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THE CITY OF WORCESTER.

We give an engraving of the magnificent steamer City of Worcester, which has been built by the Harlan and Hollingsworth Company, Wilmington, Del., to ply on Long Island Sound between New York and New London. She is one of the finest specimens of this class of marine construction ever turned out, and as a business boat she has no equal, both as to freight capacity and general arrangement for handling it, while in passenger accommodation she is simply superb in finish and without a peer in this country. She is the largest iron vessel of her special class in the world.

Her register tonnage is 2,485 85-100 tons; length on water line 325 feet, over all 340 feet, moulded beam of hull 46 feet, over guards 80 feet; depth of hold 16·3 feet. The plating is from 7-16 inch to ¾ inch in thickness, the shear streak being 11-16 inch and the inside one 10-16 inch, which being doubled, gives her a thickness of $1\frac{5}{16}$ inches.

She has six water tight bulkheads fitted between double frames on the side, one as a collision bulkhead and one at each end of the machinery space, and the others at regularly intervening distances. Should two of these bulkheads be destroyed by collision, the other four would float the boat.

Her machinery consists of a surface condensing walking beam engine, having a cylinder 90 inches in diameter and 12 feet stroke of piston, arranged with composition valves and seats and Stevens cut off. The wheels are 38 feet in diameter, with buckets of about 11 feet face. She has three main boilers, 37 feet 6 inches long by 12 feet diameter and 13 feet front, containing about 9,300 feet of fire surface and 280 feet of grate surface, and has a certificate for a working pressure of 50 pounds to the square inch. The boat has independent engines and blowers of ample size, which are arranged to blow under the grates. She is also fitted with a 40 horse power donkey boiler, together with steam pump, located on the guard deck and fitted with the necessary attachments and fixtures complete. There are 200 tons of boilers in all, and her main boilers are claimed to be the largest in the world. Her coal bunkers, when full, contain 125 tons of coal.

The forward part of the hull has been extra braced and extra plated, to enable the boat to be safely propelled through ice, with the full power of her engine exerted. The bottom is covered inside with the best quality of Portland cement.

Over a million pounds of iron were expended on her up to the time she was launched (March 12, 1881), and as strength was the first great desideratum it was gained at a small expense upon the original proposed draught of water of the vessel, but all are satisfied that no stronger boat exists to-day. As to her beauty, taken in every detail, there are none to be found who do not pronounce her perfect in this respect. She has 161 selling state rooms, 519 berths, and is licensed to carry 519 first class and 223 deck passengers; a total of 742. The City of Worcester carries eight metallic life boats, six 22 feet long, two 24 feet long, and one wooden 16 feet long, all square sterned; four metallic life rafts, and several of Woolsey's cork life buoys. Every berth in the vessel is provided with Kanhweiler's Neversink cork life jackets, and the same kind of jackets are liberally provided for the deck passengers and crew. In fact she has eight hundred of these valuable and only reliable life preservers on board, all within easy access to the passengers. Every precaution within the range of practical experience has been taken to guard against fire. There are nine fire plug outlets on the main deck, eight in the saloon, four in the hold, and four on the hurricane deck, all supplied from two large pumps, driven by the donkey engine, in which steam will always be kept up for immediate action in case of an emergency. There are 1,450 feet of hose attached to the plugs in convenient positions, to be used for no other purpose whatever.

The boiler space is closed in with iron fireproof deck and bulkheads, making a fireproof section, to guard against any danger of fire from that quarter. So far as we can see nothing has been left undone to make her secure against any character of accident, either by collision, stranding or fire.

Now a word as to her freight capacity, which is greater than any combined two of the other large Sound steamers, as she will easily stow ninety long car loads, and can upon a pinch carry 120 car loads. This fact alone shows how great an improvement has been made in this respect in designing this boat.

A special feature of her internal arrangements consists of a separate gangway for passengers which has been provided on the freight deck, by which they can enter or leave the boat without coming into contact with the incoming and discharging freight and baggage.

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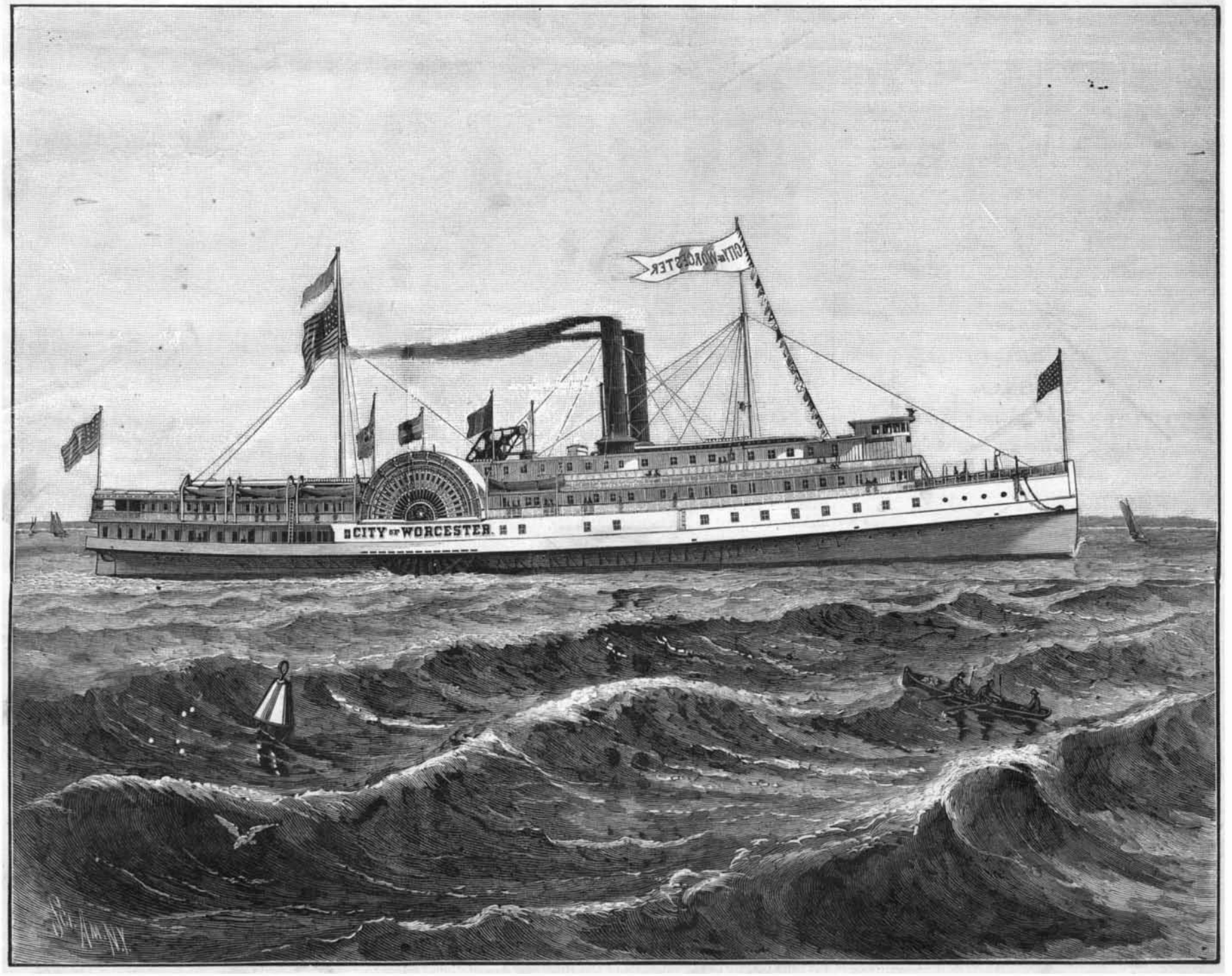


THE NEW PALATIAL IRON STEAMER CITY OF WORCESTER OF THE NORWICH AND NEW YORK TRANSPORTATION COMPANY.

THE CITY OF WORCESTER.

[*Continued from first page.*]

The lower forward saloon contains the officers' mess room, forward of which is a washroom for passengers, with four marble basins, the bar, and a small pantry, hot tables, etc. In this saloon there are 48 berths, in tiers of three; the berth tiers are built out from the sides of the vessel, so that there is a wide passage way between the skin of the vessel and the back of the berths, giving the most perfect system of ventilation ever in use on a steamboat. This saloon is lit with three electric light chandeliers. The after part of this saloon is bulkheaded off, so as to make sleeping quarters for the waiters, and contains 27 berths in a finely ventilated apartment. We will now ascend by a broad staircase to the main deck, and going forward we find the forecastle under the main deck, which contains 24 berths for the crew. The forecastle is well lighted and ventilated. Ascending again to the main deck in the "eyes of her" is a series of lockers; a large space here is bulkheaded for the windlass room, in which is placed a splendid Providence steam windlass, of the double cylinder pattern, made by the American Ship Windlass Company, of Providence, R. I., which handles her two anchors of 4,100 and 3,000 pounds of weight respectively, and her cables, which are each 75 fathoms long. The steam windlass gear is connected to the capstan on the deck above.

The electric lamp engine room contains a twenty-horse power electric engine for lighting 100 Edison lamps on every part of the boat. The City of Worcester is piped for gas, is provided with lamps for burning Downer mineral sperm oil, and also for complete lighting by electricity.

The boilers, three in number, are in the lower hold, lying fore and aft, and connected with two steam chimneys and two smokestacks. The boilers and coal bunkers take away no freight space, and in laying out the joiner work the steam chimneys are completely hidden from view. We now come to the after main deck freight space, and the magnificent front to the lower grand saloon. About 20 feet of the deck in front of the saloon, and abreast of the after gangways, are alternate strips of ash and black walnut. On the starboard side is the barber shop and washroom, and on the port side is the purser's room, which is entered from the saloon.

As to the staterooms: there is not a "poor" room on the boat. The average size of the rooms is about 7 by 7 feet by 8·6 feet high. The berths are fitted with woven wire mattresses, upon which are placed the best of hair mattresses and pillows, linen sheets and pillow-slips, rose blankets, and white Marseilles bed covers, and rich curtains and lambrequins. The light and ventilation are faultless; while the heating appliances for the winter season will render the boat perfectly comfortable, and in accord with the science of heating, as regards health. All the doors are hung on "Parliament" hinges, so that they can be made available, in case of dire necessity, for life-preserving appliances. There are twelve bridal rooms, each having a handsome curtained bedstead and other furniture in it. Amidships, on the deck, on either side, are the ladies' and gentlemen's toilet rooms. Passing forward to the end of the engine space, we come to the forward saloon, which contains the grand dining hall, the finest apartment afloat in the world for dining purposes. Over one hundred persons can be seated at once in this hall, with 23 feet 6 inches air space overhead, lighted with three large electric chandeliers, and in air as pure as can be breathed on the bosom of Long Island Sound.

Passing out on to the upper forward promenade deck, we find a nest of staterooms abaft the pilot house, the captain occupying the forward one on the starboard side, and the chief pilot the one on the port side, both connecting with the pilot house. Under the pilot house is a portion of the steam steering gear, the signal lockers, etc. The pilot house is finished in hard woods entirely, and contains a powerful steam steerer, which can instantaneously be connected or disconnected at will. A six-year-old boy can steer her, so far as strength is concerned. She is fitted with two of Riggs & Brother's patent binnacle heads and blinders, with liquid compasses, which are the finest combinations in this line we have yet seen on a steamboat.

The officers of the boat are quartered, in a "Texas," built against the wheel houses, on top of the upper deck, and abreast of the gallows frame. Here are rooms for the chief and second mates, second steward, wheelsmen, watchman, express and baggage men, chief, first, and second assistant engineers.

The City of Worcester is a grand triumph of naval architecture and engineering skill, she is really beautiful and very fast. We will not enter into a detailed description of the joiner work; it is simply exquisite. She is a credit to her builders in every particular, having been built with more than ordinary care and with that scrupulous integrity for which the Harlan & Hollingsworth Company are so widely credited. The Norwich Line people are very justly proud of her. Nothing seems lacking in or about her, and the public who patronize her will say with us she is the "Belle of Long Island Sound." She has been built for a "business boat," and calculated for hard work, summer or winter, and although much money has been expended in beautifying her, the question of her strength and security has always been paramount, both in the eyes of the company who own her and those who built her. *Safety* first, *capacity* second, *speed* third, and *comfort* fourth, have been the objective points sought after, and we believe they have all been attained in a marked degree, and no one who will carefully inspect this marine beauty but will agree with us in this statement. She was built under the supervision of Captain S. A. Gardner, Superintendent of the N. and N. Y. Steamboat Line, and Charles W. Copeland, Superintending Engineer.

The officers are: Captain, H. C. Lamphere; Chief Officer, Richard T. McGeary; Chief Engineer, Joseph Carter; Second Assistant, John Smith; Steward, Thomas Byrnes.

The "City of Worcester" runs on the New York and Boston Line, via New London, and sails from Pier 40 North River.

Domestic Silk Growing.

The Women's Silk Culture Association opened its first exhibition in Philadelphia, Jan. 31. A prize of $500 offered by a firm in that city for the best exhibition of cocoons called out twenty-five competitors, including three from the Southern States. In all there were about thirty exhibitors of cocoons, floss silk, and reeled silk. Cocoons were shown surrounded by floss as spun by the worms on branches, and also as spun separately in small paper horns, according to the "cellular" system, as well as packed in bottles denuded of the floss. Single, double, and pierced cocoons were exhibited, with silk worms' eggs and specimens of the dead worms and moths. An especially interesting exhibit of the silk of foreign and domestic worms, and of the silk of a new species, fed on osage orange, was made by Prof. C. V. Riley, of the United States Department of Agriculture. The process of reeling was practically illustrated, and plush, taffeta, and satin looms were in operation. There was also a large variety of manufactured silk goods, including many hand-painted screens and banners.

In the two years since the society was started it has sent silkworms' eggs and slips of the mulberry tree to persons in nearly every State of the Union. The cocoons spun by the worms at the houses of those who have taken up this new industry have been purchased by the society. An ounce of eggs costs $5, and the worms hatched from them will make 40,000 cocoons. The society pays $1 a pound for cocoons, from which the silk is then reeled off, each pound of cocoons making about a quarter of a pound of silk. The reeling is done by an employe of the society, as there are no skilled American reelers.

Some specially interesting facts with respect to the practical condition and results of the industry were lately given to the Philadelphia *Public Ledger* by Miss Nellie Rossiter, a girl of fifteen, who has for a year or more made a business of silk-growing. By combining the work with teaching the art of sericulture Miss Rossiter has found it quite profitable. Just now, while home-grown silk is a curiosity, there is quite a demand for hanks of the reeled silk, untwisted, as specimens. There is also the beginning of a private business demand for hanks to be used in embroidery and in the manufacture of artificial flowers. The bright young lady teacher had on exhibition a cream-white lily with buds of glistening yellow, a beautiful piece of work, which was to be sent to Mrs. Garfield. It seemed to the reporter that it could scarcely be hand-made, so delicate and pure were the shining petals, but he was informed that the process was the same as that employed in making hair work. There are seven natural shades in cocoons, Miss Rossiter said—green, a brimstone yellow, straw, salmon, lemon, orange, and white; all of them making good effects to work with.

The hanks of reeled silk bring from $1.00 to $2.00—fifty cocoons making a hank. From 350 to 800 cocoons yield a pound of silk, according to fineness, and the silk brings from $3.50 to $8.50 from manufacturers, according to the skill exercised in the reeling.

Badly reeled silk, the American Consul in Lyons points out, is worth less than when on the cocoons. Accordingly he denounces as a fatal error the attempt of our silk growers to furnish reeled silk. Skillful reeling, he says, is an art to be acquired only by years of apprenticeship and constant practice, and not all who try can learn the trade. Reeling by ordinary reels requires a sufficiency of highly skilled labor thirteen hours a day for twenty cents, and even Italian women find it better to sell their cocoons; the idea of reeling is like each farmer's grinding his wheat to sell in flour. This much premised, the Consul sees no practical force in the objection that sericulture cannot be made profitable in this country because of the cost of labor, since the labor required does not necessarily involve any outlay. It is essentially a home industry, needing no severe manual labor, except for a few days at the end of the season, and when large crops are raised. In many of our States the wives and daughters of country people, now relieved by machinery from all the old-time labor of making clothing from the raw material, are unable to contribute to the family income except by going away from home; in the silk districts of Europe there is less agricultural machinery than here, and nearly every woman who works at sericulture takes for it time that would otherwise be turned to field labor; land is also dearer there, and taxes heavier. The buildings possessed by the peasants and used for sericulture are generally small and miserable, while here the roomy barns are empty during the cocoon season; better intelligence prevails here; some diseases which have been more or less prevalent in Europe have not appeared here, although many experiments in silk-growing have been made; and the prospect is that these differences will make the necessary cost of cocoon production here at least as low as in Europe. As to the matter of profit, the Consul thinks that the yield may be large enough to be very convenient to numbers of families, the reasonable product of an average family probably being $75 to $200. The great difficulty being to find a market for the cocoons, sporadic and hasty efforts should be discouraged; the product of a few isolated families in the interior could not be sold to advantage; but if several hundred families were engaged in the work in the same neighborhood, the charge of marketing their united crop would be only a small percentage of its value. Sericulture must have proper channels, just as wheat-growing must; the machinery need not be either complicated or expensive, but a system of nuclei in towns and cities is required. It might be well to interest in the subject the county and State agricultural societies and the village improvement clubs; and, besides the fifty or sixty millions which successful silk-growing might add to the country's production, it might effect a social improvement by increasing the cash income of many families and raising their scale of living.

How far the Silk Culture Association will succeed in reconciling the conditions of profitable silk production with our domestic customs and the requirements of our silk manufacturers remains to be seen. Thus far their efforts seem to have been cautious and judicious; and it may be that our inventors will so overcome the difficulties in the way of economical reeling as to make possible a much wider utilization of waste time in domestic silk production than our Lyons Consul anticipates.

Western Canal Projects.

To shorten the waterway between the West and the Atlantic, two new canals are proposed in Congress. The first contemplates a connection between the Mississippi River and Lake Michigan, by a canal sixty-five miles long, between Rock Island and Hennepin, on the Illinois River, there to connect with the existing Illinois and Michigan Canal, to Chicago. The cost of this canal would be close upon $4,000,000. The second canal is designed to provide a short cut across the State of Michigan, probably from Saugatuck to Detroit, a distance of 178 miles. The proposed course of the canal is along the Kalamazoo River to its head, thence eastward. The number of locks required would be twenty-two. Another line is also talked of, running from a point near Chicago through Northern Indiana and Ohio to Toledo. The estimated cost of a canal along the first described line is about $5,555,000. To insure an abundant traffic in grain by water eastward, it is further proposed to make the Erie Canal free.

Projected Railway Tunnels Under Water.

The Hudson River Tunnel at our doors, and the English Channel Tunnel, the construction of which has lately been undertaken by a powerful railway company, are not the only works of the kind in prospect or under way.

The contract for constructing a railway tunnel under the St. Lawrence, at Montreal, Canada, has just been taken by J. B. Bouilliard, for $3,500,000; this to include drainage and lighting, the work to be finished in 1885.

By a decree of the 30th December last the Italian Minister of Public Works granted permission to the Venetian Society of Construction to make the necessary studies for the construction of a submarine tunnel under the Straits of Messina. According to the plan of the Venetian Society the railway line of the tunnel will branch off from that of Eboli-Reggio, and, by means of a spiral tunnel, will descend to the level of the submarine line, rising to the level of the Messina-Patti line in a similar manner. The approximate length of the submarine tunnel will be about two miles and a half. The rock to be traversed is extremely hard, and the thickness of the stratum left between the top of the tunnel and the bottom of the sea will be about one hundred and twenty feet.

Steam Compression of Fluid Steel.

A method of compressing fluid steel, invented by H. R. Jones, of Pittsburg, is attracting attention in England. Steam pressure is applied to the top of the mould immediately after the metal is poured. The steam is drawn from a receiver fixed to the side of the ingot frame. The conducting pipes have one end permanently attached to the receiver, the other end being joined by a coupling with the lid of the mould. It is said that in practice no higher pressure than from eighty to one hundred and fifty pounds has appeared to be necessary; the higher pressure is used in the case of mild steels. Under this process the ingots are turned out free from porosity and with a perfectly level top. The steam, besides consolidating the ingot, cools the top of the ingot and allows it to be conveyed to the reheating furnace sooner than when the old process was used.

Society of Civil Engineers.

At the recent meeting of the American Society of Civil Engineers, in this city, the following officers were elected for the ensuing year: President—Ashbel Welch, of Lambertsville, N. Y.; Vice Presidents—James B. Eads, of St. Louis, and William H. Paine, of Brooklyn—Secretary and Librarian—John Bogart, New York; Treasurer—J. James R Croes; Directors—Thomas C. Keefer, Ottawa, Canada; Thomas L Casey, Washington; and Joseph P. Davis, George S. Green, Jr., and George W. Dresser, of New York.

The annual report of the directors showed a present membership of 657, of whom about 150 reside in New York, the remaining members being scattered throughout the United States, Canada, and Mexico.

The American Agricultural Association.

The annual convention of the American Agricultural Association is in progress in this city, a large number of delegates from the various agricultural societies of the country being present. In his presidential address Colonel N. T. Sprague spoke of the need of scientific knowledge on the part of farmers, and mentioned some facts which show the magnitude of some of our less considered industries. The poultry crop, for instance, was said to be in value more than one-third of that of the cotton crop. The butter product of this country for 1880 was 1,000,000,000 pounds, and of cheese 300,000,000 pounds, and in the same year we exported of cheese, 130,000,000 pounds, and of butter, 40,000,000 pounds, amounting to more than $20,000,000. A cheese made in Iowa, weighing more than three-fourths of a ton, took the prize, a silver medal, at the late great cattle and dairy show at Birmingham, England. The first shipment of cheese from this country was made in 1830, consisting of some 10,000 pounds. More than 200,000 head of cattle have been landed in Liverpool alone from this side of the water in the year 1881. How does our country compare with the leading dairy countries of the world? Great Britain and Ireland have 3,708,776 milch cows; France has 4,513,765; Germany has 8,962,221; America has 13,000,000 —we having 45 per cent more milch cows than any one of the leading dairy countries of the world.

The following gentlemen were elected as officers for the ensuing year: President—N. T. Sprague, of Vermont; Senior Vice President—Henry E. Alvord, of New York, with about forty associate vice presidents; Secretary—Joseph W. Reall, of New York; Treasurer—H. W. McLaren, of New York; Trustees—Messrs. C. W. Miller, T. A. Havemeyer, M. Folsom, Samuel Remington, and Lawson Valentine. Directors —F. D. Moulton, of New York; John J. Holly, of New Jersey; H. S. Kimball, of Georgia; George A. Crawford, of Kansas; Judson C. Stevens, of Ohio; T. S. Gold, of Maryland; J. B. Grinnell, of Iowa; D. H. Wheeler, of Nebraska; Thomas A. Galt, of Illinois; W. H. Jackson, of Tennessee, and A. M. Tulford, of Maryland.

The Mediterranean of the West, and its Lumber Trade.

Puget Sound, Washington Territory, perhaps the least known in the East of all our important water surfaces, is the one for which its acquaintances claim the largest future fame. It covers an area of 2,000 square miles, with a breadth rarely exceeding ten miles, and has a coast line of 1,5 0 miles. Its shores are bold and its waters deep, and it is quite free from shoals and reefs. The large lumber vessels which frequent the Sound are bothered to find good anchorage, scarcely less than a hundred fathoms of water appearing anywhere. So deep are the clear waters of this Mediterranean of the West, says a recent visitor, that a great commodore of the United States navy once innocently almost ruined the chances of one of the Puget Sound towns for being the final terminus of the Northern Pacific Railroad, by taking his ship up to the town. On sounding the water for anchorage ground, he failed to find as little as thirty fathoms of water anywhere, excepting one place, and that so near the bank that there was danger of the ship going ashore when swinging with the tide. He had to depart and anchor at the one other place, where there is a large natural bay, affording excellent advantages of the kind he was seeking.

The pure waters of this great Sound swarm with fish. There are eighty-five varieties, it is said. The salmon is the prince of fish here. The catch of salmon sometimes amounts to 40,000,000 pounds a year. A species of cod is also very abundant. It is dried and salted in large quantities.

The principal industry of the Sound is lumbering. The timber comprises ash, dogwood, alder, white oak, maple, cotton wood, spruce, hemlock, and laurel among other varieties; but these are in limited quantities. The greater part of the timber is yellow fir and cedar. This vast fir forest is thought to be the finest tract of valuable timber land on the face of the earth. It covers an area of about 32,000 square miles, according to the rough estimates which are current in the Territory. It is accessible from every point on the Sound, and from the ocean coast for a vast distance southward. The proprietors of the logging camps fell their first trees so close to the shore that they could be made to fall directly into the water if desired. The yellow fir is from 150 to 300 feet high, the trunks being from 5 to 12 feet in diameter at man's height from the ground The first lumbermen cut only the five and six foot trees. The saw-mills could not handle logs which were larger than that. Even yet there is no saw-mill on Puget Sound which can saw a log that is more than eight feet in diameter. The consequence has been that, at first, for many years, the axmen left the small trees and the very large ones ; and a piece of timber land which has been cut over once presents the singular phenomenon of a collection of small and of gigantic trees, with none of medium size among them. Since the enlargement of the mills, some camps are sending their men over the ground a second time to fell the big timber. The firs are cut off about five or six feet from the ground. The butts are generally unsound.

It requires from half an hour to an hour to fell a good sized tree. A large number of the fir tree trunks are unsound. The principal defect is what is called a "shake." It is a small crack inside the tree, formed by the swaying of the tall tree in the wind. When such a crack forms it soon becomes filled with the turpentine-like balsam which is characteristic of the fir. The woodchopper at work on a big tree is frequently astonished by driving his ax through one of these fissures and seeing several gallons of turpentine suddenly run out. If the tree, when felled, is found to be defective, it is left where it lies. If sound it is cut up into logs from 30 to 120 feet in length and hauled out of the woods. Sticks 150 feet long are sent out.

The United States is exceedingly jealous of this vast tract of valuable timber land. It permits the timber to fall only into the hands of those who wish to do a legitimate business in logging. The regulations are quite strict both as to keeping the land out of the hands of speculators, and as to the waste of timber. To buy a square section of timber land costs $1,600. The logger employs about six men and a team of eight oxen. He builds a rough camp and boards the men. His running expenses are about $35 dollars a day, and he is able to get out of the woods about 30,000 feet a day. The rafts of logs are towed off to the neighboring saw mill at a cost of $1,50 per thousand feet, and he sells them there at the rate of $6 per thousand feet.

The yellow fir is known in the East as Oregon pine or Puget Sound pine. It is a wood of great value, owing to its toughness and strength. The first cargoes of it were sent to San Francisco about twenty-five years ago. The length and beauty of the timber attracted the attention of Admiral Farragut, who caused tests of it to be made at the Mare Island Navy Yard. Still other tests were made at the Navy Yard in 1878 by Constructor Much, for the purpose of discovering the sizes of scantling required for building the United States screw steamer Manzanita with Pacific coast woods instead of with oak. Tests have also been made recently in the oak. It is proved that yellow fir is fully the equal of Eastern white oak in tenacity, strength, and toughness. There is no doubt left upon the point, and yellow fir is now the universal building wood on the Pacific coast.

Importation of Air.

To discourage the introduction of American canned meats into Germany the customs officers have contrived a threefold duty upon such commodities. The meat is taxed for itself; the can is taxed as fine iron ware; and the labels are compelled to pay another high duty as chromo-lithographs. Apparently to justify the customs charge upon the covering of imported goods, a Berlin paper relates how Alexander von Humboldt once took advantage of the exemption from duty of the covering of articles free from duty, formerly if not now the rule in France. In the year 1805 he and Guy-Lussac were in Paris, engaged in their experiments on the compression of air. The two scientists found themselves in need of a large number of glass tubes. This article was exceedingly dear in France at the time, and the rate of impost upon imported glass tubes was something alarming. Humboldt sent an order to Germany for the needed articles, and gave directions that the manufacturer should seal up the tubes at both ends, and put a label upon each tube with the words *Deutsche Luft* ("German air"). The air of Germany was an article upon which there was no duty, and the tubes were passed by the customs officers without any demand, and arrived free of duty in the hands of the two experimenters.

New York Harbor Improvements.

Two schemes for the improvement of New York Harbor have just been brought before Congress. The first contemplates the cutting of a deep and wide and straight channel through Sandy Hook bar, at a point between the "Swash" channel and the "fourteen foot" channel. The completed channel is to be 500 feet wide, and 31 feet 6 inches deep; the cost is put at $5,500,000. The bill provides that the contractors are not to resort to the method of shutting off the flow of water through any of the several channels over the bar by dams or jetties, and are not to impede or contract the natural flow of water through them for the purpose of causing an increased flow through any one particular channel in order to gain a temporary scour therein. The work is to be done under the inspection of the War Department, and it may be stopped at any time when it appears that the provisions of the bill are not being carried out in the opinion of the officers of the department.

The second project contemplates the construction of a ship canal extending from a point between Ellis Island and the docks of the Central Railroad of New Jersey to a point between Constable Hook and Robbins Reef. Assistant Engineer Doerflinger, who was specially detailed by the War Department to make the examination to determine the feasibility and cost of the proposed canal, reports to the main question as follows: "To obtain access to the deep water of New York Harbor, it is the desire of the owners of the land bordering on the flats, and of others interested in the utilization of the flats for the purposes of trade and commerce, that a ship canal be constructed about five hundred feet outside of the pier line, as at present established, from the docks of the Central Railroad to Craven's Point, the channel to continue in a straight line to the deep waters of the Kill von Kull. The Riparian Commissioners of the State of New Jersey propose, should the construction of the channel be undertaken by the United States, to establish a new pier line to coincide with the westerly limits of this channel, so that the future pier-heads will thus be accessible from the navigable waters of the bay. In addition to affording a means of deep-water communication between future piers that may be built on the flats and the navigable waters for the harbor, the channel would somewhat shorten the distance from points on the Hudson River to points on the Kill von Kull, and would furnish a more sheltered waterway to the numerous tows now playing between these points, and one more free from strong head currents than the main ship channel."

Accompanying Assistant Engineer Doerflinger's report is a detailed estimate of the cost of the proposed channel—21 feet deep at mean low water and 300 feet wide at the bottom —which places the total cost at $7,134,980.

The Probable Nationality of the Mound Builders.

The question, Who were the "Mound Builders?" is one that still remains open in American archæology. The most recent expression of opinion on the subject is given by Dr. Daniel G. Brinton in an interesting article in the last number of the *American Antiquarian*.

After reviewing the historical evidence on the subject, Dr. Brinton says that it would appear from all the facts collected that the only resident Indians at the time of the discovery of America who showed any evidence of mound building comparable to that found in the Ohio Valley were the Chahta-Muskokees—the great and powerful family which inhabited what we now call the Gulf States, and which embraced the tribes known as the Choctaws, Chikasaws, Muskokees or Creeks, Seminoles,, Allibamons, Natchez, and others. The evidence is sufficient to justify us in accepting this race as the constructors of all those extensive mounds, terraces, platforms, artificial lakes, and circumvallations which are scattered over the Gulf States, Georgia, and Florida. The earliest explorers distinctly state that such were used and constructed by these nations in the sixteenth century, and probably had been for many generations. Such is the opinion arrived at by the well known authority, Col. C. C. Jones, who, referring to the earthworks in Georgia, writes: "We do not concur in the opinion so often expressed, that the Mound Builders were a race distinct from and superior in art, government, and religion, to the Southern Indians of the fifteenth and sixteenth centuries." It is a Baconian rule, which holds good in every department of science, that the simplest explanation of a given fact should be accepted; therefore if we can point out a well known race of Indians who, at the time of the discovery, raised mounds and other earthworks, not wholly dissimilar in character and not much inferior in size to those in the Ohio valley, and who resided not very far away from that region and directly in the line which the Mound Builders are believed by all to have followed in their emigration, then this rule constrains us to accept for the present this race as the most probable descendants of the Mound tribes, and seek no further for Toltecs, Asiatics, or Brazilians. All these conditions are filled by the Chahta tribes.

The size of the southern mounds is often worthy of the descendants of those who raised the vast piles in the northern valleys. Thus, one in the Etowah Valley, Georgia, has a cubical capacity of 1,000,000 cubic feet. The Messier Mound, near the Chatahoochee River, contains about 700,000 cubic feet. Wholly artificial mounds, fifty to seventy feet in height, with base areas of 200 by 400 feet, are by no means unusual in the valley of the Gulf States. With these figures we may compare the northern mounds. The massive one near Miamisburg, Ohio, sixty-eight feet high, has been calculated to contain 311,350 cubic feet—about half the size of the Messier Mound. At Clark's Works, Ohio, the embankments and mounds contain about 3,000,000 cubic feet. Greater than any of these is the truncated pyramid at Cahokia, Illinois, which has an altitude of 90 feet and a base area of 700 by 500 feet. There is apparently not so great difference between the earth structures of the Chahta tribes, and those left us by the more northern Mound Builders, that we need suppose for the latter any material superiority in culture over the former when first they became known to the whites; nor is there any improbability in assuming that the Mound Builders of the Ohio were in fact the progenitors of the Chahta tribes, and were driven south probably three or four hundred years before the discovery.

Distinction of Wool, Silk, and Cotton.

A. Remont communicates a short process to detect or separate these fibers, which may suffice for ordinary purposes. The fabric to be examined is first dipped, for fifteen minutes, in boiling water containing five per cent of hydrochloric acid, for the purpose of removing coloring matter and sizing; it is then washed and dried. If at all possible, the woof is then to be separated from the warp, and each examined separately, according to the following scheme:

I. Burn a few fibers.

1. An odor of burnt urine is developed. If this is the case, heat a few fibers with solution of soda, and examine the vapor given off; if ammonia is present, this indicates the presence of an *animal fiber*.

A. Dip a few fibers into a boiling solution of basic chloride of zinc.

a. The fiber dissolves completely.—*Silk.*

b. On the addition of hydrochloric acid, an abundant flocculent precipitate is produced.—*Silk* mixed with *wood* or vegetable fiber.

c. The chloride of zinc does not dissolve it. Remove the fibers to a boiling, moderately dilute solution of soda.

It dissolves completely.—*Wool.*

It dissolves partially.—*Wool* and *cotton.*

2. No odor of burnt urine is developed.—*Vegetable fiber.*—*Jour. de Pharm. et de Chim.*, 1881, 135.

The Jeannette's Long Drift.

The hope that, notwithstanding the disastrous fate of the Jeannette, the expedition might have made important discoveries in high latitudes before she was caught in the ice has been dispelled. It is now known from the survivors that from the time she entered the ice, in the vicinity of Herald Island, September 6, 1879, she was practically helpless. For nearly two years she drifted with the ice northwestward; while for a year and a half she was leaking badly, her fore-foot having been "twisted" on the first day of 1880. She was finally crushed by the ice June 12, 1881. No discoveries of moment were made during the long drift. Lieutenant Danenhower telegraphed from Irkutsk, February 1, that the whereabouts of Commander De Long had been discovered.

To Make Rubber Packing Air and Steam Tight.

The packing is brushed over with a solution of powdered rosin in ten times its weight of stronger water of ammonia. At first, this solution is a viscid, sticky mass, which, however, after three to four weeks, becomes thinner and fit for use. The liquid adheres easily to rubber, as well as to wood and metal. It hardens as soon as the ammonia evaporates, and becomes perfectly impervious to liquids.

MULTIPLE PRESSURE SUGAR MILL.

WITH INJECTIONS OF WATER, STEAM, AND LIQUOR BETWEEN EACH PRESSURE.

The special feature of this sugar mill—the first which has been made with such a large number of rollers—is that the canes are not only submitted to successive and increasing pressures, but that, while passing under the rollers, before each of the last three pressures, they are injected at the will of the attendant of the apparatus, with either steam, liquor, or water. The liquor used for this purpose is derived from the two last pressures, and is directed on to the preceding ones in the same order as their degree of density according to the saccharimeter.

It is this system which the inventors have called the "Mutiple Pressure Sugar Mill," for which they have recently taken out a patent.

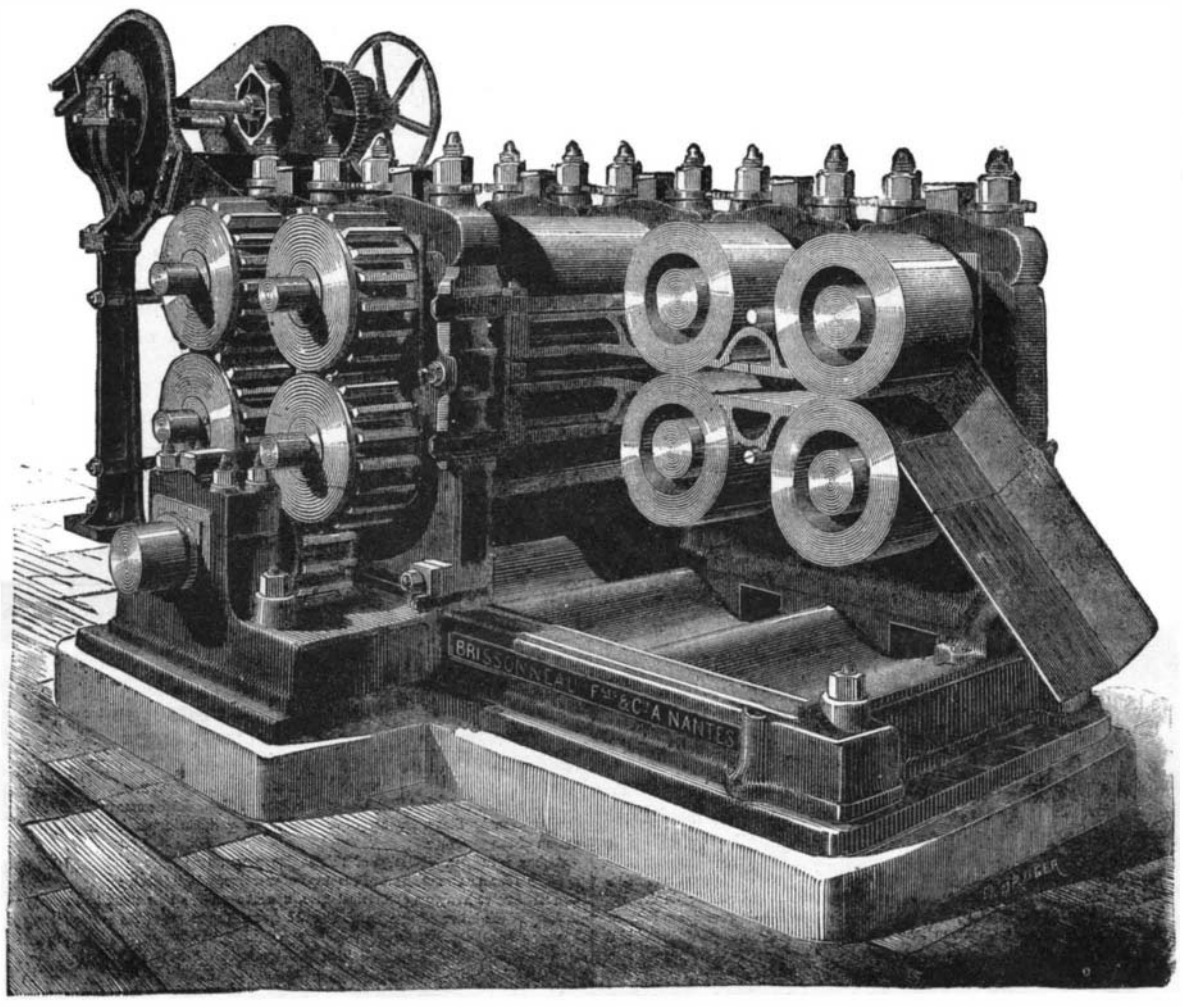
It is well known that, according to different analyses, sugar cane when ripe, and when freshly cut, has the following composition:

Water, 72; sugar, 18; cellulose and ligneous matter, 9·50; insoluble salts, 0·50; total 100.

Up to the present time, with the different forms of apparatus employed for extracting the juice from sugar cane and the use of the most improved machinery, such as *triple effets* and vacuum pans, no more than from 8½ to 9 kilogrammes of sugar have been obtained per 100 kilogrammes of crushed cane; and this result has only been obtained in exceptional years, when the weather has been most favorable for the development and ripening of the canes.

The home sugar industry, however, can reckon a much larger percentage. This is easily explained by the fact of its being able from its situation to employ, to the best possible advantage, all the new processes and machinery as they are brought to light, more especially in the large European industrial centers. This superiority in the quantity of sugar obtained, and the number of large works which have been erected during recent late years, have increased in considerable proportions the home sugar production; and as the consumption has not kept pace with this production, the value of sugar has consequently decreased. As the colonial planters could not, without danger to their industrial existence, submit to the fall of price which has taken place, they have endeavored to discover a remedy for this state of things. This remedy has been found by extracting from the cane itself the greatest possible quantity of the 88 or 90 per cent of juice which it contains.

As the other forms of apparatus, with the exception of the mill, have been successively modified and brought to a comparative degree of perfection, it followed that the roller mill had also to be improved.

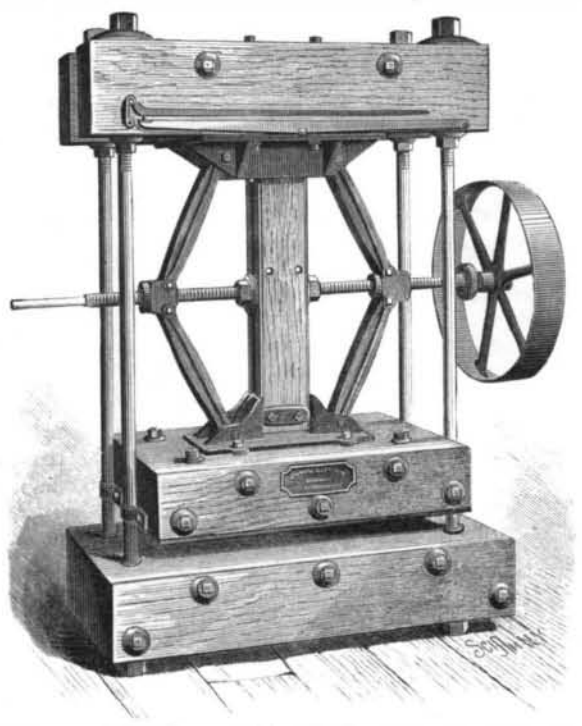


MULTIPLE PRESSURE SUGAR MILL.

This new apparatus of Messrs. Lahaye & Brissonneau, of Nantes, France, embodies the latest improvement in this direction. This mill, of which the accompanying figure represents a perspective view, is furnished with two pairs of rollers, which are shown in cross section. It has already been working for two years in Guadaloupe, at the Courcelles Sugar Works, belonging to Messrs. Dubos frères.

PRESS FOR THE MANUFACTURE OF BELTS.

The press shown in the engraving is particularly designed for the manufacture of belts twelve inches or more in width; are used by a number of the leading manufacturers of the country; has a wood frame with a heavy iron plate, planed smooth and true, bolted to the underside of platen. On the base of the press is placed a sheet of rubber the size of the platen and an inch or more in thickness; and between the rubber and iron plate the belt, after being connected, is pressed. The rubber plate seems to bring the pressure to bear on all parts of the belt alike, even if the thickness of same should be unequal.



BOOMER & BOSCHERT'S PRESS FOR THE MANUFACTURE OF BELTS.

The press is designed to be run by power, but may be used as a hand press, a pulley being keyed fast to one or both sides of the press screw and actuated by a countershaft on which are pulleys for both crossed and straight belts, for running the press up or down, as required. As the screw is run rapidly the press can be operated very quickly. Upon the head beam is fastened a system of levers called an "indicator," and which seems to show the amount of pressure being applied, so that having found the requisite amount of pressure to do a certain kind of work, the same pressure can always be applied.

This firm also manufacture presses made entirely of iron for any width of belt, and to be worked by hand or power, as may be preferred.

Further information may be obtained by addressing Messrs. Boomer & Boschert, 96 West Water street, Syracuse, N. Y.

American Manufactures Abroad.

Although the general impression is that the important position held by America in foreign markets is due almost wholly to our immense production of raw material, yet American manufactures also obtain a recognition, all the more notable from the fact that it is generally reluctant. Even in Russia, to which our direct exports are inconsiderable, the reputation of American hardware is so high that it is sold to some extent by German and English houses, but the most of the goods sold as American are imitations. The American Consul at Moscow says even the names of the makers of goods selected for imitation are retained in the spurious and inferior products. The Consul at Crefeld, Germany, reports that the preference for American sewing machines is so great that the German manufacturers adopt the brands of American makers, and attempt to justify the deceit on the ground that the makers' names are mere commercial terms, like Bessemer steel or Windsor soap, and do not designate any special make. It is also reported that German manufacturers vigorously assail the character and quality of American goods, while constantly putting cheap imitations of them on the market. An adjustable chair vaunted as superior to anything made in America was found, on examination, to be an exact imitation of an American chair. Nevertheless, stores in Germany making a specialty of the sale of American sewing machines, stoves, agricultural implements, and labor-saving articles, are doing a flourishing business. The market would become extensive were it not for the tariff imposed by the empire. A growing trade in American shirtings and jeans has already been wiped out by tariff exactions. But while American products are grudgingly received, there is no indisposition to appropriate the discoveries of American inventors. Our consul at Lyons reports that a machine for testing silk fiber, which is coming into general use in France and Italy, is the design of an American inventor.—*N. Y. Sun.*

The Chicago Cable Road.

The first car of the new cable road for street service in Chicago was run over the road January 26. The trial is reported highly satisfactory to the managers and directors of the enterprise. A speed of eight miles an hour, it is said, can be maintained without difficulty.

Manufacture of Wooden Shoes.

The London *Globe* says that the wooden shoe is quite a national institution of France; and in Brittany, more than in any other part of the country, its "clank" is heard everywhere. People wear it almost habitually there who would fight shy of it elsewhere, save on high days, holidays, and *en grande tenue*, when "there is nothing like leather." Hence follows the necessity for a sufficient large brotherhood of sabotiers, who, as they could not possibly live in towns or large villages, by reason of the cost of transport of the rough material exceeding the price of the manufactured goods—Mam'sell Marie's well-made shoon aforesaid may be bought for a mere trifle—are forced to reside in the woods and forests, or other places where suitable timber may be available. He is a regular Bedouin, this sabotier, and, like that nomad, can say, "The rope which holds my tent has seen all cities perish." The never-altering end and aim of a Breton wooden shoemaker's being is to fabricate sabots, and out of this groove he and his never run. Such as the father is, such is the son, and, for the matter of that, his daughter also. Children, so to speak, are to the manner born of making sabots, and at so tender an age as five or six years they may be seen smoothing, blackening, varnishing, stringing together in lots the coverings which their parents and other relatives have cut, shaped, and hollowed out into chaussures for the human foot. When a sufficient load of sabots has been completed at a certain fixing, the sabotier goes with it to the nearest village or town where his wholesale dealer resides, and to whom he disposes of the lot. With the money thus obtained he replaces a few articles absolutely necessary for his wants, and with the residue pays for timber already bought, felled, and utilized.

REMEDY FOR HICCOUGH.—Dr. M. S. Leslie, of Lexington, Ky., says that the best remedy in ordinary hiccoughs is about twenty-five grains of common table-salt placed in the mouth and swallowed with a sip of water.