

THE IRON INDUSTRIES OF BIRMINGHAM, ALA.

In a recent visit to the Exposition in Atlanta the attention of our correspondent was called to a specimen of red iron ore in the Alabama building. It was in the form of a monolithic column, twenty-two feet high, and was said to represent in its height the thickness of the vein of ore in the Birmingham, Ala., district from which it was taken. Naturally such an exhibit arrests the attention of the iron-working community and inspires the spectator to know more of this iron wonderland. It was in pursuit of more knowledge of this subject that led the writer to visit Birmingham, and he was enabled thereby to procure some illustrations from recent photographs taken of interesting features of the place and its industries.

When it is seen that such vast stores of iron are concentrated in so accessible a location as Birmingham, with its network of railways diverging to all points of the country, the reflection comes, What effect can this profusion have upon less favored fields?

The earliest workers in iron, the Phœnicians, producing small quantities, with abundant timber at hand for producing the charcoal fuel, did make iron that excelled in quality for the purposes for which wrought iron was useful. It can be said truthfully that the ores of Birmingham, with coal and coke as the reducing fuel, are also capable of producing a superior wrought iron for all commercial and mechanical purposes. The demands of the present day, however, have a wider field, in the various grades of steel and malle-



GENERAL VIEW OF BIRMINGHAM ALA.



PLATT MINE COKE OVENS.

try is familiar to every traveler in the vicinity of an iron district. In this view are shown the rows of ovens, in which the superabundance of the bituminous element and impurities are eliminated by charring. Raw bituminous coal is prone to cake and clog up the charge in the furnace, and besides this, elements other than pure carbon are driven off by coking, and the fuel brought nearer to that most perfect of fuels for smelting, wood charcoal.

The coal used is brought from the mines, in drifts with the mountain side, and run in chutes down into cars as shown in our view at the Sumter coal mine, on Blue Creek. Where the coal lies deeper in the earth and requires power to bring it to the surface, it is necessary to use cables from hoisting engines for this purpose. We show in a view the engine house and machinery used at Henryellen coal mines, in the Birmingham district. This photo clearly shows its operations, with the winding drums in the background, from which lead cables to the mines below, and which are rotated by the engines shown in the front.

The view of the Ishkooda ore mine has been selected as exhibiting the magnitude of the ore deposits in the Birmingham district. This interesting view shows the portion worked, of a solid vein of red fossiliferous iron ore, in which vein there is a thickness of thirty feet, varying but slightly from these figures, though the "working" shown was for special reasons located at the twenty-foot depth. The massive column showing in the front is a solid block of iron ore. As a representative type of the blast furnaces in this

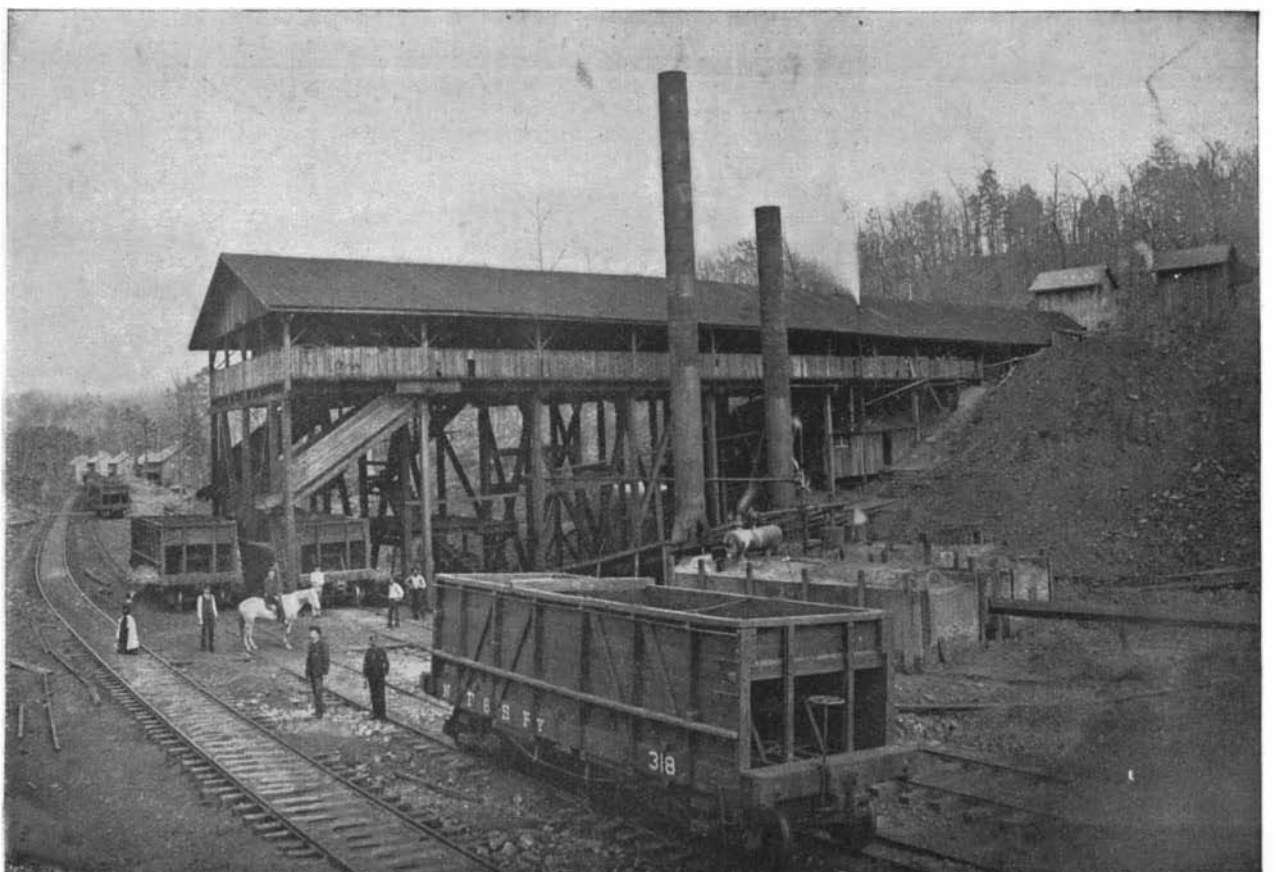
able iron work; and it is essential that certain conditions shall exist in the metal used for these purposes.

Our present purpose is to show some of the plants erected for the reduction of the ores, and other views connected with the iron industry.

The city of Birmingham, the center of the iron district, is most beautifully located upon an eminence in a broad valley between two ranges of mountains.

Our sketch of the city was taken by our artist from the northerly one of these mountains, on the slope of which is located the principal cemetery of the city. Over the city itself is seen the southerly range, which is called Red Mountain, and it is from this range that most of the iron ore, coal and limestone are obtained.

The city contains a population of over 30,000 inhabitants, has wide, paved streets, rows of fine business structures, hotels, fine churches, schools, street cars, and its people have much social refinement and talents for arts other than that of iron production. In this district, of which Birmingham is the center, are 22 furnaces. Their names and number of furnaces are: Thomas, 2; Alice, 2; Sloss, 4; Ensley, 4; Woodward, 2; Bessemer, 5; Ox Moor, 2; Williamson (not in operation now), 1. Besides these are a large rolling mill and puddling plant, producing merchantable bar and round wrought irons, and associate industries. One of these is the producing of coke for blast furnace purposes. An excellent view of the coking ovens of the Platt mines is shown in one of the views. The beauty of a night view of this indus-



SUMTER COAL MINE, BLUE CREEK NEAR BIRMINGHAM.

district a view of the Ensley furnaces is shown, having four furnaces or stacks in the plant. The working of one of these huge furnaces will be described in a future issue, together with some notes on the great industries which have been built up in Birmingham in so short a time.

Long Distance Signaling.

In his annual report, Captain W. A. Glassford, Chief Signal Officer, Department of Colorado, enters at length into the subject of military signaling over long distances.

Successful heliographing was accomplished over ranges from 20 to 85 miles in length by signal parties from posts; and ranges of 125 miles will be undertaken during the coming year. Such, indeed, has been the interest in the heliograph that ranges have been tried until now there is but one intervening range to be tested in order to complete, should it be necessary, a plexus of heliograph stations to connect every post in Colorado, Utah, Arizona, and New Mexico with the Department Headquarters in Denver. In the preliminary long range practice between Pike's Peak and Denver, Col., the flash from Pike's Peak

could be seen with the naked eye, and this signaling was interestingly witnessed by a number of spectators; among others General McCook was a pleased observer of this preliminary work, and it was only then that the possibility of heliographing over the 183 mile range ceased to be considered by many as chimerical.

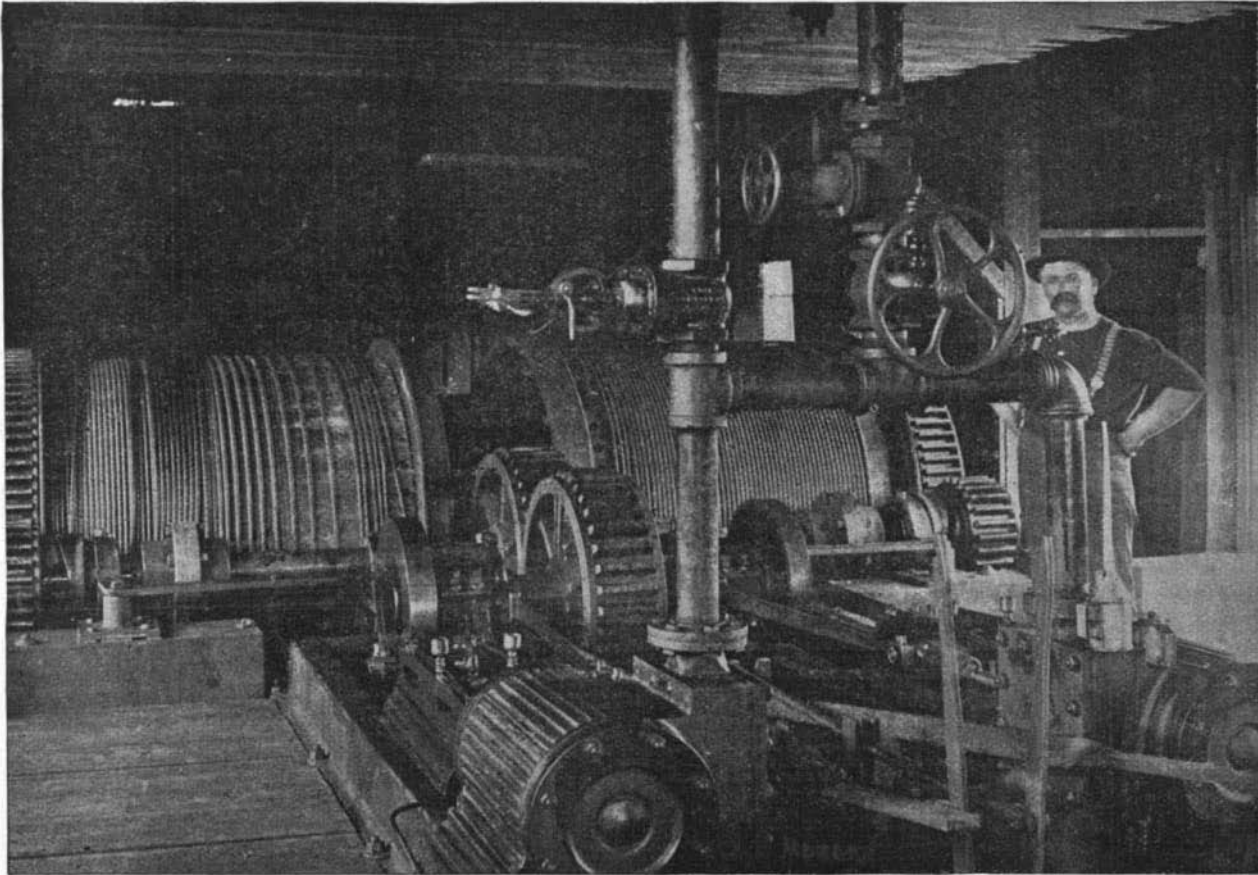
The conclusion arrived at from this experience in long range signaling is, that under the conditions of sunlight or clearness that obtain in this Western region, with a mirror of sufficient surface area, with some modifications of manipulation, these ranges are only limited by the curvature of the earth and intervening mountains, and are as practicable as the shorter ones. It is not tenable, however, to claim for such long distance heliographing signaling that it is always to be relied upon, or that it is a practicable means of military communication under all circumstances; but for that matter, the heliograph is never to be wholly depended on, because, even in short ranges, clouds may intervene in some cases for a long time. A system of repeating signals is accordingly suggested. Words deciphered in one message can be recorded, and others added to it from the repetitions until the whole message is received.

The following lines have been engraved upon Huxley's tombstone:

"And if there be no meeting past the grave,
If all is darkness, silence, yet 'tis rest,
Be not afraid, ye waiting hearts that weep!
For God still giveth his beloved sleep,
And if an endless sleep he wills, so best!"

Work of Life Savers.

According to the report of the General Superintendent of the Life Saving Service for the fiscal year ended June 30 last, the number of disasters to documented vessels within the field of the operations of the service during the year was 483. There were on board these vessels 5,402 persons, of whom 5,382 were saved and twenty lost. Eight hundred and three shipwrecked persons received succor in the stations.



ENGINE HOUSE AT HENRYELLEN COAL MINES.

to whom 2,232 days' relief in the aggregate was afforded.

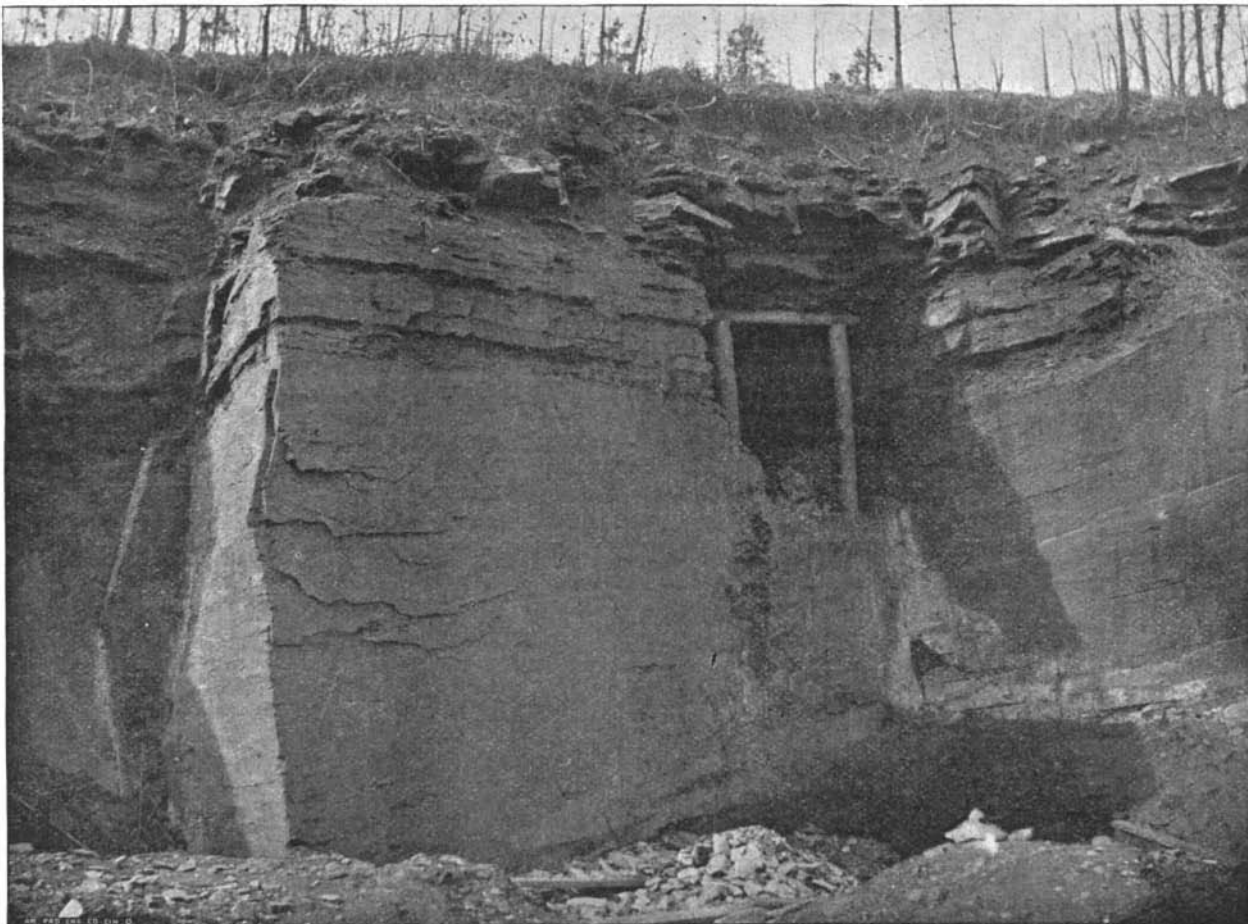
The estimated values of the vessels involved was \$8,001,275, and that of their cargoes \$2,645,960, making a total value of property imperiled \$10,647,235. Of this amount, \$9,145,085 was saved and \$1,502,150 lost. The number of vessels totally lost was seventy-three.

In addition there were 192 casualties to small craft, on board of which were 421 persons, of whom 415 were

growth of part of the present plateau. This ancient forest was apparently thrown down by the wind, for tree butts are common in horizontal position while only one was found erect. The gravel and sand covering would seem to have come soon, for only a few have fillings of sediment in hollows or give other indications of decay; the logs were buried at least fifty or sixty feet deep. The weight of the overlying sediments crushed the trees so that the horizontal diameters are commonly greater than the vertical as they are seen in place. Silicification was probably accomplished by percolating surface waters, as the logs are distant from volcanic vents, as far as known to the writer; then no hot water deposits were seen accompanying the logs, and the distribution as seen over many miles and reported much more widely would also militate against the theory of change by hot waters.

The Lava of Idaho.

Ages ago a vast river of fire poured down the center of the State of Idaho. This river consisted of molten lava, was 400 miles long, 100 miles wide, and from 300 to 900 feet thick. Across the corpse of this mighty river of fire a river of water has slowly cut a channel in several places. Born in the



ISHKOODA ORE MINE.

saved. Life saving crews also rescued 110 persons who had fallen from wharves, piers, etc.

The crews saved and assisted in saving 379 vessels, valued with their cargoes at \$3,561,665, and rendered assistance of minor importance to 181 other vessels in distress, besides warning from danger by signals of patrolmen 249 vessels. The cost of maintaining the service for the year was \$1,345,324.40.

melting snow of the majestic Tetons, this river has cut its way for hundreds of miles through lava beds, in its course tumbling over numerous precipices until the great climax is reached at Shoshone Falls, where this mighty river makes an awful leap of 210 feet, a magnificent spectacle, in marked contrast to the desolate country on either side.

The Hermit of Moose Island.

Uncle John Cusack, the hermit of Moose Island, has just sold part of his insular domain in Moosehead Lake, and, to this extent, has abdicated the long seclusion in which he has dwelt for about 30 years. He retains 200 acres, upon which his house and stable stand. Four hundred acres he has sold to a wealthy woman, said to be a Southerner, for about \$4,000, who will build there her summer residence.

It was near the close of the civil war that John Cusack, now a hale and hearty man of 65 years, came from Reedfield, Me., and pitched his camp upon Moose Island, which subsequently he bought. He was a man of intelligence and some education who had studied law. Here he worked for various lumber firms that operated about the head water of Maine's great rivers in the Moosehead Lake region. Energetic, industrious and temperate, he became famous on the west branch of the Penobscot for his wonderful skill in log riding, a proficiency exercised to great advantage in getting the log drives down the broken waters of that swift and turbulent stream.

Not long ago there appeared in print an account of John Cusack's feat in crossing the Piscataquis River at Foxcroft, standing on a 35 pound binding pole. Such a performance is a commonplace one for him. Frequently, on a wager or merely to exhibit his skill, he has crossed the broad reach of West Cove at the foot of Moosehead Lake, on a pole as slender, and even when upheld by nothing more buoying than a lumberman's pick-pole. As to the matter of a boat to take him from his island to the mainland he gives himself little trouble. To leap upon a log, with a slab or sapling for paddle, propel himself across the dividing channel, is as much a matter of course with him as for an urban resident to step upon a horse car.

With such a craft he sometimes has made strange and adventurous voyages. Once as the steamer from Kineo plowed down the lake through a heavy sea, the ship's company were astounded by the sight of a man, in mid-lake, standing breast high in the heaving waters, with which he was battling in seeming pursuit of a small dog that sat in full view above the surface a few feet ahead of him. The steamer, changing her course, slowed down to pick up John Cusack, who was making the fourth mile of a voyage with an old tree

root as his craft and his dog as passenger. He stood upon the larger end of the root, thereby lifting the other end above the water, and upon this upraised tip the dog found a safe if not quite dry footing. The sight of Uncle John and his dog making similar though less venturesome voyages about the lower part of the lake is not uncommon, and the dog has learned to take his place on the dry end of the stick or root at his master's first word of command.

In his primitive castle on Moose Island, John Cusack lives on terms as patriarchal and friendly with the dumb animals which are his companions as did Robinson Crusoe with his goats. In the summer his sleek oxen, sheep and poultry forage well for themselves over the slopes and fertile meadows of the island. In the winter, should it chance that John Cusack desires to go away to remain for several days, he does not trouble himself to import a man to care for these creatures. He pitches half a ton of hay down into the middle of the barn floor, scatters corn and grain around where the hens can get to it, opens the barn door so that they can go to the spring for water at pleasure, and goes away for an indefinite time with assured confidence that all will be well at home.

Despite his secluded and celibate life—Uncle John is a bachelor—he has no aversion to human society, but, on the contrary, enjoys it, and he is especially gallant and chivalrous to the fair sex. In the solitude of Moose Island he doesn't find much of a field for conversation, but he makes full amends when he emerges, as he often does, into the settled communities. Then, by the stove of a country store or a hotel office, he can talk a continuous streak, without pause for rest or re-

freshment, for six hours at a stretch, and then stop when time at last is called as fresh and colloquial as at the beginning.

In person the hermit of Moose Island is short and active of motion, and his hair and full beard are now sprinkled with gray. He dresses neatly, but on his island domain he is prone to discard the use of shoes and stockings as a needless conventionalism, and it is a cold day when he takes the trouble to don footwear for an informal trip to Greenville, the nearest base of supplies.—Maine State Press.

Our Export Trade.

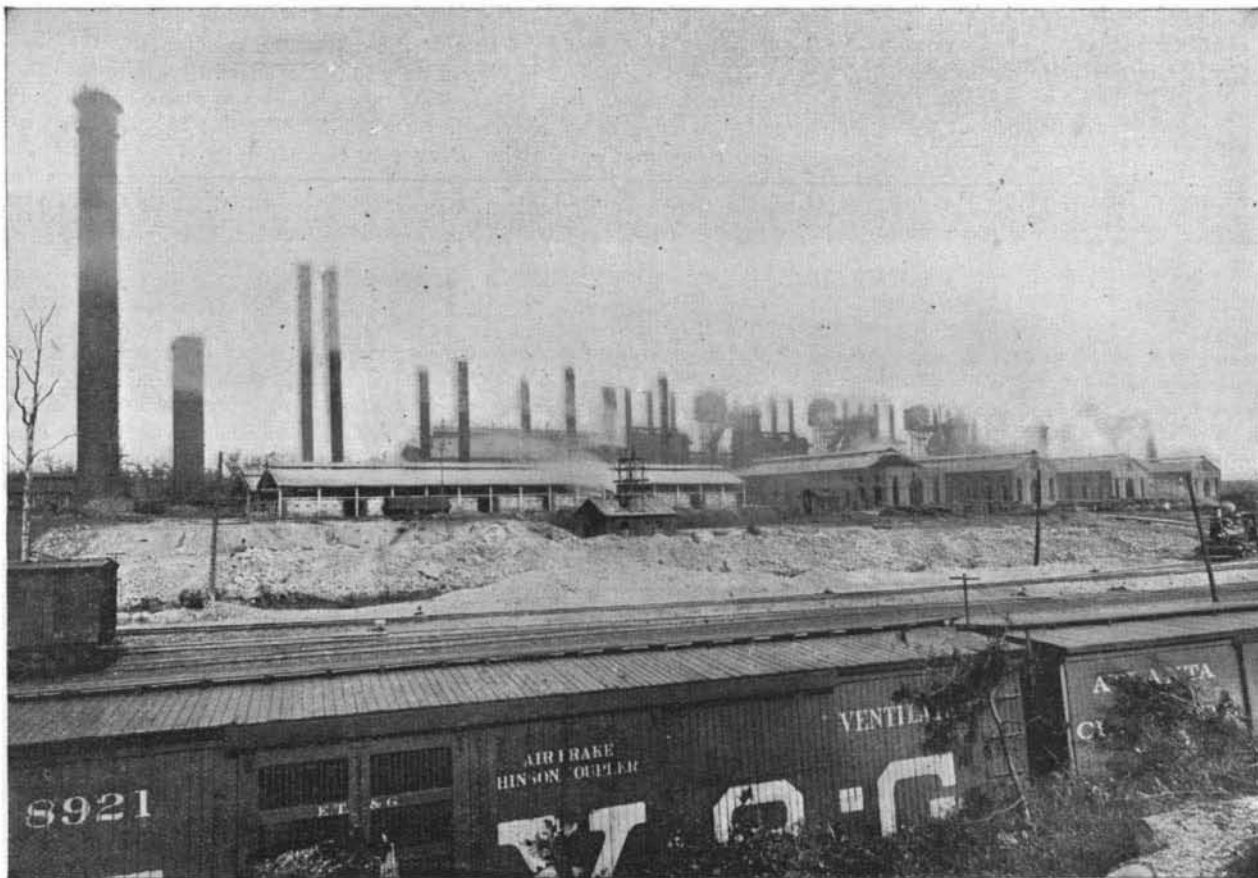
A notable feature of our export trade in recent months, the Boston Journal of Commerce says, has been the widening of the markets for American manufactures. Thus this fall \$100,000 worth of American cotton fabrics have been sent to Arabia, while Roumania, Turkey, and Spain have placed trial orders for hardware. Russia has bought very large lines of American manufactured rubber. Brazil has placed large orders for chemicals of American manufacture. France bought American bicycles to the value of \$12,000 this autumn, while the United States of Colombia purchased \$8,000 worth of American "wheels." South and Central American countries have bought large quantities of American cutlery. The Argentine Republic took \$60,000 worth of binding twine. Electrical material is in demand in Brazil, which, between August 1 and October 1, placed orders for more than \$30,000 worth of it in the United States. Australia favors American carriages, and has bought

Industrious Leeds.

At the recent annual meeting of the Society of Chemical Industry at Leeds, Mayor Gilston delivered himself after this fashion:

I am not going to make any comparisons between the industries of Leeds and other places, because it would be to their disadvantage. There are some places that are noted for one thing, and they live and sometimes thrive by it. Leeds, I am glad to say, is dependent on no one industry. I daresay it would take Mr. Jackson and myself all our time to tell you to-night which is the staple trade of Leeds. We not only make cloth, but we have one firm that can supply 10,000 suits of clothes in a single week. That does something to clothe humanity, whether it betters it or not. The variety of our industries, to my mind, is but an evidence of the versatility of the genius of our people. I sometimes say London is what we have made it and that it could not exist without us; for whenever we have a man who seems to rise above the common herd, he is taken to London. Even when we had made Professor Thorpe what he is, they would not let him remain; they took him to London that he might raise the standard of intelligence of the people there. That is no uncommon practice with Leeds people. In the leather industry I believe we are second to none. We not only make the leather, but we supply all creation with shoes. People go so far as to say that by means of recent discoveries the hides of cattle bought in our markets on Wednesday and taken to Mr. Jackson's, on Friday night reappear as ladies' shoes. You have seen through the steam plow works. We have supplied creation with

the means of husbandry. You have seen Greenwood & Batleys, where we can destroy creation with almost equal ease. I have no fear as to the future of this country, if genius, skill, perseverance, and intelligence are allowed fair play in the development of our industries. We have not only iron, machinery, flax, cloth, linen, glass, and porcelain works, but we have an industry in this town unknown almost to you. I daresay not many know that Leeds is a wine-producing center; but you might have had your suspicions raised if you had gone round and seen the fields of rhubarb we cultivate. By the railway over which Mr. Jackson so ably presides it is no uncommon thing to send out 250 to 300 tons of rhubarb in a



ENSLEY FURNACES.

single month to be made into wine. It was worth coming to Leeds to know that. But to my mind the great aim and object of the society is not to lessen the means of production, nor the amount of employment for our artisan population, but it is to economize and recover what has been hitherto waste material. This will not only have to be taught in our colleges but put into practice in our workshops. I was through a large chemical works a short time ago and saw a great pile of refuse from the making of alkali. When I was a boy I saw that heap being piled up, wagon after wagon, as a nuisance because it occupied useful ground. What did I find the other day? After it had lain there for sixty years they are working that heap over again and converting it into sulphuric acid. This is one of the provinces of chemistry. We have been making useful what has been useless. We are making profitable that which was unprofitable in the past, and Leeds, from its great variety of industries and the skill and intelligence and frugality of its people, is in the van of progress. When you, gentlemen, have taught us how to utilize the carbon we send out of our chimneys, the produce of our labor will be less costly and the atmosphere purer. I am satisfied that England has not yet arrived at her greatest development, and if English skill is left "free" from fetters of an artificial kind, I will back England against creation in her manufactures.

Tree Ages.

Gericke, the great German forester, writes that the greatest ages to which trees in Germany are positively known to have lived are from 500 to 570 years. For instance the pine in Bohemia and the pine in Norway and Sweden have lived to the latter age. Next comes the silverfir, which in the Bohemian forests has stood and thrived for upward of 400 years. In Bavaria the larch has reached the age of 275 years. Of foliage trees, the oak appears to have survived the longest. The best example is the evergreen oak at Aschoffenburg, which reached the age of 410 years. Other oaks in Germany have lived to be from 315 to 320 years old. At Aschoffenburg the red beech has lived to the age of 245 years, and at other points to the age of 225 years. Of other trees, the highest known are ash 170 years, birch 160 to 200 years, aspen 220 years, mountain maple 225 years, elm 130 years and red alder 145 years.

A CONCESSION to build a carriage road from Teheran to Bagdad and also to build electric railroads in the suburbs of Teheran has just been granted to a German contractor.

Typhoid Fever Disseminated Through the Milk Supply.*

The relation of milk to the spread of infectious diseases has been most strikingly shown in an epidemic of typhoid fever that occurred at Stamford, Conn., during this year, the official report of which has been recently issued by Professor H. E. Smith. The evidence gathered shows beyond all question that the disease was propagated by means of the milk supply, so that the epidemic possesses unusual interest for students in bacteriology and hygiene.

The epidemic broke out in April, and within six weeks 386 cases were reported in a town of about 16,000 inhabitants. Of this number, 65 cases or 16.8 per cent were five years old or under, while over one-third of the total number were under ten years of age.

The mortality statistics of the State of Connecticut for the last 15 years show that less than 10 per cent of the total number of deaths from typhoid have been under 10 years of age. In view of this, the large number of cases in early childhood has a peculiar significance in explaining the origin of the epidemic, as the infection of the milk supply would be more apt to manifest itself in infants than in adults. As soon as the milk supply was suspected, its sale was prohibited, and in fifteen days (about the usual period of incubation of this disease) after this prohibition went into effect the number of new cases dropped from an average of over ten a day to less than two. It was further shown that out of the total number of 386 cases, 352 or 91.2 per cent lived in families that were supplied with milk from the same dealer. In 14 other cases milk from this same dealer was consumed by parties at a cafe and bakery. In 8 of the remaining cases milk was supplied the parties by the producer from whom the milk peddler obtained his supply. This makes a total of 97.1 per cent of all cases that received the milk, either directly from the producer or indirectly through the milk dealer who peddled the milk. As the milkman in question only supplied about 9

* From Science.

per cent of the total amount used in the town, the number of cases that developed on his route is of especial interest.

The evidence of a contaminated milk supply was overwhelming, but how to account for the infection of the milk was not so easy. The milk might have become infected in the hands of either the dealer or the producer. Inasmuch as a few cases of the epidemic developed that were not supplied with milk from the dealer, but were supplied by other parties that had been using some of the milk cans in common with him, the presumption was strongly in favor of the view that the infection occurred while the milk was in the hands of the dealer. It seems that the dealer was in the habit of washing out his cans himself, and while he obtained most of his supply from the producer in question, at times he secured an extra supply from other parties. No particular attention was paid to the cans that were used, so that they were often mixed up and returned to different parties after they had been cleaned by the dealer.

No case of typhoid had occurred at the house of either the dealer or the producer, so that direct infection of the milk did not seem probable. An examination of the water supply was then made. At both places shallow wells were found, that of the milk dealer's being only thirteen feet deep with nearly twelve feet of water in it. The well was surrounded on several sides by privies, an extremely foul one being within twenty-five feet of the well. It was the habit of the dealer to first rinse out the milk cans with water from this well, then they were thoroughly cleansed with hot water and soda, and finally rinsed in cold water again that was taken from this well.

Both the bacteriological and chemical examination of water from the two wells was made.

Neither of the wells was good, and that of the milk dealer was grossly contaminated, having nearly 70,000 germs per cubic centimeter.

Typhoid bacteria were not discovered, but this is not surprising. It is possible that the privy near the

well may have been used by some unknown person, as it was close to and easily accessible from a railroad. There is no positive evidence, however, that the water was contaminated except in the history of the epidemic. The evidence, however, is so strong that there can be no valid objection to the conclusion that milk was infected by washing the cans with contaminated water.

H. L. RUSSELL.

Torpedo Boat Practice at Newport, R. I.

Rules were arranged similar to those which have governed the drill between the torpedo station and the Cushing, except that Lieut. Smith promised not to take shelter behind any obstructions within 2,000 yards—one sea mile—despite the fact that the battleship Maine has four searchlights and should consequently be impregnable against a torpedo attack, if there is such a possibility with a reliance on searchlights alone, without other scouts.

The officers of the ship thought they were sure of success in such an attack, and in a harbor where they had but four narrow channels to sweep and a searchlight to each. But they were doomed to disappointment, as the torpedo boat had an easy task.

November 22.—The Cushing ran out to the ship in mid-harbor under running lights. After a brief conference these lights were hidden, and the Cushing sped off toward the channel. The searchlights swept the waters, but the boat was not to be seen. She had doubled her tracks, passed within 1,500 yards of the ship, and run out to sea. Then she glided up the channel, close under the Fort Adams shore, and then laid out a direct course for the ship. She was discovered only when within twenty seconds of torpedoing distance, and before all the lights could be trained upon her, to say nothing of an effective battery, she had discharged all three of her rockets. When the allotted two minutes had expired after her discovery she was alongside the ship. The second attack, while differing in method, was equally successful for the Cushing.

RECENTLY PATENTED INVENTIONS.**Agricultural.**

PLANTER.—Anders Matson, Moline, Ill. This is especially a corn planter, automatically dropping corn at regular intervals, and the mechanism being adjustable to drop the corn in drills, one seed or as many as may be desired at a time. The markers are adjustable to large or small planting wheels, one marker marking the field one row in advance, and the marker on the opposite side of the machine traveling in the row previously marked, enabling the driver to readily see how to drive to plant the corn equal distances apart.

Electrical.

ELECTRIC DESK LAMP.—William H. Sheppard, New York City. This is an incandescent lamp admitting of three adjustments to shed light in different directions, having two swinging bracket arms in hollow trunnions projecting from the socket, the arms being revolvable to change the position of the light, while a cylindrical shade or drum may be revolved to alter the position of the light opening, the size of which may be adjusted by the drawing out, more or less, of a shutter. By means of a single key the current may be sent into either one or both of the lamps.

Miscellaneous.

FARE REGISTER.—Walter D. Campbell, Buenos Ayres, Argentine Republic. To insure the co-operation of passengers in observing the registering of the fares by the conductor, this invention provides an accurately registering mechanism in connection with a plainly visible dial, but the registering mechanism is so arranged that, after a certain number of fares has been registered, a prize or premium ticket will be thrown out, as, for instance, a small percentage of all the fares, the prize ticket becoming the property of the passenger paying the last fare.

WRAPPING PAPER PRINTING.—Byron J. Churchill, Morris, N. Y. To print upon rolls or sheets of paper as it is drawn off for wrapping up parcels in stores, this inventor has devised a paper-supporting frame with which is combined a pivotally connected yoke and casing carrying an inking roller and a printing roller, the latter always remaining in contact with the paper and being rotated by frictional contact therewith, while springs keep the inking roller in contact with the printing roller.

THILL COUPLING.—Peter Bold, Woodbourne, N. Y. This is an improvement in couplings in which the opposite trunnions of the thill are received in sockets carried by clip plates, and provides, by a novel construction of the clip and plates, for holding the upper clip plate rigid against the under side of the axle, the lower clip plate moving on the upper clip plate to effect the proper adjustment, and thus preventing the scratching or marring of the axle, which is frequently caused where both plates have movement.

PUMP.—Dudley L. Smith and Frank E. Womer, Fairhaven, Wash. This is a pump more especially designed for raising impure water containing gravel, stones, etc., and the invention provides for a chamber connected with the pump cylinder and the suction pipe, and by a drop or downward bend with the discharge pipe, inclined hinge valves controlling the inflow and outflow to and from the chamber.

EAVES TROUGH PROTECTOR.—Marcellus M. Hitt, Luray, Va. To prevent birds from building their nests over the trough, and also keep the droppings of birds, leaves, and other trash out of the trough, this

inventor has devised a protector whose body is composed of bent wire gauze having in its edges projecting rods and holders provided with hooks for attaching the protector to the trough. The protector can be adjusted to give it the same inclination as the roof.

BOOT OR SHOE HOLDING STAND.—Richard Lundqvist, Laguna de Terminos, Mexico. For conveniently cleaning, blacking, polishing, or otherwise treating a boot or shoe, this inventor has devised a stand for holding the boot or shoe in the best position. The stand comprises a suitable base on which is a post having near its middle a box for brushes, etc., and on the top of the post is a rest similar to a foot, the shoe being engaged by a last and held in position on the rest by a curved spring-pressed lever. The last does not need to fit very snugly, and the two or three sizes required may be kept in the brush box.

BATHING FORM.—Kate Hatch, Brooklyn, N. Y. For the use of ladies while bathing in the surf or other place, to protect and shield the upper front part of the body, this inventor has devised a form comprising a front made of a single piece of rubber or other flexible material, adapted to fit snugly and conform to the upper part of the wearer's body. The front has bust-supporting pockets, and at its upper end are shoulder straps adapted to hook upon rear extensions at the sides of the front. There are also side straps which pass under the wearer's arms, crossing the back, to be attached to hooks on the sides of the front, and back straps. Each of the straps is adapted to be drawn and held sufficiently tight to conveniently support the form on the wearer's body.

BEDSTEAD BRACKET.—Henry G. Traeger, Portersville, Cal. This invention provides a bracket, preferably made of cast metal, for convenient attachment to the inner corners of bed posts, on which the bracket is readily adjustable vertically, it being designed to receive one corner of the bed spring, mattress, etc., and for use in lieu of slats, dispensing with the racks commonly provided on the side pieces of bedsteads and affording a much more cleanly and desirable article of furniture.

NECK YOKE.—John B. Lockwood, Helena, Montana. This device has an eye adapted to receive the vehicle pole, there being pivoted to the eye the lower end of a clamping bar with a cam surface engaging the pole, while a sleeve receiving the yoke has lugs pivoted to the upper end of the clamping bar. The harder the pull in a forward direction on the neck yoke, the tighter the clamping bar will be engaged with the top of the pole, which is positively prevented from becoming accidentally detached and dropping to the ground.

TRAP.—Job T. Wells, Cando, North Dakota. To catch small animals or birds, this inventor has devised a bait-alluring device in which the cage has at one end a transverse passage with normally open ends, a hinged gate at each end of the passage, and spring mechanism to release the gates upon the entry of a victim.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

NEW BOOKS AND PUBLICATIONS.

UNITED STATES COMMISSION OF FISH AND FISHERIES. Part XIX. Report of the Commission for the year ending June 30, 1893. Washington, 1895. 8vo, pp. 142.

ECONOMIC MINING. A practical handbook for the miner, the metallurgist, and the merchant. By C. G. Warnford Locke. London: E. & F. N. Spon. New York: Spon & Chamberlain, 1895. Pp. 668. 8vo. 175 illustrations. Price \$5.

Notwithstanding the fairly abundant mining literature, there is no room for doubt that a book founded on the lines of this volume will supply a long felt want. The reason for this is, that by the rigid exclusion of matters having only an academic or historic interest, the space is afforded for dealing with just those points which are, perhaps, not of strictly scientific value, but which have, nevertheless, a high economic importance, and go far toward determining the profitable or unprofitable result of an undertaking. As mining and metallurgy are industrial pursuits, followed with a view of financial gain, the economic aspect is quite as deserving of study as the highly controversial questions regarding the history of strata, etc. Accepting the beds and lodes and veins as accomplished facts, the book endeavors to describe in plain language and with a practical aim how these deposits will best be worked under the various conditions encountered, and how the valuable portions of their contents can most cheaply and effectively be separated and prepared as marketable commodities. This is a most excellent book, and the author has acted very wisely in excluding the old processes, which are now interesting only from a historical point of view.

AMERICAN WOODS. By Romeyn B. Hough, author and publisher. Lowville, N. Y. 1893. 8vo. Pp. 79. Illustrated, 75 samples of wood, port folio, in cloth case. Price \$5.

American Woods is a publication in book form illustrated by neatly arranged sections of wood, which have been sliced by an ingenious machine. It is issued in parts, like the above, which is Part I, each representing twenty-five species by seventy-five or more authentic and beautifully prepared specimens showing transverse, radial and tangential views of the grain. The design of this work is to show in as compact and perfect manner as possible the beauty and characteristic structure of the various timbers of our North American forests. The thin slices measure 2 by 5 inches and exhibit the grain in all aspects. They are so thin as to admit light through them. (The author also prepares lantern slides of wood, which prove very useful in teaching.) Each section is securely mounted in a cardboard frame of a purple black color, bearing the scientific or botanical name, in the English, German, French and Spanish languages. A single frame contains only the set of three sections of a single species. With these frames, which are separate, not bound together—so as to admit of being examined singly or arranged in a window—is a pamphlet of text giving full information containing the various species represented. The author has been very careful about the identification of each tree selected for the specimen; hence he can vouch for the authenticity of every specimen represented. Mr. Hough had charge of the remarkable New York State Forestry Exhibit at the Columbian Exposition. The work is also supplied in other bindings and the specimens of wood or the text may be purchased singly. The author also prepares wooden cross section cards which are a novelty. The science of botany is apt to make a very dry study, but it could easily be rendered more interesting by a collection of these woods.

ANNUAL REPORT OF THE STATE GEOLOGIST FOR THE YEAR 1894. By John C. Smock. State Geologist. Trenton, N. J. 1895. 8vo. Pp. 304. Plates, maps.

SCIENTIFIC AMERICAN**BUILDING EDITION.**

NOVEMBER, 1895.—(No. 121.)

TABLE OF CONTENTS.

1. An elegant residence at Wakefield, N. Y. Two perspective elevations, also an interior view and floor plans. Mr. Ralph N. Cranford, architect, Wakefield, N. Y. An excellent design.
2. Plate in colors of a cottage in the Colonial style, recently erected at Mount Vernon, N. Y. at a cost of \$4,750. Two perspective elevations and floor plans. A picturesque design. Mr. H. J. Robinson, architect, Mount Vernon, N. Y.
3. A double house at Marietta, Ohio, recently erected at a cost of \$2,163. Three perspective elevations and floor plans. William Foreman, architect, Marietta, Ohio.
4. A residence at Germantown, Philadelphia, recently erected at a cost of \$25,000 complete, including stable. Perspective elevation and floor plans. Architects, Messrs. Hazlehurst & Huckel, Philadelphia, Pa. An ornate residence in the Spanish Renaissance style.
5. A residence at Lake Waccabuc, N. Y. Two perspective elevations and floor plans. An attractive design.
6. A Reformed Dutch Church at Warwick, N. Y. Three perspective elevations and floor plans. Cost \$30,000. Architect, Mr. E. G. W. Dietrich, New York. A design successfully treated in the Byzantine style.
7. A cottage at Mount Vernon, N. Y., recently erected at a cost of \$2,500. Two perspective elevations and floor plans. Architect, Mr. A. M. Jenks, Mount Vernon, N. Y.
8. Perspective elevations of two low cost houses located at Hasbrouck Heights, N. J. Perspective elevations and floor plans. Cost, \$1,850. Mr. S. A. Dennis, architect, Arlington, N. J.
9. Views and floor plans of two windmills, at Mount Vernon and Wakefield, N. Y. Cost complete, \$1,800. Architect, Mr. Frank M. Wright, Mount Vernon, N. Y.
10. A stable at Wakefield, N. Y. Perspective elevation and floor plans. Architect, Mr. Ralph N. Cranford, Wakefield, N. Y. An original design.
11. Miscellaneous Contents: Hints to readers.—The education of customers.—The echo organ at Westminster Abbey. The Mascot heater, illustrated.—Carlisle's burglar proof window sash lock, illustrated.—Steam pipe and boiler covering, illustrated.—A large shipment of roofing slate.—Moving a masonry house.—The "Royal" door check and spring, illustrated.—An improved window screen and awning, illustrated.—An improved steam heating boiler, illustrated.—Improved wood-working machinery, illustrated.—Painting iron work.—A new and powerful elevator, illustrated.—Cheap flour or middlings in paint.

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