in the furnace and numerous mining properties.

W.H. Dosey, of Pittsburg, Penn., furnace expert for the Jones & Laughlin Steel company.

W.D. Washburn, attorney of Chicago.

Col. G. Watson French, of Davenport, Iowa, director of the Republic Iron & Steel company.

Moise Dreyfus, director of the Inland Steel company, Chicago, and the Ohio Steel company, Columbus, Ohio.

A.W. Houston, of Chicago, representing large steel interests.

W.E. Fenwick, of Detroit, mining engineer and chemist, representing W.H. Yawkey, the millionaire owner of iron properties.

MENOMINEE RANGE HISTORY – IRON MINING – ARDIS FURNACE AND GALENA FURNACE

[Compiled and Transcribed by William J. Cummings]

President Klotz of the Inland Steel company, Chicago.

Paul Brown, attorney, secretary of the Jones Iron company, Chicago.

E.D. Brigham, of Chicago, general traffic manager of the Chicago & North-Western road, who was accompanied by a number of Chicago capitalists.

It was the most notable gathering of furnace experts and chemists ever held in this country and nearly all the leading steel corporations were represented. The experts commenced arriving on Sunday and remained until Monday night.

During the visit of the experts, the Ardis furnace was in constant operation and on Monday the first test of the cupola furnace was made. The results secured in the cupola furnace, while fully establishing every contention of Mr. Jones, was not entirely satisfactory. Prof. Crabtree and his experts are of the opinion that, with a few minor alterations, much better returns can be secured. The changes recommended will be made at once. Mr. Jones and Expert Dosey left last Tuesday evening for Chicago to place the order for the necessary parts. Prof. White will remain here to superintend the installation and second test.

The main point established by the visit of the experts, however, was that the Ardis furnaced *[sic – furnace]* metalized the ore and that the work was performed at a much lower cost than in the present methods. These points were freely conceded. This concession on the part of the experts has been a long time coming. Experts have been loathe to admit that Mr. Jones' invention would metalize the ore and were inclined to ridicule the claim of the inventor in the matter of low fuel cost. Now that these claims have been conceded, after a most exhaustive investigation conducted by experts who came here in a skeptical mood primed to pick flaws in the invention, the financial success of Mr. Jones' invention is no longer a question of doubt. Some of the steel men have advised Mr. Jones to confine his operations to the metallization of the ore and assure him a good market for the product of such furnaces. Mr. Jones, however, is determined to complete every step of his invention as soon as possible. This work, however, will require much time and labor and in the meantime Mr. Jones may decide to erect and operate a number of furnaces similar to the Ardis, disposing of the product to one of the large steel corporations, several of which stand ready to contract for all that can be produced.

The Ardis furnace, which has been running steadily for nearly a month without a mishap, will continue in operation for several weeks longer. The cupola furnace will be in operation before the close of another week.

This should be "A Merry Christmas" for Inventor Jones and his family and The Press hopes that they may live to enjoy many of them!

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 32 [Thursday, December 29, 1910], page 1, column 6

ORDER CUPOLA FURNACE

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White Standard Has Been Ordered by John T. Jones.

John T. Jones, president of the Chartiers Mining & Manufacturing company, placed an order with a Chicago concern for a standard White cupola furnace last Saturday.

The Chicago manufacturers have agreed to deliver the furnace in Iron Mountain within the next ten days and it will

be erected as soon as it arrives under the direction of E.A. White, chief of the department of research of the Jones & McLaughlin Steel company. Mr. White, as the representative of the Jones & McLaughlin interests, will remain in the city until the plant is in perfect operation.

The new furnace will have a daily capacity of fifty tons of the metalized product of the Ardis furnace.

The Ardis furnace continues in operation with day and night shifts and the longer it runs the better the results secure *[sic – secured]*. All doubts as to the success of this step in the invention of Mr. Jones have been removed by the continuous run of more than a month.

Last Monday, three different grades of ore were fed into the tube and in each case the results secured were highly satisfactory. It is probable that the Ardis plant will continue in operation until all the ore in stock has been metalized.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 34 [Thursday, January 12, 1911], page 1, column 1

Cupola Furnace Here.

The standard White cupola furnace, which President Jones, of the Chartiers Mining & Manufacturing company, ordered several weeks ago, has been received from the Chicago shops and is now being erected. E.A. White, chief of the research department of the Jones & Laughlin Steel company, will return from Pittsburg in a few days to superintendent *[sic – superintend]* the work. The furnace has a capacity for handling daily fifty tons of the metallized product of the Ardis furnace. There is no uncertainty regarding the success of the cupola furnace.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 34 [Thursday, January 12, 1911], page 1, column 4

WANT FURNACE PLANT.

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Escanaba Will Send a Delegation of Citizens to Interview Mr. Jones.

A determined effort will be exerted to the Business Men's association, of Escanaba, to induce John T. Jones to locate either one of the furnaces at Escanaba, or a rolling mill which will handle the product of the furnaces located at different mines in the peninsula. A committee composed of a number of the leading citizens has been named to visit Iron Mountain and submit propositions.

The committee is composed of the following well-known gentlemen: J.C. Kirkpatrick, chairman; John M. Millar, M.N. Smith, S.M. Matthews, H.W. Reade, W.B. Linsley, J.E. Byrns, W.R. Smith, John J. Cleary, C.M. Thatcher, H.J. Robertson, R.E. MacLean, F.M. Shaw, O.P. Chatfield, A.R. Moore, C.W. Kates, Mayor Solomon Greenhoot, Leslie French, T.M. Judson, George M. Mashek and John P. McColl.

It is planned to have the members of the committee come to Iron Mountain and personally interview Mr. Jones and those interested with him and lay before them the advantages Escanaba possesses as a location for a plant of the character to be established by them. Mr. Jones is now in the east and it is not known when he will return.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 36 [Thursday, January 26, 1911], page 1, column 5

MENOMINEE RANGE HISTORY – IRON MINING – ARDIS FURNACE AND GALENA FURNACE

[Compiled and Transcribed by William J. Cummings]

Surrender Options.

The Jones & Laughlin company, which had control of three or four parcels of mineral lands near Iron River, and others near Crystal Falls, have *[sic – has]* surrendered their options. Drilling operations were conducted on all of the tracts, but no ore to speak of was encountered.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 50 [Thursday, May 4, 1911], page 1, column 6

Install Three Furnaces.

The Kloman Mining company, of which John T. Jones is president, has decided to instal *[sic – install]* at once three of the new stop process furnaces at the Kloman mine in the Republic district. One of the furnaces is now enroute *[sic – en route]* from the shops of the Allis-Chalmers company, Chicago, and the other two are to be delivered within the next few weeks. The furnaces will differ in construction somewhat from the experimental furnace in this city. The most radical change noticeable will be in the rotary tube, which will occupy a horizontal position instead of an incline one. The capacity of each furnace will be from two to four hundred tons each twenty-four hours. The company has been assured of a market for the entire production of the furnaces.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 15, Number 52 [Thursday, May 18, 1911], page 1, column 2

Furnaces Arrive.

The three Jones furnaces ordered by the Kloman Mining company have arrived at Republic and the work of erection will commence as soon as the foundations can be built. The Kloman mine is being prepared for a production sufficiently large to keep the furnaces active. The Kloman property is a large one, containing fourteen forties, and the ore, as was established in experiments here, is splendidly suited for the furnaces.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 16, Number 3 [Thursday, June 8, 1911], page 1, column 4

At the Kloman.

The Kloman Mining company is now employing about thirty men in construction work at the Kloman mine in the Republic district. The main work in hand is the building of the foundations for the three Jones step furnaces about to *[be]* erected. A shaft-house is also in course of erection. It is expected to have the furnaces in operation early in August and a considerable shipment of the metalized ore has been contracted for delivery this season.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 16, Number 21 [Thursday, October 12, 1911], page 4, column 2

Explore Tredo Farm.

The Jones furnace interests will diamond drill the Tredo farm lands, to the west of Michigamme, upon which they have held an option for purchase for several months, and which are considered to

occupy an excellent location with respect to the mineral formations of this section. It is thought that ores of higher grade than those thus far mined on the western end of the Marquette range may be developed in the Michigamme field. The Jones people are developing ore for the Ardis furnace operations and have tied up a lot of land in this section. They are to make a speciality *[sic – specialty]* of the treatment of low-grade ores and their operations in mineral lands have been with this object in view. Of course they would not object to finding ores of high grade, but they secure very favorable terms on ores that are now commercially valueless, this being the kind they propose treating in their furnaces. – Iron Ore.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 18, Number 50 [Thursday, April 30, 1914], page 4, columns 1-2

A JONES FURNACE

———

FIRST OF THE NEW MODEL WILL BE ERECTED AT MARQUETTE.

———

Definite Announcement Made by Mr. Longyear; Furnace Will Come to Iron Mountain Later.

John T. Jones and his associates have finally decided to erect their first furnace plant at Marquette. Mr. Jones was desirous of building the plant in Iron Mountain, but the necessary arrangements could not be concluded without a delay of several months. Chicago was under consideration, but Mr. Longyear was favorable to his home town and Marquette was selected. The Iron Mountain furnace will come later, as Mr. Jones is very loyal to his home town.

The site for the Marquette furnace has not been selected, but the contracts have been closed for the necessary machinery. Negotiations are pending for the old Carp river furnace plant. A.T. Roberts is in Cleveland this week negotiating with the Pickands-Mather company for the Carp site and if the deal is closed the Jones furnace will be located at that point. Otherwise it will be erected on Mr. Longyear's property in the northern part of the city.

The Marquette furnace will be constructed on the same lines as the one in Salt Lake City. The latter plant embraced all the new inventions of Mr. Jones and was successful to a degree. The new furnace, however, will be considerably larger than the one in Utah and will have a daily production capacity of one hundred tons.

The following interview with Mr. Longyear printed in the Marquette Chronicle will interest readers of The Press:

"Announcement of the perfection of an iron smelting process that will revolutionize the iron industry the world over, and incidentally that the first plant to use the new process will be in Marquette, was made yesterday in Marquette by the interests that are developing the new process. The site for the new furnace is selected, its construction will be begun as soon as possible.

"But more important, by far*[,]* than the fact that this first furnace is to be erected in Marquette, *[sic]* is the fact that a new process will make possible the profitable smelting of low grade ores that cannot now be reduced profitably by any process. This means that unnumbered billions of tons of low grade ore now lying untouched throughout Marquette and adjoining counties, even inside the city limits of Marquette, will be available.

MENOMINEE RANGE HISTORY – IRON MINING – ARDIS FURNACE AND GALENA FURNACE

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"The revolutionizing of the smelting process and the use of low grade ores with Marquette as the logical port for the Michigan iron ranges, *[sic]* will have only one result – a tremendous effect upon the future of Marquette – its rapid growth to a point that can only be conjectural.

"With millions of tons of ore at hand, ore that is now lying useless, and its transformation into iron at a cost far below that of the processes now employed with high grade ores, the construction of furnace after furnace is assured, together with the inevitable coming of steel plants. Already the interests back of the new process are planning a steel plant. The first furnace will be small and will, in part, be used to determine a few points as yet not definitely known – for one the minimum percentage of ore that can be profitably handled. Already it is known positively that ore containing 30 per cent iron can be used, whereas there is now no process by which ore containing less than 48 per cent, and then only in conjunction with higher grades, can be smelted at a profit. With this and a few other points determined, so that the construction of furnaces can be done with certainty as to exact requirements, there remains only the straight course of the naturally rapid development the industry must have.

"The new process is the work of J.T. Jones, of Iron Mountain, formerly of Sharon, Pa., and marks the culmination of 30 years of unremitting experimenting and the expenditure of a couple of fortunes. The process does away entirely with "pigging," saving that cost entirely. The metalizing is done by gases from either coal or wood, leaving the charcoal or coke as a by-product instead of consuming them in the process. A wonderful chemical, or natural, feature is that any oxide ore can be metalized – whether copper, manganese or iron. The heat is controlled so that these metals do not fuse, but each is reduced and comes from the furnace as the pure metal. The iron is delivered from the furnace as wrought iron.

"It is said that thus far it is known with a certainty that ores containing 30 per cent iron can be smelted with a profit. The Bessemer standard is now 55 per cent, the non-Bessemer 51 ½ per cent. Form- ***need to copy remainder of column here]***

Per cent, but the constant inroads upon the iron ore supplies of the country, with consequent efforts to make use of the lower grade ores, operated to reduce to the figure given. How much lower than 30 per cent ore can be profitably smelted is not yet determined.

"Mr. Jones, who has evolved the new process, has worked for 30 years to bring his ideas to a point where they could be demonstrated. Epitomized, his process is that of the ancients who made Damascus steel. The ancients had no blast furnaces, yet they were able to produce steel such as the world has not since surpassed. He worked incessantly upon his idea. Year after year he spent his time and his money. Finally came a point where he believed he had the process perfected. A small plant was built in Iron Mountain. It did not prove a success. Then a second was built three years ago at Republic. Still the desired point has not been reached. Then Mr. Jones and his son set to work with a miniature furnace in a barn at Iron Mountain and came a little nearer to the point. But their money was gone. It had been gone before, but men interested in the success of handling a low grade ore had aided him. Again he saw the iron men. Among them was J.M. Longyear, of Marquette. A considerable sum – many thousands of dollars – was again raised and last winter an experimental furnace was built in Salt Lake City, where conditions for experimenting with various ores were

excellent. This time the missing links in the process were evolved and the successful metalizing of low grade ores was done with a perfection that immediately made the success of the process certain.

"To-day *[sic – Today]* Mr. Jones is in Marquette conferring with Mr. Longyear over the construction of the first commercial furnace to handle the low grade ores of Upper Michigan.

"The gentlemen who are back of the new iron furnace are trustees for the process and its use, for which patents have been applied, while several have already been granted, are J.M. Longyear, Marquette; Major Henry L. Higginson, of the banking firm of Lee, Higginson & Co., Boston, and Seth T. Gano, of Boston."

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 19, Number 13 [Thursday, August 13, 1914], page 1, column 3

READY IN A MONTH

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JONES FURNACE AT MARQUETTE IS NEARING COMPLETION.

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All the Heavy Equipment and the Machinery in Place and Plant About Ready for Test.

The Jones furnace of the New Process Metals company in course of erection in the northern part of the city during the past few months, *[sic]* will be ready for operation in four to six weeks, and, if there are no delays, it should be in blast by the middle of September or the first of October, at the latest, says the Marquette Mining Journal. Since work on the plant was started a considerable force of men has been employed, and the progress has been satisfactory, especially during the last four weeks. More than thirty men are now employed at the plant. Practically all of the heavy machinery and other equipment is in position, and the installation of the smaller equipment is now going forward at a rapid rate. The buildings that will enclose the plant are now being erected.

Within the last week John T. Jones, of Iron Mountain, who perfected the new process furnace, and who, together, *[sic]* with his son, Arthur J. Jones, is in charge of the plant's erection, has arranged for a water supply for the furnace. A large caisson has been sunk in a swamp several hundred feet distant from the furnace property, and it is believed that the supply obtained there will be sufficient. An electric pump has been installed near the caisson. It will force the water to a large tank on the rock bluff where the furnace is located. The water will be distributed to all parts of the property from this tank.

The stack of the plant was finished last week. It is sixty feet from the base to the top, and the heavy brick work at the base is twenty-four feet high. The steel portion of the stack is lined with fire brick.

The part of the equipment that particularly arrests the visitor's attention is the large preheating tube six feet in diameter and sixty feet long, in which the electro-magnet process perfected by Mr. Jones takes place. This tube, which is now in position, rests on concrete pillars a considerable distance up from the ground. The electrically driven machinery by which it will *[be]* rotated is now being installed. The tube will be lined with brick of special ***[need to copy remainder of column here]***

MENOMINEE RANGE HISTORY – IRON MINING – ARDIS FURNACE AND GALENA FURNACE

[Compiled and Transcribed by William J. Cummings]

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 19, Number 22 [Thursday, October 15, 1914], page 1, column 6

Jones Furnace.

The Press learns that the furnace under construction by John T. Jones for the New Metals Furnace company at Marquette, *[sic]* will be in shape for a preliminary test within the next ten days. The information is given by Hon. Alton T. Roberts, who was a visitor from Marquette last Monday. Mr. Roberts is interested in the enterprise. A consignment of ore from the Iron Mountain mine on the Cuyuna range will be used in the test. Iron Mountain friends are hopeful that the test will prove every contention of the persistent inventor.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 20, Number 10 [Thursday, July 22, 1915], page 1, column 6

The Jones Furnace.

The Press is pleased to learn that John T. Jones and his associates will resume operations at their Marquette furnace at an early date. Regardless of the opinion of the every *[sic – ever]* present knocker, it can be stated that Mr. Jones and his associates have not lost confidence in their project. The suspension of operations at the furnace plant was due to a desire on the part of Mr. Jones to conduct some additional experimental work along analytical lines at the extensive laboratories at the Carnegie Institute at Pittsburgh. This work is about completed, and the results obtained, we are assured, have been very satisfactory.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 20, Number 17 [Thursday, September 9, 1915], page 1, column 5

FURNACE OF JONES

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Work of Re-Modeling the Marquette Plant Started Yesterday.

Officials of the New Process Metals company, builders of the new Jones iron furnace in North Marquette, yesterday put a force of men to work re-modeling the plant with a view to making the continued operation of the furnace possible from a commercial standpoint.

The decision to rebuild the plant was made after a thorough analysis of the product of the furnace by several of the best metallurgists in the country had proven beyond all doubt that the Jones process of making iron is a success. During its few weeks of operation, several months ago, the furnace produced, from a low grade ore which could not be used commercially in the ordinary iron furnace, several very satisfactory and remarkable products. Productions of iron, manganese, and silicon of desirable quality have been made with the new furnace and it builders are now convinced that all that remains to be done is to rebuild the plant, possibly more than once, until a furnace is built which will be a commercial success.

The remodeling work will be done under direction of Arthur Powell, of Marquette. Not much new material will be necessary to make the changes intended, and it is thought that the plant will be ready for operation in about two weeks.

J.T. Jones, *[sic]* will arrive in Marquette with his family in a few days.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 20, Number 25 [Thursday, November 4, 1915], page 1, column 4

First Electric Pump.

While in the city recently and during a conversation relative to the new electric pumps at the Hamilton shaft of the Chapin mine, John T. Jones recalled the fact that the first plant of the kind ever constructed was delivered at the same shaft some twenty-four years ago. Mr. Jones was general manager for the Hamilton Ore company at that time and the pumping plant was built to the order of that corporation. It was never erected and was finally returned to the manufacturer. The question of a constant electrical current sufficient to operate the plant was an uncertain quantity and quality *[in]* those days. The pump was a very crude affair in comparison with those now in operation.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 20, Number 36 [Thursday, January 20, 1916], page 1, column 6

Jones Furnace.

The Marquette Chronicle of last Tuesday says that it is expected that within the next few days the new Jones furnace in North Marquette will be given the first test since is *[sic – its]* construction this fall. It has been ready for operation for some time, but action has been delayed until the Schneider & Brown Lumber Co. could install the new automatic circular saw, which will be used to cut fuel for the furnace. This saw arrived a few days ago and as soon as it has been installed and an ample supply of wood has been cut the furnace will be charged with ore and will be tested.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 20, Number 37 [Thursday, January 27, 1916], page 1, column 4

Jones Furnace.

The new Jones furnace in north Marquette was filled with iron ore yesterday ***[need to copy this article]***

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 21, Number 2 [Thursday, May 25, 1916], page 1, column 6

Sold Furnace Tube.

The Press learns that the St. Clair interests have sold the large steel tube at the defunct Ardis furnace erected several years ago by the Chartiers Mining and Manufacturing company. The tube was sold to the Thomas Iron & Steel company, an Ohio corporation, and will be employed in experimental work at some point in the south. The tube is constructed of steel and is lined with fire brick. It has a length of about eight-five feet and is about eight feet in circumference *[sic – diameter]*. In order to ship it the tube will have to be cut in three or more sections. When the tube is removed but little of value will remain at the furnace, where considerably more than $100,000 was expended in experimental work. The several buildings are in ruins.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 21,

Number 6 [Thursday, June 22, 1916], page 1, column 6

Assault Attempted.

A beast in man form attempted to assault Mary, the ten-year-old daughter of Mrs. Schupp, a widow, residing in the first ward, at about ten o'clock this morning. The scene of the assault was the Jones furnace, where the little one, accompanied by two younger brothers, was gathering wood about the ruins. The screams of the children resulting in the coming of help and the brute fled. He had not been captured at the noon hour. If caught the hemp law *[hanging]* should be appealed to.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 21, Number 14 [Thursday, August 17, 1916], page 1, column 6

Loading the Big Tube.

Anton Miench has taken the contract to load on the cars the big steel tube at the abandoned Ardis furnace and is now engaged in the work. The tube was purchased by the Thomas Furnace company, of Milwaukee, from George A. St. Clair, of Duluth, and it will be shipped to some point in West Virginia, where it will be employed in experimental work. It is about one hundred and twenty-five feet in length and about eight feet in circumference *[sic – diameter]*. It will weigh several hundred tons. The tube will not be cut in three sections, as was originally intended, but will be loaded on three cars for transportation. The job of loading is a difficult task, as the tube must be lowered about twenty feet to the track level.

Iron Mountain Press, Iron Mountain, Dickinson County, Michigan, Volume 21, Number 18 [Thursday, September 14, 1916], page 1, column 2

Tube Sold.

Thomas Iron company has sold the large Ardis furnace tube to the Mississippi Valley Iron company, who will employ the same in their operations at Waukon, Iowa. Warren J. McLaughlin, an Iron Mountain boy, is in charge of the company's mining operations.

Iron Mountain News, Iron Mountain, Dickinson County, Michigan, Volume 5, Number 8 [Monday, April 20, 1925], page 1, column 2

MINE COMPANY TO SELL LAND

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Disposal of Property To Mean End of Chartiers Venture

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Stockholders of the Chartiers Mining Manufacturing company at a meeting held in the office of C.T. Hampton, Commercial bank building, elected officers and directors to conduct the sale of the remaining property of the company which is located on the North side and authorized the conveyance of property to the city of Iron Mountain and settlement of an award in payment as allowed at the October term of circuit court.

The company was founded by John T. Jones, who erected an experimental furnace to be lined in an entirely new smelting process. The furnace was built on

a large tract of land near Lake Antoine but proved unfeasible. The charter of the company was suspended by the state for several years upon failure to file reports.

A few months ago the city of Iron Mountain started a condemnation suit to obtain part of the company's land for the new filtration plant. The suit was first begun in probate court and later settled in circuit court where a jury awarded the Chartiers company $4,750 for the land upon which the filtration plant now stands. This award was accepted at the stockholders' meeting and the officers were ordered to offer for sale the balance of the land upon completion of which the company will dissolve.

Members of the board of directors elected at the meeting were Elmer W. Jones of Marquette, president; George A. St. Clair, Duluth, vice president and treasurer, Raymond Turner, Iron Mountain, secretary, E.W. MacPharren, of Duluth, and C.T. Hampton.