

# Connecticut's Iron and Copper Part 1

By Charles Rufus Harte

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## CONNECTICUT'S IRON AND COPPER\*

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CONNECTICUT'S fame as an industrial state is widespread; what is not so generally known is the extent to which in the past she has indulged in mining and quarrying, some of which has contributed in no small degree to her wealth, not to mention the fact that not a few of her citizens were poorer but, it is hoped, wiser men after investing in some of the ventures. And it is quite probable that some of her minerals may play important parts in her post-war economy.

Unfortunately, much of the early mining activity seems to have been known only in the immediate vicinity; today, facts regarding the operations either are apparently lacking, or are to be found only here and there in scanty and scattered references, or in the often open-to-question "recollections" of old inhabitants. Only through the generous assistance of many persons has it been possible to get together the following partial story; it is hoped that this outline may stimulate sufficient further interest and bring out much more information on the subject.

### THE IRON ORES

Of Connecticut's ores—and it should be remembered that an ore of a metal is not merely any mineral containing that metal; it must contain the metal in such quantity and under such conditions as to make it commercially profitable to recover it—those of iron, of which the State has four:—magnetite, siderite, bog ore and limonite in the order of their abundance—have been by far the most important.

MAGNETITE, the black magnetic oxide of iron,  $\text{Fe}_2\text{O}_3$  to the chemist, which contains the highest proportion of iron, some 72.4 per cent when pure, was the least abundant. It occurs in two forms, in solid masses and as a black sand. Of the former, a mine in the southeast corner of the town of Sharon is said to have furnished some fifty tons of ore to the furnaces at Cornwall Bridge and at West Cornwall, and it probably supplied some to local forges; the Tuttle mine, west of Winsted, may have produced an equal

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amount; and there were other workings in New Preston and Norfolk, but it is doubtful if the total magnetite produced amounted to two hundred tons.

Notably at Selden's Point, Hadlyme, and on the Long Island beaches from New Haven east into Rhode Island, magnetite occurs as a fine black sand, which, in the days before blotters, when wet ink was dried by "sand-ing", was considered the best for the purpose. About 1760, Jared Eliot of Killingworth, believing that since this material was picked up by a magnet it must contain iron, began a series of experiments and eventually produced from 83 pounds of the sand 50 pounds of, as he said:—"very good if not the best iron". On the strength of this he wrote a delightful essay, dedicated:—

"To The Honorable and Laudable Society, Instituted at London  
for the Encouragement of Arts, Manufacture and Commerce",

and in turn they presented him with a beautiful gold medal.

It seems probable that the Killingworth forge produced some more iron from this sand; a forge in Voluntown is said to have worked with it; and it may well have been used elsewhere; but the total tonnage unquestionably was very small.

SIDERITE, the glassy or spathic ore, which is a light cream color when first mined, but becomes a rich red-brown on exposure to the air, is a carbonate of iron,  $\text{FeCO}_3$ , to the chemist. It has been found at Long Hill, Trumbull; at the Bristol copper mine; and at Ore Hill in Salisbury, but only in small quantities; at Mine Hill, Roxbury, however, is one of the largest deposits in the United States. Discovered about 1724, the vein at that time and for some hundred of years thereafter, was thought to contain silver in paying quantities, and much good money was spent trying to obtain the precious metal, the small amount of silver actually present, coupled with some judicious "salting" with silver from an outside source by the German goldsmith in charge at one time, serving as bait for the "suckers". And just as the Bronson brothers of Waterbury had come to the conclusion that the German Feuchter ought to spell his name "Fakir" and had dismissed him, the man carrying his goods to the shipping point dropped a chest out of which popped bars of silver. Convinced by this that he had been "holding out", more money was put into the mine, only to add another failure to the list.

Early in the 1800's, however, it was realized that the mineral was primarily an iron ore, and plans were made to work it as such, but meantime, what between sales, leases and sub-leases, not to forget permits, the title had become so clouded that for thirty years it proved a "gold mine" for the lawyers, the title finally being cleared up in 1856 by a decision by the

United States Circuit Court for the district. In 1865 the property was purchased by a company—"The Shepaug Spathic Iron and Steel Company"—organized for that purpose. It erected the furnace still standing at Roxbury Station, but at first had very serious trouble from explosions in the stack, until it was discovered that by roasting the ore before it was charged into the furnace this trouble was cured, and thereafter excellent iron and steel were produced. In 1867 the capital was increased to one million dollars; the name changed to "The American Silver Steel Company"; and in a fine new plant in Bridgeport it made high grade cutlery and surgical instruments, the Roxbury siderite being practically identical with that from which was made the famous Damascus steel.

Oddly enough, for the plant was a large one for its day, other than that it was absorbed by the Farist Steel Company, to date no further information concerning either its output or when it ceased operation of the furnace has come to light.

BOG ORE, the rusty-brown lumps occurring in the surface of certain swamps fed by springs of water carrying iron in solution, and "mined" by simply scraping up, is a form of limonite, with the same chemical composition,  $2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ , as the much denser and quite different appearing other forms of the mineral. Generally distributed over the middle and eastern portions of the State, it was the first, and until about 1734 the only, iron ore worked. From it, by the direct process, in their little forges, our early if not our earliest settlers obtained at least part of the iron from which they wrought ox and horse shoes, hinges, hasps, latches, nails, tools, and anything else of iron which would have to withstand bending or sudden shock.

In 1644, John Winthrop, the younger, who had been very active in promoting the construction and operation of blast furnaces in eastern Massachusetts, obtained from the General Court permission to set up an iron works, and in 1651 received what might justly be termed a generous mining grant:—

"Whereas in this rocky country, among these mountains and rocky hills, there are probabilities of mines of metals, the discovery of which may be of great advantage to the country in raising a staple commodity; and whereas John Winthrop, Esquire, doth intend to be at charges and adventure for the search and discovery of such mines and minerals; for the encouragement thereof, and of any that shall adventure with the said John Winthrop, Esquire, in the said business, it is therefore ordered by the Court that if the said John Winthrop, Esquire, shall discover, set upon and maintain such mines of lead, copper, or tin, or any minerals, as antimony, vitriol, black lead, allum, stonessalt, salt springs, or any other the like, within this jurisdiction, and shall set up any work for the digging, washing, and melting, or any other operation about the said mines or minerals, as the nature thereof requireth, that then the said John Winthrop, Esquire, his heirs, associates, partners or assigns, shall enjoy

forever said mines, with the lands, wood, timber, and water within two or three miles of said mines, for the necessary carrying on of the works and maintaining of the workmen, and provisions of coal for the same."

Just what part, if any, John Winthrop had in the discovery of the North Haven bog ore deposits or in the construction of the dam at what is now the outlet of Lake Saltonstall, East Haven, does not appear, but it was probably his influence which led to the erection of a blast furnace as well as a forge at that point. That he had a very considerable interest in the furnace is evident from John Davenport's letter of June 22, 1663, to him:—

"The freshest newes here, & that which is *e re vestra*, is, that they have bene blowing at the iron worke, and have runne, from the last 6th day to this 2d day, 5 sowes of iron, which are commended for very good; & this night it's thought they will run another & begin tomorrow to make pots. The worke is hopeful, but the workemen are thought to be very chargeable and froward."

(Swank: "Iron Through the Ages", page 88.)

It would appear, from the last sentence, that in those days also they had their labor troubles.

Winthrop's furnace continued to produce "sowes" and pots until about 1678, when, presumably because of exhaustion of the ore beds it went out of blast, and for some eighty years thereafter what iron was made in Connecticut was produced in the little forges, and, until the discovery of the Salisbury limonite deposits in 1734, from bog ore.

Because of the superior quality of the iron made from it, the Salisbury limonite, soon after its discovery, took the place of bog ore in the north-western portion of the State, but elsewhere the bog ore was in use until about 1850 or 1860. In 1779, the Phelps blast furnace at Stafford Hollow started operation, and it is said to have furnished cannon and cannon balls to the Colonial Army, besides camp kettles and pots. Twenty years later, in nearby Hydeville, the Lafayette furnace was blown in; it was said to have been the first Connecticut furnace to cast stoves; and by September of 1835 there was a third furnace in operation in this region, this last one at Hebron. Phelps and Lafayette exhausted the local ore they were using, and closed in 1840; it is not clear just when Hebron, which was also using local ore, went out of blast; it was no longer operating in 1853. Possibly a few little country forges used bog iron for a while longer, for its loose texture made it particularly good for the direct process and to some extent offset the better quality of the iron from the denser ores, or from pig iron, but it is probable that by 1860 the story of bog iron was ended. Undoubtedly it produced a considerable amount of the iron of the earlier years of the State, but just how much is anyone's guess. The author has been unable to find any records.

LIMONITE, or Brown Hematite, in the dense form was by far the most important iron ore of the State. It has the same chemical composition as the bog ore,  $2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ , but it is of very different appearance, being much denser and ranging in color from a yellowish-brown to a jet black of high gloss. In form it may be:—

“pulverulent and compactly mixed, mammillary, botryoidal, spongiform, stalactitic, some with hemispherical and some with acicular terminations, others like bunches of pendant moss.”

(Lesley: “Iron Manufacturers' Guide,” page 548.)

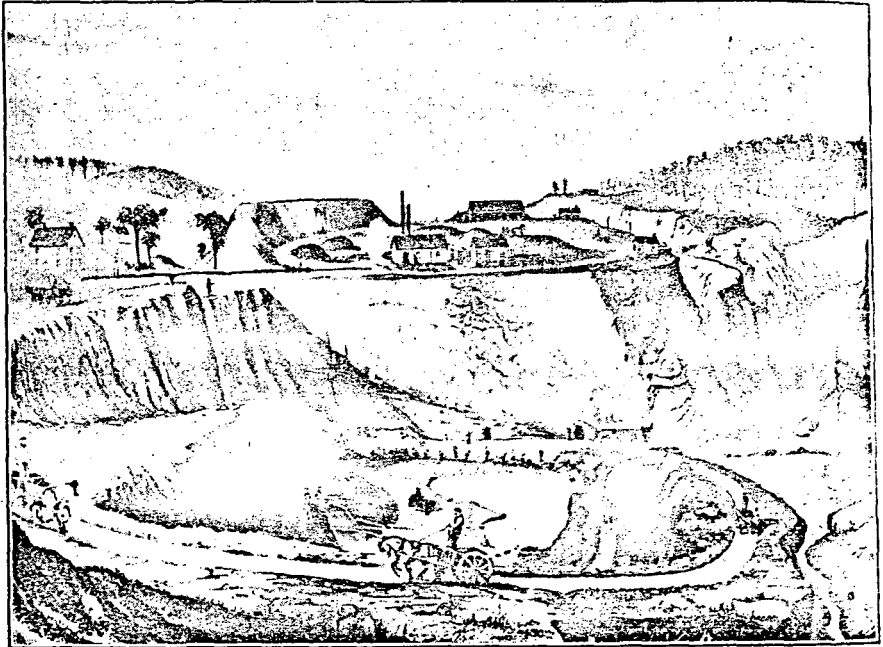
not to forget ore-balls, shells and pipes.

About 1734 came the first discovery, at Salisbury, of the great deposits of limonite in the northwest portion of the then colony of Connecticut. For several years the ore was used only in forges, the resulting iron being



ADIT ENTRANCE ROXBURY SIDERITE MINE

of such excellent quality and becoming so famous that forge-masters came long distances to obtain the ore, which they carried back in their leather saddle-bags. Thereafter, although as previously noted, bog ore was used, it was to a constantly decreasing extent until about 1860, and all but four of the blast furnaces erected in the period ran on limonite, which, when the Roxbury siderite furnace went out of blast, probably early in the "seventies", became the sole ore used, and so continued until 1923, when the last furnace closed down.



OPEN PIT LIMONITE MINE WITH CART HAULAGE

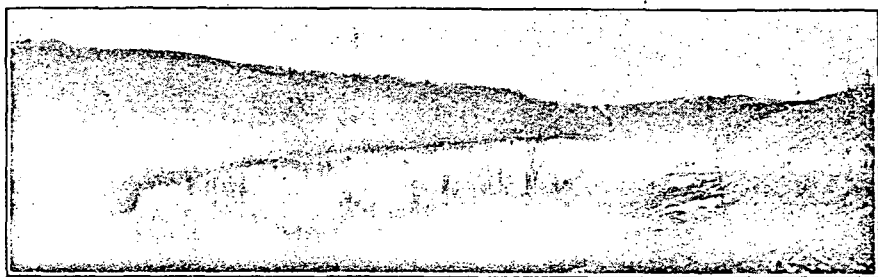
### MINING AND SMELTING THE ORE

Iron mining in Connecticut was comparatively simple. Bog ore had only to be gathered out of the surface of its swamp and washed; magnetite, siderite and, in a few instances in the larger mines, limonite, were taken out of underground workings, but the bulk of Connecticut's iron ore came from open pits. It was hauled to the surface by carts until the depth of the pit made the grade of the roadway too steep for horses, after which, if the prospects seemed to warrant the cost, power haulage was installed; otherwise the pit was abandoned. Today, all of the old pits are full of water.

At the surface the ore was broken to size, at first by hand hammers;

later, at the larger mines, power crushers were used. It was then washed, and in some instances it was "beneficiated", as the metallurgists say, by a preliminary roasting, after which it was ready for the forge or furnace.

Until 1776, with the two exceptions of the Winthrop furnace of 1663 and the Allen of 1762, all iron produced in Connecticut was made by the "direct" process. The ore, mixed with the fuel, was heated to a temperature of about 1,350 degrees Fahrenheit in a little open furnace, the "forge", of but a few bushels capacity, a simple blowing arrangement producing the desired temperature. So heated, the ore gives up its oxygen to the hot carbon of the fuel, leaving a spongy mass, the "loop" of "sponge iron", which is practically pure, for at that temperature there is very little tendency on the part of the metal to combine with any other element which may be



DAVIS MINE, LAKEVILLE, TODAY

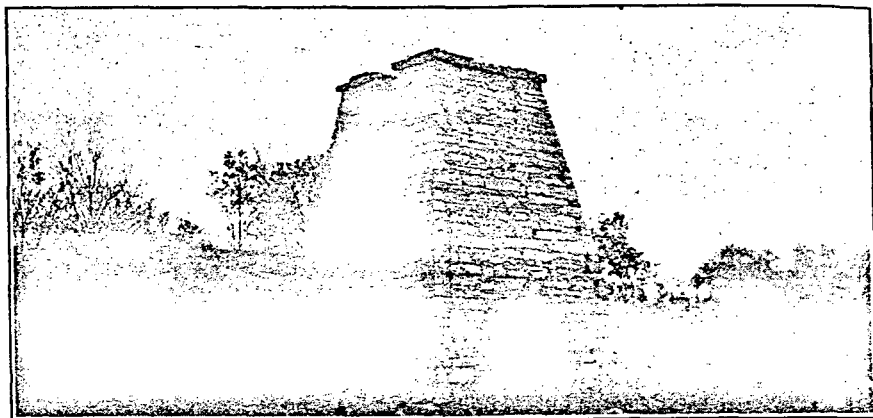
present. The white-hot loop is then "shingled", that is, by hand or power hammering, it is freed from most of the melted cinder mixed with it, after which it is shaped either into a plain bar or one with a head at each end, the latter being known as an "ancony". It is then ready for the blacksmith or the market. Iron so produced, "wrought iron", is comparatively soft, can be hammered into many shapes even when cold, can be drawn into rods and wires, and when two pieces are heated white-hot, they can be "welded" into one.

That our thrifty Connecticut ancestors waited from 1678, when lack of ore put the Winthrop furnace out of blast, until 1762 before building a second one, and then fourteen more years before erecting the third, is not surprising when it is remembered that the forge was inexpensive and required but little skill to run it, whereas the blast furnace was a great stone structure holding tons of "charge" as compared to the few hundred pounds of the forge, and it required a huge blowing device, making it vastly more expensive than the forge, both in first cost, and in operation.

Moreover, any clever blacksmith could run a forge, but the blast furnace required an operator of long experience and great skill. Because of the



comparatively low operating temperature of the forge the reaction in it consists simply of the reduction of the ore to sponge iron, with practically no complications. The much higher temperature at which the blast furnace operates, however, creates very different conditions. Near the top of the stack the ore is reduced to sponge iron as in the forge, but as this settles down into regions of higher temperature there occur complicated reactions, for the iron is only too eager to combine with other elements, some of which are particularly harmful. Today the furnace-master has many instruments to assist him in knowing just what is going on inside his furnace,



TYPICAL BLAST FURNACE STACK

but the old-time operator had none of these, and was obliged to adjust the strength of his blast and the relative proportions of fuel, flux, and ore in the charge, his means of control, on the basis of the appearance of the flame at the top of the stack, the rate of settlement of the charge, and the color and consistency of the melted metal and cinder as they flowed out at the hearth. It required highly experienced men to correctly read these signs and know what to do to correct actual, or prevent threatened, trouble, and until after the Revolutionary War such men were few indeed. Still further, until the discovery of the Salisbury ore beds in 1734, there were no known ore deposits of any considerable size, so that a prospective furnace owner, besides the other difficulties, faced the possibility of having Winthrop's experience; exhaustion of his source of ore.

The product of the blast furnace is "pig iron", which contains from 3 to 4 per cent of carbon, 2 to 3 per cent of silicon, about 1 per cent of manganese, and fractions of a per cent each of sulphur and phosphorous. Unlike the wrought iron of the direct process, it cannot be welded, forged, or drawn,

but it can be melted and cast in moulds, whence the name, "cast iron". By removing the carbon by a modified direct process, cast iron can be converted to wrought iron, while by changing the carbon content to a value between one-half per cent and one per cent it becomes steel.

### GROWTH AND DECLINE OF THE IRON INDUSTRY

England's colonial policy always has been to forbid, to a greater or less extent, the production or manufacture of anything the mother-country could furnish, regardless of the relative costs to the colonists. In 1719, alarmed at the growth of the iron industry in America, the House of Commons:—

"passed a bill having the clause 'that none in the plantations should manufacture iron wares of any kind out of any sows, pigs, or bars whatsoever.' The House of Lords added 'that no forge, going by water, or other works should be erected in any of the said plantations, for the making, working, or converting of any sows, pigs, or cast-iron into bar or rod iron.' The opposition of the northern colonies defeated the bill \* \* \* but the purpose was never abandoned."

(Swank: "Iron in all Ages," page 357.)

In 1750 a bill was passed which set out:—

"that pig and bar iron made in His Majesty's colonies in America may be further manufactured in this kingdom \* \* \* from and after the twenty-fourth day of June, one thousand seven hundred and fifty, no mill or other engine for slitting or rolling of iron, or any plateing forge to work with a tilt hammer, or any furnace for making steel, shall be erected, or after such erection continued in any of His Majesty's colonies in America; and if any person or persons shall erect, or cause to be erected, or after such erection continue, or cause to be continued, in any of such colonies, any such mill, engine, forge or furnace, every person or persons so offending shall, for every such mill, engine, forge, or furnace, forfeit the sum of two hundred pounds of lawful money of Great Britain.

And \* \* \* every such mill, engine, forge or furnace, so erected or continued, contrary to the directions of this act, shall be deemed a common nuisance, and that every governor, lieutenant-governor, or commander-in-chief of any of His Majesty's colonies in America, \* \* \* upon information \* \* \* shall order and cause every such mill, engine, forge, or furnace, to be abated within the space of thirty days next after such information given and made as aforesaid."

(Swank: "Iron in all Ages," pages 358-359.)

And in 1785 there was passed:—

"An act to prohibit the exportation to foreign ports of tools and utensils made use of in the iron and steel manufactures of this kingdom; and to prevent the seducing of artificers or workmen, employed in these manufactures, to go into parts beyond the seas."

(Swank: "Iron in all Ages," pages 365-367.)

with very heavy penalties for violations. These restrictions were not removed until 1845. England's attitude towards colonial development is well set out by the fact that:—

"In 1816, Lord Brougham, in a speech in Parliament advocating the increased exportation of British goods to the United States, declared that 'it was well worth while to incur a loss upon the first exportation, in order by the glut to stifle in the cradle those rising manufactures in the United States which the war has forced into existence contrary to the natural course of things.'"

(Swank: "Iron in all Ages," page 368.)

Under the circumstances, it is not surprising that the early development of the iron industry in Connecticut moved slowly—but it did proceed. It is probable that there were quite a few little forges in operation by 1660; by the time the Salisbury ore beds were discovered there undoubtedly were many of them pretty well scattered through the Colony.

In 1728, Samuel Higley, who, besides having been authorized by the Connecticut Assembly to practice the arts of "Physick and Chirurgery", was a blacksmith, set forth to the Assembly that he had—

"with great pains and cost, found out and obtained a curious art, by which to convert, change, or transmute common iron into good steel, sufficient for any use, and was the very first that ever performed such an operation in America."

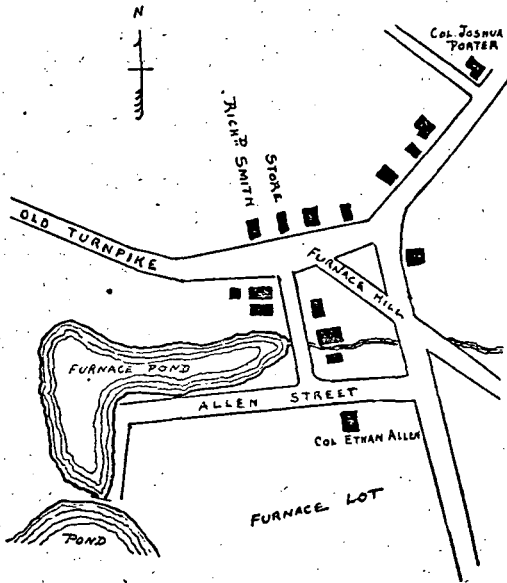
On the strength of this statement, backed up by some of his neighbors, he and his associate Joseph Dewey of Hebron were given the exclusive right of steel-making for ten years. Two years after the expiration of Higley's grant, in 1740, "Messrs. Fitch, Walker and Wyllis" were granted the sole privilege of making steel for the term of fifteen years, and they erected a furnace for that purpose at "Symsbury". This trio was followed by Aaron Eliot, the son of Jared Eliot of Killingworth. On Aaron's showing, in 1772, that "for several years past" almost the entire supply of steel for the Colony had been purchased in New York of dealers who had bought their supply from Aaron, and that with a little financial help he could sell direct to the Colony, which would thus save the middlemen's profit, he obtained from the "publick treasury" a loan of 500 pounds, which at that time was equal to \$1,666.67.

In 1740, Philip Livingston, who had purchased an interest in Ore Hill, the chief Salisbury deposit, erected a blast furnace at Ancram, New York, some twelve miles northwest of the mine. It was this furnace and the forge connected with it which, using the Salisbury ore, made the one and one-quarter inch square bar iron from which was forged some two-thirds—about 1,200 feet—of the great chain intended to prevent the British from

going up the Hudson past Fort Montgomery, but which was captured by them in 1777. Beatson, the English historian, says that it:—

“was of the most excellent workmanship; it was sent to England and from there to Gibraltar where it was of great use in protecting the shipping at the moles.”

(Beatson: “Naval and Military Memoirs of Great Britain from 1727 to 1783,” Vol. IV, page 236.)



SITE OF REVOLUTIONARY WAR CANNON FOUNDRY AT SALISBURY, CONNECTICUT

Courtesy of Malcolm D. Rudd, Lakeville, Ct.

#### SITE OF ETHAN ALLEN FURNACE, LAKEVILLE

It may have been the success of the Ancram furnace, or just his adventurous spirit that led Ethan Allen, in 1762, in company with John Hazeltine, to buy an interest in Ore Hill and to build a forge and a blast furnace, the latter the second in Connecticut, at the outlet of Lake Wononscopomus. Allen's capture of Fort Ticonderoga is usually considered his great contribution to the cause of American liberty, but actually the construction of this furnace was far more important, for from it came a very large proportion of the Colonists' cannon for the Revolutionary War, although by that time it had passed out of Allen's hands. In 1765 he and Hazeltine sold to the Caldwell brothers of Hartford, Allen celebrating the sale by getting gloriously drunk with George Caldwell, whom he then beat up, giving, incidentally, an early example of the strip-tease act, for the Salisbury town records tell us:—

"Ethan Allen did \* \* \* strip himself even to his naked body and \* \* \* did assail and actually strike the person of George Caldwell of Salisbury."

Five years later the Caldwells sold to Richard Smith, who was suspected of being a Tory, a suspicion supposedly confirmed when, just before the outbreak of the Revolutionary War, he went to England and did not return. Thereupon Governor Trumbull seized his furnace, mines, and forges in the name of the State of Connecticut, and thereafter, until the end of the war, Connecticut produced cannon, cannon-balls, army pots and kettles, and other iron articles for military and naval use in great quantity. The guns of the frigates *Constitution* and *Constellation* and those of the New York City "Battery", to mention but three of the many vessels and fortifications supplied, were of Salisbury make. It is an interesting sidelight on Connecticut justice that when, after the war, Smith returned to the State, his story that he was no Tory, but had been the victim of circumstances which kept him abroad until the declaration of peace, was accepted, and his seized property was returned to him.

Relieved by the conclusion of the Revolutionary War of the characteristic restrictions with which Great Britain had endeavored to suppress the industrial development of the Colonies, Connecticut's iron industry began a growth which at one time seemed likely to make the State the iron center of the Nation. As of 1837, Dr. Shepard listed 11 Connecticut furnaces in blast, producing over 6,000 tons of pig iron annually, while forges in the vicinity of Kent were credited with the production of 300 tons of wrought iron. (Shepard: "Report on the Geological Survey of Connecticut", page 27.) However, the latter tonnage may well have been produced, at least in considerable part, from pig iron included in the 6,000 tons.

In 1840 the State ranked fourth in the production of steel and iron; in 1851 the "Connecticut Business Directory" listed the following twelve firms operating blast furnaces:—

Barnum Richardson & Co.	Lime Rock
Camp & Fenn	Bulls Bridge
Cornwall Bridge Iron Co.	Cornwall Bridge
Cornwall Iron Co.	West Cornwall
Hiram Wead	Sharon
Hunts, Lyman & Co.	Huntsville
John A. Beckley	East Canaan
Landon & Co.	Chapinsville
Lee & Camp	New Preston
Scoville & Church	South Canaan
Stuart, Hopson & Co.	Kent
The Salisbury Iron Co.	Mt. Riga

and by 1923, when the last one went out of blast, Connecticut had had at least 26 blast furnaces, although not all were in operation at the same time. Of the 26, 22 were in the Salisbury region. Among earlier ones than those of the list were C. Edwards' at Macedonia; the Hebron furnace; the Lakeville furnace, operated in turn by Ethan Allen, the Caldwells, Richard Smith, the State of Connecticut, Smith again, and finally Holley & Coffing; H. Landon & Company at Sharon Valley; Nathaniel Hyde & Company's "Lafayette" at Hydeville; the Phelps at Stafford Hollow; the Sage Iron Company's at Joiceville; and Winthrop's at East Haven.

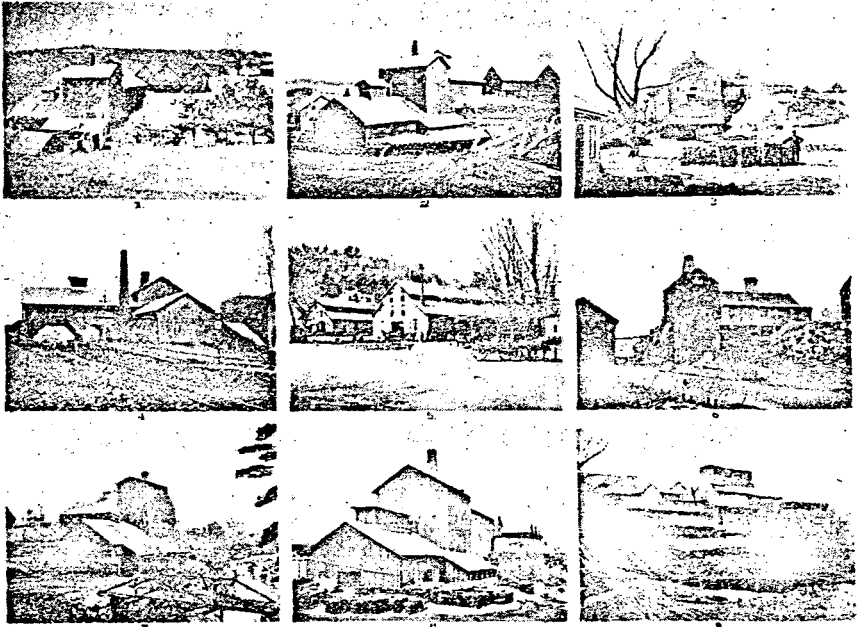
Connecticut furnaces cast comparatively few cannon after the Revolutionary War, but they made a large part of the armor for the river iron-clads of the Civil War, and they furnished the Alger works of South Boston with much of the metal for the great "columbiads" and the Dahlgren guns that company cast for the Union forces. It was during the Civil War that Horatio Ames, whose Falls Village plant was famous for its Salisbury iron forgings—for many years its Nasmyth steam hammer was the largest in this country—and who had invented and patented a method of making wrought iron cannon, furnished both the Army and the Navy with a number of his guns, at least 26 being 14 feet long, of seven inch bore, and rifled. Although previously attempts to forge large guns had been made abroad, Ames was the first to make really successful ones.

The unusual strength and toughness of Salisbury iron made it in great demand for anchors and chains. Two forges were particularly noted for such products, that of the Hunt Brothers at Huntsville, and that of the Salisbury Iron Company on Mt. Riga. It was this latter plant which made the anchors and chains for the U. S. S. *Constitution*.

Very hot castings of certain types of iron, suddenly and properly cooled—"chilled", the foundrymen call it—become very hard on the chilled surfaces. Most irons which take a heavy chill do not withstand heavy and sudden shocks very well; from the Salisbury ore, however, it was possible to produce an iron which while very tough took an exceptionally hard and deep chill, making it ideal for car wheels. From about 1840 into the nineties a very large portion of Salisbury iron—the term includes irons from any of a number of mines in the general vicinity of Salisbury, some being in Massachusetts and some in New York—went into car-wheels: it has been said that during most of that period no reputable railroad would have any other than "Chilled Salisbury iron" wheels under its cars.

Of the Connecticut producers of car-wheels the Barnum and Richardson interests were particularly and deservedly famous. Started as a small hardware concern in the early eighteen-thirties as the "Barnum & Richardson Company", it steadily broadened its field and increased its facilities until by

1880 it controlled practically all the furnaces in western Connecticut, besides having extensive New York and Massachusetts interests. During most of its existence it rang changes on the two names, with sometimes



- No. 1 Lime Rock Furnace
- " 2 Huntsville "
- " 3 Sharon "
- " 4 Millerton "
- " 5 Foundries-Lime Rock.



- No. 6 Cornwall Bridge Furnace.
- " 7 Canaan No. 1 "
- " 8 " " 2 "
- " 9 " " 3 "
- " 10 Office-Lime Rock.

**BARNUM RICHARDSON COMPANY'S  
IRON WORKS.  
SALISBURY, CONNECTICUT, U. S. A.**

A BARNUM RICHARDSON COMPANY ADVERTISING POSTER. PHOTO NO. 8, HOWEVER, IS OF CANAAN NO. 3, AND PHOTO NO. 9 OF CANAAN NO. 2 OR "BECKLEYS"

Barnum and sometimes Richardson first. Finally, as "The Salisbury Iron Corporation" it was the owner and operator of the last of the Connecticut charcoal blast furnaces, "Canaan No. 3", and in 1923 this one was blown out for the last time.

Eventually the steel car-wheel supplanted the one of chilled iron and destroyed that market, but for a long time thereafter Salisbury iron was in considerable demand for crushing rolls and other castings requiring a very hard surface but subject to severe shock. Increasing labor costs, however, and the exhaustion of the local sources of charcoal, making necessary its purchase in distant markets, finally raised the cost of production of the iron to a prohibitive figure, and the closing down in 1923 of "Canaan No. 3", put an end, at least for the time being, to Connecticut's iron industry.

That Connecticut produced a very large amount of iron is beyond any question or doubt, but what that amount was can only be guessed at, for such records as exist are few and far between. Mr. D. H. Newlands has stated (*Economic Geology*, Vol. XXXI, page 137) that the entire yield of the Salisbury region—this including, as previously noted, parts of Massachusetts and of New York—was not less than eight or nine millions of tons of ore. On this basis it seems probable that Connecticut's share was at least three or four million tons.

The question is frequently asked whether at some future day Connecticut may not re-open her iron mines. If there remains enough ore to warrant it, a fact yet to be determined,—for to-day there apparently are no records of the extent of the ore beds, The Salisbury Iron Corporation having destroyed practically all such documents when it went out of existence in 1923, and recently threatened surveys having failed to materialize—it is possible that one of the "sponge iron" processes recently developed may revive the industry, but as to that, only time can tell.

### COPPER

Connecticut's second most important metal was her copper. The two principal ores were Chalcocite, "Copper Glance",  $\text{Cu}_2\text{S}$ ; and Bornite, "Peacock Ore",  $\text{Cu}_3\text{FeS}_4$ , while the metal itself, "Native Copper"; Cuprite, "Red Copper Ore",  $\text{Cu}_2\text{O}$ ; Chalcopyrite, "Copper Pyrites",  $\text{CuFeS}_2$ ; and Malachite, "Green Copper Ore  $\text{CuCO}_3(\text{OH})_2$ ", were found in lesser quantities. Chalcocite was the chief ore of the Simsbury mines; Bornite, at Bristol; but practically all of the ores occurred at each mine.

Of the industry itself, an anonymous writer in the *Waterbury Republican* of February 28, 1937, had this to say:—

"Behind the history of copper in Connecticut lies a legend of dead men's ambitions and dead men's failures, studded with suicide and possible murder, almost as colorful as the stories that came back from California in the late 40's or from Alaska many years later.

Nuggets of pure copper fermented lush dreams of quick fortunes; huge corporations floated stock issues to elevate pay-dirt from the bowels of nearby ridges; crashes, foreclosures, tears and heartaches, rejuvenated old folks and



disillusioned youths, all stalked the highways and home fires during the peak years of Connecticut's mining century. The whole drama of mining from debacle (sic) to death unfolded before our grandfathers' and fathers' doors."

### THE NEWGATE MINE

The most famous—or perhaps infamous would be better—of the copper mines was one at East Granby, known after its use as a prison began as "Newgate", after the famous English prison of that name. The location was in what originally was called "Massacoe", but in 1670 that settlement "which hitherto hath been an appendix to the town of Windsor", by order of the General Court of the Colony was given town privileges and named "Simsbury". One hundred and sixteen years later, in 1786, that part of Simsbury in which the mine was located, was set off as "Granby", and finally, when in 1858 Granby was made two towns, the mine found itself in East Granby.

The Simsbury town meeting in December of 1705, on the suggestion that "there was a mine either of silver or copper in the town"—it proved to be copper—appointed a committee to investigate and report. Their finding is not on the record, but obviously the mine was found, for in 1707 the majority of the proprietors of the town—who, as the mine was on unallotted land, held the rights in the soil—formed an association to develop the find. It was agreed that after deducting the expenses of the work, and paying the town ten shillings on each ton of copper obtained, the balance of the proceeds should be divided among the associates in proportion to the amounts of their respective subscriptions. In 1709, believing that "a public benefit" might result from the operations, the legislature passed an act legalizing the association, setting out its rights and powers, and prescribing its duties and procedures. So far as is known, this act constitutes the first mining company charter granted in this country.

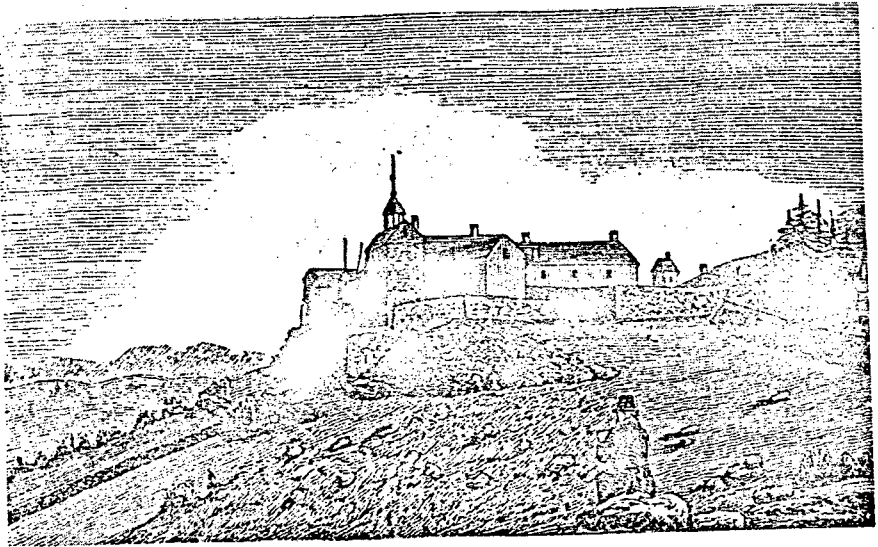
Of this association Phelps—"History of Granby and Canton", page 114—says:—

"This company dug the ore only—they did not undertake to smelt it. But, in the same year (1707), they entered into a contract with Messrs. John Woodbridge of Springfield, Dudley Woodbridge of Simsbury, and Timothy Woodbridge, Jr., then of Hartford, all clergymen, by which these gentlemen agreed to run and refine the ore, and cast the metal into bars fit for transportation or a market;—and after deducting the tenth part belonging to the town, of which two-thirds thereof was to be given for the maintenance "of an able schoolmaster in Simsbury", and the other third to the "Collegiate School", Yale College,—the residue was to be equally divided between them and the proprietors or workers of the mine.

"The business was carried on in this manner but a few years—probably because the smelting process was not understood, and could not be proceeded with

to the advantage of either party. In 1712, the proprietors, or "association", appointed a committee to call the contractors "to account, and, if necessary, to sue them for the ore that had been brought to them at divers times."

By 1714 the original "contractors" obviously were out, for in that year the mine was leased to Johnathan Belcher, William Partridge, and Timothy Woodbridge, Jr., the latter of whom will be remembered as one of the original trio of contractors. This group mined vigorously; in 1721 they were employing German miners, and were spending some seventy pounds each month, a rate averaged throughout their control, for in 1735 Belcher, then governor



NEWGATE PRISON FROM THE SOUTH AS SKETCHED BY JOHN W. BARBER ABOUT 1837

of Massachusetts, stated that in about 23 years the company had expended upwards of fifteen thousand pounds.

After 1745 comparatively little mining was done, although some work went on until the sale to the State in 1773. At that time two shafts had been sunk, one to a depth of thirty-five feet, the other, to more than seventy feet, and from the bottoms drifts, some four or five hundred feet long, had been extended in various directions.

Under the restrictive British acts the ore was supposed to be shipped to England for smelting, and at least some of it was. It was teamed over the poor and hilly roads to Hartford, then by boat to New York, and from that city to "the other side". The cost of transportation and the hazards of the sea—one ship carrying ore is said to have been lost by shipwreck, while another was captured by a French privateer—created, as was the intention

of Great Britain should be the case—an all but prohibitive handicap—and as was not Britain's intention, every incentive to bootlegging. Whether the reverend Woodbridges ran an outlaw smelter is not certain, although there is reason to believe they did, but with little if any success. In any case, in 1721, a rather extensive plant was set up on Hop Brook. To the difficulties resulting from the refractory character of the ore were added those due to the necessity for concealment, while at the mine the inflow of large quantities of water, necessitating continuous pumping, for which they had only man-power, created another serious handicap, and by 1745 the combination of troubles all but closed the mine. It continued in operation, however, though on a much reduced scale, until 1773, when, acting on the report of a committee that by an expenditure of about 37 pounds the "caverns" could be made so it would be next to impossible for any person to escape from them, and the mine then could be beneficially applied to the purpose of confining, securing and profitably employing criminals and delinquents, the State purchased the property and used it as a prison for the next 55 years. Its reputation in that capacity is well indicated by the following letter to the Simsbury Committee of Safety:—

"Gentlemen:

Cambridge, Dec. 11, 1775

"The prisoners which will be delivered you with this, having been tried by a court martial and deemed to be such flagrant and atrocious villains, that they cannot by any means be set at large or confined in any place near this camp, were sentenced to Symsbury, in Connecticut. You will, therefore, be pleased to have them secured in your jail, or in such other manner as to you shall seem necessary, so that they cannot possibly make their escape. The charges of their imprisonment will be at the Continental expense.

"I am, etc.

"George Washington"

For 55 years the property served as:—

"One of the most terrible and at the same time one of the most picturesque \* \* \* of American prisons."

(O. F. Lewis—"Development of American Prisons.")

But it was by no means as successful as a prison as the committee of 1773 had anticipated. It had been intended that the prisoners should mine the ore, but their tools for this purpose also served to dig tunnels to liberty, and after several such escapes the prisoners were given other kinds of work, and on the surface, but at night they went below, where they were locked in until morning. In 1790 Connecticut made Newgate the State prison, and it so remained for 37 years, during which time there were a number of escapes and three very serious riots. These, the heavy cost of maintenance, and the steadily growing criticism of the barbarous character of the institution finally forced the Legislature to act, and on September 29, 1827, the

prisoners were transferred to the new establishment at Wethersfield, and Newgate ceased to be a prison.

In 1830, for twelve hundred dollars, the State sold the mines, the buildings, and some five acres of land to the Phenix Mining Company. It spent much money on new equipment and started out bravely. But like its predecessors it was unable to smelt the ore successfully, and like them, shipped it to England. Completion of the Connecticut section of the Northampton Canal substituted an easy and short haul for the long and far more expensive



NEWGATE PRISON YARD AS DRAWN BY AN INMATE. COURTESY OF THE CONNECTICUT HISTORICAL SOCIETY, OWNER OF THE ORIGINAL

drag to the Connecticut River, but even so, the transportation cost proved the last straw, and after a few years the company gave up.

In 1855 another group, "The Connecticut Copper Company", took over the property, but after two years of business they too joined the ranks of the earlier failures. Today the property, in private hands, is maintained as a museum, parts of the mine as well as a collection of old-time tools being open to the public for a small admission fee.

#### THE BRISTOL COPPER MINE

Newgate was Connecticut's most famous copper mine, but the most successful one was at the northeast corner of the town of Bristol. In the early 1790's one Theophilus Botsford, curious as to why the waters of a little

spring there killed the vegetation along the banks, and stained green the stones in the bed of the brooklet it fed, did a bit of excavating, and uncovered a vein of copper ore. Satisfied with his discovery, he did nothing more about the find. In 1800, Asa Hooker, a brass founder of Bristol, who had learned of Botsford's discovery, got from "the widow Sarah Yale", who owned the land, the right to mine the ore on a percentage basis, but he took out only a small amount for use in his foundry. In 1802 his rights were transferred to Luke Gridley, a blacksmith, who is said to have smelted a small amount of ore, but who up to his death in 1810 did only just enough work there to hold the lease.

Nothing further seems to have been done until 1836, when George W. Bartholomew became interested and sent samples of the ore to England for analysis. On the strength of the favorable report the "Bristol Mining Company", with an authorized capital of \$60,000, of which the sum of \$42,000 had actually been paid in, was organized in 1837, under the Joint Stock Company act, and at once began active operations.

Buildings were erected, a shaft was sunk to a depth of 240 feet, and from this tunnels were driven at different levels, following the ore. This was stored on the surface until enough had accumulated—the Company report of 1839 lists among the assets, "several thousand tons of ore raised from the mine and now lying on the surface of the ground"—to warrant shipment. Then a courier on horseback notified the farmers of the surrounding country, who did the teaming to the point of shipment, and thereby earned much of their ready money.

A charter member of the company was one Andrew J. Miller, a New Jersey capitalist and a practical miner as well. Convinced of the value of the property he soon bought out the other stockholders, and having sold a half interest to an English group for \$28,000, he operated the property actively and profitably until his accidental death by drowning, in 1840. The success, however, was clearly due to Miller's management; after his death the business declined until 1846, when the company went into bankruptcy and its assets were sold to Richard H. Blydenburg of New York. The new owner promptly renewed the leases for a period of nine hundred and ninety-nine years, and then sold two-thirds of his interest to Henry Bradford, also of New York. Professor Benjamin Silliman of Yale, one of the most distinguished mineralogists of the time, made a glowing report on the possibilities of the mine, as he saw them, presumably on the strength of which Dr. Eliphalet Nott, the wealthy president of Union College, loaned the owners \$212,052, taking a mortgage on the property. Shortly thereafter he bought Blydenburg's interest for \$31,000 and apparently foreclosed the mortgage,

for several accounts say that by the purchase of Blydenburg's interest he became sole owner.

Thereafter the records are somewhat confused. A report by the directors to the stockholders meeting in August, 1855, in the State Library at Hartford, sets out that since 1847 there had been raised 1811 tons of ore and that nearly \$200,000 had been received from the sale of copper; that the capital investment was \$490,000, and that profits of \$1,800 a month were estimated for 1855.

Of this period, Milo Leon Norton has this to say:—

"The mine was worked on a large scale, extensive drifts were made, large buildings erected, and ore of exceeding richness was taken out in vast quantities. Extravagance in management and expenditures soon exceeded the income from the mine, great as it was, and Dr. Nott got out of it finally, wiser, undoubtedly, but decidedly no richer for his mining experiences, and the property passed into the hands of John M. Woolsey of Yale College. Under the direction of Prof. Silliman (who apparently also had an interest in the property—CRH) the most extravagant schemes and experiments, of a costly nature, were indulged in, the Professor being a fine theorist but a very poor practical miner. Hundreds of thousands of dollars, from first to last, were poured into the mine \* \* \* and the Bristol Mining Company, organized in 1855, became bankrupt in 1857."

(Bristol "Red Book", page 440.)

The "Bristol Mining Company" referred to by Norton had been chartered in 1849 under the Private Laws of Connecticut—Vol. IV, page 830—the rights of the former "Bristol Mining Company" apparently having died with the company. The later company originally had an authorized capital of \$500,000, which in 1855 it was authorized to increase up to a maximum of \$750,000. There seems to have been some question as to the legality of the charter grant of 1849, for the amendment of 1855 declares it "to be in full force and virtue, any doubts which may have arisen to the contrary notwithstanding".

Concerning the extravagance, an article in the "Tunxis Valley Herald" of December 17, 1886, said:—

"The collapse which came was caused by the grossest mismanagement, and not from any fault in the mine. The manager's crowning impulse seems to have been to spend the most money in the shortest possible time. Large and expensive buildings were for some trivial cause torn down and used for fuel, and new ones erected which if reports are true, were liable to meet a similar fate.

"The agent resided in Farmington street and kept eight or ten fast horses at his stables in Farmington and others at the mine. The superintendent occupied the house near the mine. The office furniture and fittings were of an expensive style. Once a dance was given in the store room which had been provided with steam pipes for heating it on this occasion as it was winter. Sibley's

Band, of Hartford, the best in the State at that time, was hired for \$100; the supper was a costly one, wine of several kinds being furnished. That this wine was not an imitation may be inferred from the fact that those at the supper table amused themselves by throwing turkeys and chickens at each other."

In Justice to Professor Silliman's memory the following quotation from "The Bristol Herald" of August 15, 1889, should be coupled with the above story:—

"A Letter From Prof. Silliman

"A letter from Prof. Silliman in Colorado, who was a large share-holder in the mine a year before it was abandoned, states that the mine was paying well but he became aware that the extravagant management would bring disastrous results and therefore he disposed of his interests a year before business was suspended."

It was chiefly in this period of operation that the mine gained its fame for its mineral specimens. Schairer—"Minerals of Connecticut", page 104—says:—

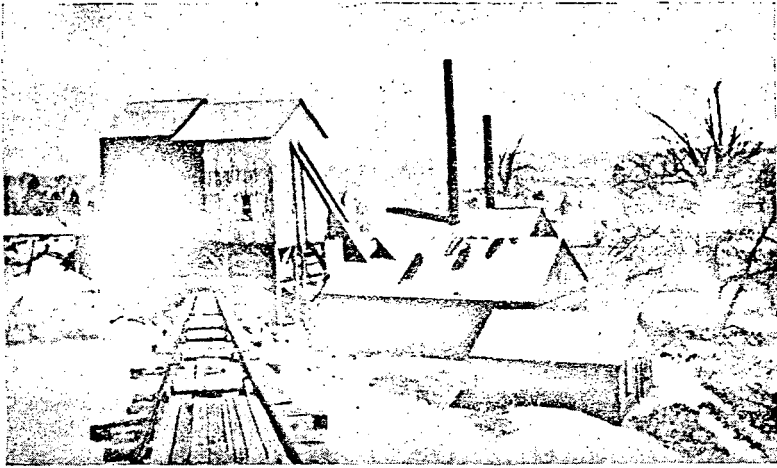
"This mine is famous throughout the world for the excellent crystals of Chalcocite ( $Cu_2S$ ) which it produced. These crystals are preserved in all the large museums in America and Europe."

In 1858 Woolsey purchased the outstanding mortgages which he foreclosed, becoming the sole owner of the property, but shortly thereafter he died, leaving his estate in such confusion that thirty years elapsed before it was fully settled. Meantime all the buildings and machinery were sold or stolen, and carried away. In 1888, however, one B. S. Cowles, who had devised a process for recovering copper from low grade ore and felt it could be applied successfully to the wastes of the Bristol mine, succeeded, first, in interesting E. G. Hubbell, librarian and curator of the Athaeneum at Pittsfield, and then, with his help, forming "The Bristol Copper and Silver Mining Company" of Albany, New York, with a paid-up capital of \$500,000.

The Cowles process proving too costly, the company decided to reopen the mine, and this was done; it was pumped out, the shaft deepened from 240 to 400 feet, the old drifts cleaned out and extended, and new ones driven. Numerous small deposits of rich ore were found, but not the great vein hoped for, but at that the mine was almost on a paying basis. While the directors were debating whether to continue, the superintendent, one Allen, produced some ore rich in gold. On the basis of this discovery new capital was obtained, but unfortunately for Allen certain skeptical directors employed detectives who found that the gold ore had come from a western mine and was being "planted" to keep the works in operation. This proved the last straw; the work was stopped, one director was said to have commit-

ted suicide, having counted on his anticipated profits to cover up a defalcation elsewhere, and again, and for the last time, the buildings and machinery were sold or stolen.

But the jinx that had plagued the project from the start was not yet done. February 19, 1896, following heavy rains, the waste weir of the large dam which had been built to create the water-power once used became clogged with ice; the dam was topped and much of it washed away. The resulting flood carried away every bridge over the outlet stream, from the mine to Forestville, and at the latter place it washed out a section of the



THE BRISTOL COPPER AND SILVER MINING COMPANY CRUSHER PLANT

railroad, wrecking a freight train standing on a siding there, but fortunately without causing any loss of life, although the property loss was heavy.

In the course of the existence of the mine thousands of feet of drifts had been excavated, eight working and prospecting shafts had been sunk, one of them, the Williams, 13 feet square and 400 feet deep, being considered the best timbered shaft in the country. Many feet of diamond drill prospecting had been done, and it was claimed that the existence of "enormous quantities" of low grade ore had been demonstrated. Moreover, the property had produced a great quantity of exceedingly valuable ore, although a large part of the proceeds were wasted in what seem little less than criminal extravagances. And it is by no means improbable, that if the "enormous quantities of low grade ore" are actually there, efficient methods of working might not at least earn operating expenses today.



## THE COPPER LEDGES MINE

The fact that copper ore had been found at several points in Bristol led, in the early eighteen-fifties, first, to the sinking of several test pits in what was then a wooded tract near the present course of Brewster Road between Bradley Street and Belridge Road, and then, in view of the promising results, to the organization, in 1853, of "The Hartford County Mining Company". This outfit put up buildings, sank a shaft to a depth of about 100 feet, and pushed out drifts, one of these being four or five hundred feet long. By that time, having practically exhausted its funds, and, as far as any records go, having found nothing of value, the work was closed down.

In the eighteen nineties, Patrick Coleman, a prominent Bristol plumber, became interested in the property, purchased the land on which the mine was located, and moved some machinery there, but no further record of his activities could be found, and the property is now a private estate.

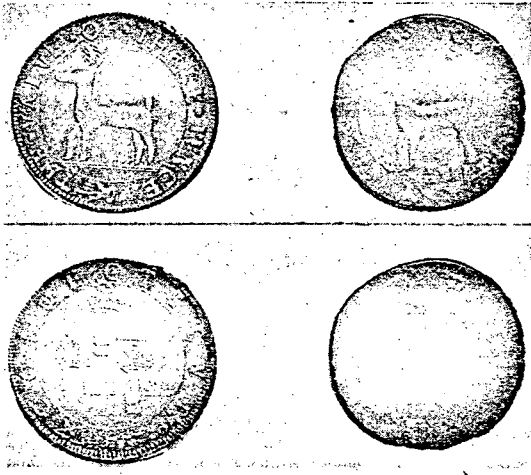
## THE HIGLEY MINE

Samuel Higley, who, "with great pains and cost", had discovered how to "transmute common iron into steel", in July, 1728, purchased of William Dement of Enfield some 143 acres of land for which he paid "ye sum of five hundred pounds currant New England money". There were three "parcells", the first one containing some thirty acres of marsh or meadow land and ten acres of upland. It was on this parcel that the mine was, or was to be, for it is not clear from the records whether or no it was there at the time of Higley's purchase.

Higley sank two shafts, and took out "many hundreds of tons" of an ore which Professor Silliman of Yale, who examined the then abandoned mine in 1870, said was "of the most valuable description". Most, if not all, of this ore was shipped to England for smelting; it was by the shipwreck, in May, 1737, of one of the ore-carriers on which he was going to England, that Higley is supposed to have lost his life. After his death the mine was operated for a few years, but only in a desultory way, and then was abandoned.

While the mine in its time produced a very considerable amount of rich ore, its chief claim to fame is on the score of Higley's bootleg currency, struck from native copper. There were five varieties of the coins, three being undated, a fourth marked 1737, and a fifth, 1739. It is thought that the last, dated after Higley's death, was the work of his brother John, aided by the Reverend Timothy Woodbridge and William Cradock. One group has on the reverse three crowned hammers surrounded by a ring inscription which on some reads: "Connecticut 1737" and on the others:

"I Am Good Copper". The other group has a broadaxe surrounded by the ring inscription: "I Cut My Way Through". All have a standing deer on the obverse, or front, inside a ring inscription which reads either: "Value of Three Pence" or "Value Me As You Please". The story is, that the "Three Pence" coins were the first struck off, and were largely used to pay for a brew of ale of which Higley was inordinately fond, but his thirst leading the inn-keeper to protest that he was being over-loaded with 'thrippences', he thereupon changed the legend to "Value Me As You Will". As a matter of fact, the inn-keeper probably had very little trouble



THE HIGLEY COPPERS. COURTESY OF THE CONNECTICUT HISTORICAL SOCIETY,  
OWNERS OF THE ORIGINALS

in disposing of the coins. Because of the purity of the copper of which they were made, the coins were in great demand by goldsmiths for alloying gold. Most of them were so used, and the few still in existence show more or less wear, due to the softness of their metal. At that, they are worth many times their weight in gold, a good specimen having today a value of several hundred dollars.

#### THE CHESHIRE COPPER MINES

The records of the Cheshire copper mines leave an investigator in considerable doubt as to what really are the facts.

About 1670, two "adventurers who came from England" are supposed to have opened a mine in a part of Wallingford which later became part of Cheshire. Operations were carried on for some time, but when two of

the ships carrying the ore to England for smelting were lost at sea, and with them one or more of the mine officers, those left behind had a quarrel, in which one man was killed. His comrades hastily disposed of the corpse—one account says they dropped it down the shaft—and left for parts unknown. How long the mine remained idle—or for that matter, if it ever was re-opened,—is very uncertain. In 1854 an old mine which had a beech tree two feet in diameter growing over the shaft was:—

“cleared out to the depth of eighty feet. At the bottom was found an old windlass, an iron bound bucket, a large wooden dipper, with handle five or six feet long, a crow bar, picks, drills, hammers, etc., all in a good state of preservation.”

(Letter of Geo. R. Johnson, “from a Meriden newspaper.”)

The evidence is circumstantial only, but the existence of all the tools at the foot of the shaft, as if left there in the expectation of using them the next day, fits in with the story of the hasty departure of long before. Under average conditions it would probably take from 50 to 60 years for a beech tree to grow to a diameter of two feet, but with no knowledge as to when it started to grow, it simply shows that operations must have stopped at least 50 or 60 years before 1854.

Again there is a great lack of information. An unsigned article in the *Waterbury Republican* of February 28, 1937, after describing the discovery of the tools, etc., says, “How much the section was worked then is not clear,” and then quotes Judge James R. Lanyon (of Cheshire) as recalling that men worked over the little knoll for three years, from 1880 to 1883, and remembering his father telling of New York men who were spending considerable money and effort to produce ore in paying quantities. To the author, Judge Lanyon said that operations were carried on until 1885 or a little later, after which the buildings were taken down and the machinery sold.

In what was then a part of Wallingford, but now in the southeast corner of Cheshire, one John Parker, in 1711, was reported to have found copper and perhaps other valuable metals on his farm, which was on “Milking-yard Hill”. The proprietors of the town, alarmed lest he lay claim to the find, appealed to the “Generall Courte”, and at the May session of 1712 the facts and rights were set out as follows:—

Whereas, there is a Copper Mine lately discovered at Wallengsford, in the undivided lands, which appertain to a certain number of proprietors, being the surviving antient inhabitants of said town and the heirs of such antient inhabitants, proprietors, who are deceased, together with such other person or persons who are admitted by common consent and agreement of the proprietors among themselves to a certain proportion of interest and right in the said mines; and more such copper mines or other mines may be discovered within the town—

ship of Wallingsford, either in the undivided lands, or in the lands that are divided and belong to particular persons; all which mines whenever discovered do belong to the aforesaid proprietors by virtue of a covenant or agreement of the inhabitants of Wallingsford made and mutually concluded on among themselves, as also by virtue of a formal and lawful quitclaim from the Governour and Company of the English Colony of Connecticut in New England in America, under their common seal, settling and confirming the said mines unto the said proprietors and other heirs and assigns forever: And whereas the well managing and improving the said mines will be not only profitable to the proprietors themselves, but also may be of publick advantage \* \* \*.

It is enacted and ordained by the Governor, Council and Representatives in General Court assembled \* \* \*.

That the proprietors \* \* \* shall have power and authority, at all and every time and times hereafter, to improve all the aforesaid mines, and manage all the affairs and business anyways relating to the said mines \* \* \* and are hereby enabled \* \* \* to lease out, demise, and let to farm, the whole or any part or parcel of said mines, \* \* \* for such term or terms of time, as well for such rents, incomes or yearly profits, or other considerations, as they shall think meet.

(Colonial Records, pages 315-316.)

Shortly after this, William Partridge of Newbury and Jonathan Belcher of Boston, merchant, both of the Province of Massachusetts Bay, entered into Articles of Agreement with the town of Wallingford for the opening of mines there, the miners, artificers and laborers connected with them to be exempted from all civil and military duties and all taxes; the lease to run eight years, with the privilege of renewal for a period "not exceeding 500 years in the whole". It would seem that Parker took exception to the deal, for June 16, 1714:—

"Ye proprietors agreed to give John Parker teen shillings in case sd Parker be forever hereafter quiet and contented with respect to ye mine money."

For a time the work seems to have prospered. At the October session of the 1721-22 General Assembly, Matthew Bellamy urged:—

"That as your petitioner is living within the township of Wallingford and living very near the place where the miners are at work where there is many of them and especyally will be many more and there being no other person within six or seven miles that can well find them entertainment except your Petitioner whereupon your petitioner with the next owners of ye mines prayeth your petitioner may have a lycense by an act of this Assembly to keep a hous of entertainment that so your Petitioner may without danger provide for and entertain the miners and others as need may require and your petitioner to be under ye same penalty as other persons that are lycensed by the Assembly Courte".

But evidently matters did not go so well thereafter. At a Proprietors' meeting held in Wallingford "june ye 23: 1723:—

"Voated and agreed yt where as Mr. William Partridge and Mr. Jonathan Belsher: Did formerly hire our mines as will appear by articles more fully described there in: said Patrig and said Belsher not performing ye covenants in said articles conserning said mines: the proprietors do authorize and impower Capt. John Hall of Wallingford in his Majesties colloney of Connecticut in New England: to render and deliver up said articles on our part: and Demand and receive of said Patrig and Belsher or either of yem the Articles on their part reciprocally to be Delivered up according to ye covenants:"

(Beach: "History of Cheshire", page 60.)

The proprietors may well have felt that a smaller group could deal more successfully with any subsequent lessee, for they appointed a committee of five "to act in their behalfe in all matters and conserns about said mines", and a few months later this committee and the proprietors by their "voat" chose another committee to sign new articles with "Mr. Belsher" of Boston, and others associated with him, from which it would seem that "Belsher" had purged himself of his default. *The proprietors were not sure of him at that, for the records carry a vote "that said Belsher shall enjoy his half part of said mines: in case he pays tenn pounds yearly to ye proprietors of Wallingford" who agree not to take any forfeiture proceedings against him if he pays promptly.*

Again there is a break in the records, and that what follows refers to Parker's mine has little more authority than that it is the author's best guess.

In October of 1854 Truman Bristol granted Sanderson Smith mining rights on a 30 acre tract of land at "Copper Valley". Smith failed to meet his obligations, and in September of 1866 Bristol gave Charles Munson and Leonard Pardee the entire and exclusive right of mining, quarrying, digging, and excavating, for minerals and metals:—

"being the same grant he gave Sanderson Smith whose right and privilege ran out and became forfeit by reason of non-payment."

Prior to this, in 1863, Munson had received another grant from Truman Bristol, and in 1866 he bought land, presumably next the Bristol grants, from David Gaylord, while a year later he obtained from Street Jones such rights as the latter had in the waters of West Brook, and mining rights on a 50 acre parcel of land, on which he and Pardee were permitted to erect a storehouse and shelter, but not smelting works.

There is practically nothing regarding the amount of ore raised. Munson seems to have worked the mine himself part of the time, and on other occasions to have leased the property. In 1874 Nathan Peck and Isaac Anderson, lessees, agreed to spend \$25,000 "because of the increasing flow of water in shafts and levels"; to deepen the shaft somewhat for a

water receiver ; to extend easterly the drift on the line of the east and west vein ; and to install a portable steam hoisting engine.

Munson took great interest in the mine, and personally went to great lengths to make it a success. Ore of a superior quality was obtained, but the shafts, sunk to a depth of more than one hundred feet, and the drifts run from them, encountered water in greater quantity than could be controlled. Munson is said to have sunk \$50,000 of his own money in the project, and various lessees also spent substantial sums, but to no avail, and the leased property eventually reverted to Truman Bristol. However, Mr. George R. Johnson of Copper Valley said that Mr. Munson, at that time in his ninetieth year, wrote him that he had not lost faith in the mine ; that he felt that they not gone down deep enough "to remove the cover off the precious metal".

#### THE GOLDEN PARLOUR MINE

By 1736 a mining venture was under way on a "peice" of land owned by Timothy Royce of Wallingford and located at "Ye Red Rocks" in the north part of the town. The earliest record of the project shows that at its date the company had expended what, for that period, was a very substantial sum of money. It is as follows :—

"A record kept by Benjamin Roys, Clark of proprietors of the mines in the land of Timothy Roys in Wallingford, February ye 11, 1736/7. Then the owners of the mines in the land of Timothy Roys in Wallingford, being Regularly met together at the hous of John Way in Wallingford did then make up their Accounts of the Charg expended in the Mines, from 8 of November 1736, which charg did amount to the sum of 86£,4s,2d"

On July 27, 1736, it was agreed to :—

"pay to Georg Bell the Sum of fourty pounds, upon his finishing a job of work he had undertaken to do in the Golden Parler, viz., to sink twelve feet in the deeper shaft nerest to docter houghs and to leave the bottom of the Shaft nere the wedth and length that it now is."

\* \* \* \* \*

"S'd owners made up their accounts which did amount to the Sum of 132£,13s,1d."

(Davis: "History of Wallingford", page 51.)

Apparently feeling that their proceedings had been too informal, on April 27, 1737, "Articles of Agreement" were drawn up and signed by the parties at interest. They begin as follows :—

"Articles of Agreement made and Concluded upon this twenty seventh day of April, Anno Domini, 1737, Between Edward Higbee of Middletown, and Walter Henderson of Hartford, both of ye County of Hartford, and Thomas Thomas of New York, Arthur Rexford, Sam'll Androus, Benj. Roys, all of

Wallingford, in ye County of Hartford, afores'd and Josiah Griswold, Thomas Goodwin, Benjamin Stillman, John Pierce, all of Wethersfield, in ye County aforesaid, Proprietors and Joint owners of a certain peice of land, or Mines in said Wallingford as leased out to them by Timothy Royce of sd Wallingford"

and are followed by seven articles, constituting a constitution, the first one stating "That the Name of Sd Mine Shall be the Golden Parlour."

It would seem from the name that the company was in search of gold rather than copper; no record was found of anything they may have ob-



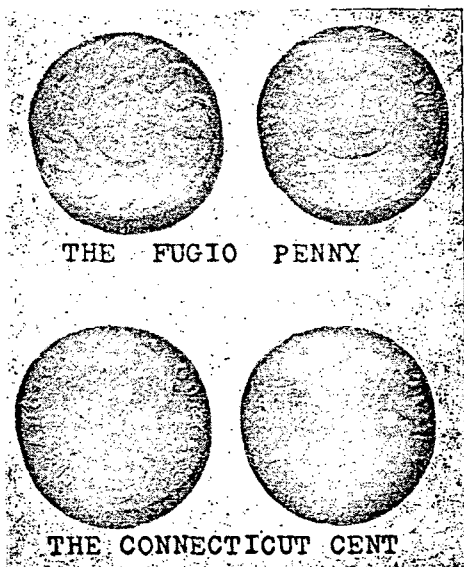
INSIDE THE ADIT TUNNEL OF THE TALLMAN COPPER MINE

tained; but a very sketchy newspaper account wound up with the statement that the failure of the mine was due to the fact that the "foreigners" employed "made off with most of the gold mined."

#### THE TALLMAN MINE

Running north from Mt. Carmel into Cheshire is Ridge Hill, on the southern end of which, some two miles south of Copper Valley there were a couple of outcrops of "Peacock Copper Ore", Bornite. Some time before the Revolutionary War, David Tallman discovered one if not both of the outcrops, which are three or four hundred feet apart. Following down the ore with a shaft some fifty feet deep, he began an adit or horizontal tunnel half way down the hill and distant horizontally some two or three hun-

dred feet from the nearest shaft, with which it was to connect. He did not push it far enough, however, and if anything else was done, the operations, judging from Dr. Shepard's comment—"Report on the Geological Survey of Connecticut", page 45—were ended some time before 1837. About 1854 Charles Munson obtained control of the mine, deepened the shafts to 150 feet, and extended the adit to connect with them, but failed to find sufficient promise of good ore to warrant further expenditures. Today the shafts are partially filled up, but the adit is open for some distance,



COURTESY OF MR. NORMAN BRYANT, OWNER OF THE ORIGINALS

although it has water to a depth of a foot or more on the floor, fed, judging from the outflow at the mouth, by some very small springs.

Considered solely as a copper mine, Tallman had little to render it notable, but there is an unsubstantiated legend which, if true, gives it quite a little importance.

Higley's coppers were bootleg coins, but in 1785 Connecticut granted the petition of James Hillhouse, Samuel Bishop and John Goodrich that they be authorized to establish a mint and make much needed copper coins for small change. They were to weigh six pennyweights each and to be of the value of the British half-penny, the total amount coined not to exceed in value £10,000 lawful money. The obverse was to have a man's head inside the ring inscription "Auctori: Connect: ("By the authority of Connecticut"); the reverse to have a seated figure of Liberty with an olive branch



in her hand, inside the ring inscription "Inde. Et. Lib.:" ("Independence and Liberty") and the date of coinage.

Two years later the United States Congress authorized the first copper coin of the new republic, a cent, with a sundial in the center of the obverse. "Fugio" ("I fly", evidently referring to time) on the left, "1787" on the right, a full sun above the dial, and "Mind Your Business" below it. The reverse has "We Are One" in the center, surrounded by a band ring with "United States" on it, and this in turn surrounded by a ring of 13 linked small circles. In the belief that the "Mind Your Business" was from his "Poor Richard's Almanac" the coin is sometimes called the "Franklin" cent, but it is better and more properly known as the "Fugio".

The "Connecticut" cents, and some of the "Fugios", were coined in New Haven, in a little mint on the south side of Water Street, between Franklin and the present Hamilton Streets, the latter being called at that time "Townsend" Street. Abel Buel, an ingenious and inventive scalawag, some years before, had "raised" a Connecticut Bill of Credit from its original value of five shillings to that of five pounds, and having been detected, he had a "C" branded on his forehead, his right ear cropped—it is said that because of his youth the brand was put well up under his hair and his ear was very lightly snipped—his worldly goods confiscated, and body clapped into jail. Released largely through the efforts of his wife, it would seem that his skill rather than any evil intent in "raising" the note was remembered, for he was employed to make the necessary dies. Not only did he make these, and that very well; he also invented a very efficient and successful press for striking the coins.

To date no actual proof has been uncovered, but several writers say that "it is believed", or "it is understood" that some of the copper from which these coins were struck came from the Tallman mine.

#### THE STEVENSON MINE

The Stevenson mine is about eight miles from Derby, on Bowers' Hill, in Oxford. It was opened some time before the Civil War by an English company, and mining was continued, though with unsatisfactory returns, until some time after 1864, the ore being smelted at Derby. Other than that the company had excavated "a huge hole", and that it had two buildings there, no information has been uncovered as to the extent of these operations.

About 1896, A. B. Hendryx of New Haven purchased the property, and anticipating success and a rise in values, leased, with the right of purchase, a large area of adjoining land. Work on the project was vigorously

pushed, although there is some question as to just what was done. An unsigned article in the *New Haven Sunday Register* of July 19, 1931, says:—

"The shaft runs 165 feet on an incline into the earth" \* \* \* \*

"A shaft about 15 feet wide and 10 feet high was sunk on an incline."

W. H. Weed, in the *United States Geological Survey Bulletin No. 455*, however, quotes E. C. Eckel as saying:—

"An inclined shaft 5 feet wide by 5 feet high follows down on the ore to a depth of 125 feet on the dip."

This time the ore was shipped to New Jersey for smelting, a narrow gauge railway, the little cars of which were hauled up, at first by a horse-operated windlass and later by a steam engine, bringing it to the surface.

But although in the few years he operated it Mr. Hendryx is said to have sunk some \$12,000 in the project, it could not be made to pay. Eckel reported that the ore bed was said to yield from 20 to 30 per cent chalcopyrite, which theoretically should yield from 7 to 10½ per cent of copper. That is enough to make the mining profitable if the operating is efficient. The *Register* article, however, said that the ore assayed but 4 per cent metal.

Today only the dumps and a shaft filled with ice-cold water—it is said, however, that it never freezes—remains to mark the project.

#### THE WYLLYS COPPER MINE

There is even less information regarding this mining effort than in the case of the Stevenson mine. The Reverend S. W. Robbins, who wrote the chapter on Manchester in "*The Memorial History of Hartford County*", speaking of Highland Park, says:—

"Here the stream falls sixty-five feet over the rocks into the valley below, grass covered, and enclosed for some distance by wooded bluffs—a miniature Yosemite, admired by all observers. At the base of these bluffs are excavations that have been made for ore (sulphide of copper), which, being found in limited quantity was once supposed to indicate the existence of valuable mines. In the original division of the land, the place where the copper mines were supposed to be, was to remain undivided "to lye for the general benefit of the proprietors."

Quoting the above, Marie de Valcherville, in the *Connecticut Quarterly*, Volume I (1895), page 299, adds:—

"The Wyllys mines were operated to some extent in the first half of the century, and one across the brook from the valley still remains open for the investigation of those who have the temerity to explore its depths."

No mention of the mine is made by Shepard, Schairer or Weed, nor have I been able to find any record other than the above.

## NATIVE COPPER

Native copper has been found, but only occasionally. It is supposed that Higley's coppers were made from native copper from his mine; it has been found in small irregular masses with other copper minerals at Bristol, Cheshire and Simsbury; while a mass weighing nearly 200 pounds was discovered in gravel near New Haven. Another lump weighing 90 pounds was found "attached by bands to a rock" in Hamden, about 1787, and around 1900 Mr. J. H. Dickerman found a number of small specimens on Mt. Carmel, Hamden, some attached to, or bedded in rocks, others loose.

Undoubtedly, Connecticut still truthfully can say:—"Thar's copper in them thar hills", but unfortunately, although the total amount is probably very large, it seems to be too thinly spread to pay for its recovery.

## ACKNOWLEDGEMENT

A paper such as this, made up of odds and ends of scanty and scattered material, can be prepared only through much investigation. In this case a great deal of what has been set down was obtained through the generous help of many people. To all who contributed to the result the author expresses his sincere appreciation and his heartfelt thanks. The list is too long for individual mention in every case, but specific mention must be made of:—

Mr. Norman Bryant, New Haven

The Connecticut Historical Society, Hartford

Mr. Kenneth Gregg, Research Director, State Development Commission, Hartford

Mr. George W. Hull, Bristol

The staffs of the Connecticut State, the New Haven Public and Sterling Libraries

Professor Edward L. Troxell, State Geologist, Hartford

Mr. Frank W. Wilson, West Cheshire

## DISCUSSION

**CHAIRMAN BARRY:** Would anybody here like to ask Mr. Harte some questions on these minerals?

**MR. HARTE:** First of all, let me say that we have a member here who is a real expert, Mr. Kenneth P. Gregg, Director of the State Development Commission.

**MR. GREGG:** I want to congratulate Mr. Harte and the Society on this splendid presentation.

There are just two points that occurred to me that might be of interest in connection with the iron ore program of the federal government. Just yesterday the Regional Engineer gave me a copy of a report on a survey, a geo-physical survey which they are now conducting at the magnetite deposits at Cornwall Bridge. It looked very interesting indeed. They report that they are proceeding to make a similar study of several of the other magnetite deposits that Mr. Harte referred to. The funds appropriated by Congress to the Department of Interior for the Bureau of Iron Ore Exploration

were not expended to a very large degree because the purpose was to develop metal necessary in the war program; and the emergency having passed, or beginning to pass, last summer, the War Production Board discouraged proceeding with that program.

One other development in reference to iron. Mr. Harte referred to the beach sands. Well, it happens that this type of sand has been found along the Connecticut River, and the Bureau of Mines Engineers have been conducting an exploration. They report one deposit above Portland as containing approximately fifty million cubic yards of iron-bearing sands which they have found to contain about five to eight per cent of the metal ore, and they are now proceeding with experiments to find out practical ways of concentrating that ore. It may be something of considerable importance.

CHAIRMAN BARRY: Anyone else?

PROFESSOR TROXELL: I want to compliment Mr. Harte on the work that he is doing, not only in digging up these old records and making them available, much of which is history, but just as interesting to us as the geology itself. It will be very valuable to us to have these records for future reference. I am not sure that we will find anything entirely new, but one can never tell where such an investigation will lead. The State Geological Survey stands back of Mr. Harte and is willing to support him in every way in the work which he is doing.

CHAIRMAN BARRY: Anyone else? Mr. Harte, we thank you very much for your address.

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