The company is constantly making improvements and adopting anything that is new and calculated to improve the value of the chucks. Their foreman, Mr. Knight, has given the benefit of a long experience in this line of manufacture, and attends personally to the difficult parts of the work.

The officers of this company are all well known business men, and it is their determination to keep up the standard and reputation of the chucks.

We are informed that the number of orders is increasing from year to year, and that these goods are sent to all parts of Europe, to China, India, Japan, South Africa, South America, and Mexico.

GREAT YIELD OF A BLAST FURNACE.

Furnace B of the plant now in process of completion at the Edgar Thompson Steel Works, Pittsburg, Pa., has recently made a record unparalleled by any blast furnace in the world. The following is the yield in pig metal for seven consecutive days in May: Saturday, 148 tons; Sunday, 156 tons; Monday, 184 tons; Tuesday, 168 tons; Wednesday, 165 tons; Thursday, 166 tons; Friday, 154 tons. Total, 1,141 tons, or an average daily (24 hours) production of 163 tons. Furnace B is 80 feet high and 20 feet in the bosh, and in general design does not differ materially in its lines from other blast furnaces. In its appointments, however, furnace B is especially notable for the heating capacity of the stoves and the power of its blast. The ores used were not especially rich, averaging less than 60 per cent during the period of this enormous run. Hitherto the best record of the "Lucy" furnace, Pittsburg, Pa.—142 tons—was considered a remarkably good day's work, but furnace B, to use a Western expression, "takes the horns." During March last the product of the rail mill of the above steel works was 9,538 tons finished steel rails, or just about 1,000 miles.

A Shower of Railroad Spikes.

The great demand for railroad spikes has called into existence a remarkable machine, now in successful operation at the establishment of Dilworth, Porter & Co., Pittsburg. It is the invention of the late Mr. James Swett, and comprises a series of "continuous" rolls handling the material automatically. The material, in the form of billets two and a half inches in diameter and three and a half feet long, is taken in by the machine, and in thirteen seconds reduced in diameter and increased in length to a rod thirty-six feet long and nine-sixteenths of an inch square. In forty seconds more this rod has to be cut in two and passed through two spike machines, from which finished spikes shower at the rate of forty tons every ten working hours. By working "double time" five of these machines have turned out eleven hundred kegs of railroad spikes per day, each keg containing one hundred and fifty pounds, or thirteen kegs to the ton. The product of ordinary rolls and machines is from two to two and a half tons of finished spikes per working day of ten hours.

The Brewers' Association.

In his annual address as president of the American Brewers' Association, which met in Buffalo, N. Y., June 2, Mr. Henry H. Rueter said that the revenue collected from brewers and dealers in malt liquors during the last fiscal year amounted to $10,729,320, or nearly $800,000 more than for the year preceding. Since 1863 the internal revenue tax on malt liquors has amounted to $120,446,863.67. A committee report was read showing that the decrease of importation of foreign beer for the year 1879, as compared with 1875, was over 1,269,000 gallons, while the exportation of American beer for 1879 exceeded that of 1875 by over $216,000 in value; also that the brewing establishments of the country now number over 3,000, and annually consume 35,000,000 bushels of barley and 35,000,000 pounds of hops.

Charcoal and its Uses.

Charcoal, laid flat while cold on a burn, causes the pain to abate immediately; by leaving it on for an hour the burn seems almost healed when the burn is superficial. And charcoal is valuable for many other purposes. Tainted meat, surrounded with it, is sweetened; strewn over heaps of decomposed pelts, or over dead animals, it prevents any unpleasant odor. Foul water is purified by it. It is a great disinfectant, and sweetens offensive air if placed in shallow trays around apartments. It is so very porous in its "minute interior," it absorbs and condenses gases most rapidly. One cubic inch of fresh charcoal will absorb nearly one hundred inches of gaseous ammonia. Charcoal forms an unrivaled poultice for malignant wounds and sores, often corroding away dead flesh, reducing it to one-quarter in six hours. In cases of what we call proud flesh it is invaluable. It gives no disagreeable odor, corrodes no metal, hurts no texture, injures no color, is a simple and safe sweetener and disinfectant. A teaspoonful of charcoal, in half a glass of water, often relieves a sick headache; it absorbs the gases and relieves the distended stomach pressing against the nerves, which extend from the stomach to the head. It often relieves constipation, pain, or heartburn.

Rapid Cabling.

A press dispatch of eleven words, announcing the result of the recent Derby race, was filed at the office of the Direct Cable Company in London at 10:43 A.M., New York time, and reached this city at 10:43:25, the time of transmission from London to New York being 25 seconds

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

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NEW YORK, SATURDAY, JUNE 19, 1880.

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(Illustrated articles are marked with an asterisk.)

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THE SCIENTIFIC AMERICAN SUPPLEMENT
No. 288,
For the Week ending June 19, 1880.
Price 10 cents. For sale by all newsdealers.

THE PROBLEM OF THE ICE SUPPLY FOR NEW YORK CITY.

The actual cost of cutting and storing ice during an ordinary winter is said by experienced Hudson River ice men to average about twenty cents a ton. There is a considerable shrinkage while the ice remains in the store house. In breaking out and loading a further loss is experienced. A third loss occurs in the course of transportation to markets; still another in transferring the ice to the delivery wagon; last, though by no means the least, comes the wastage during delivery, especially to small consumers. When the handlings are many, the transportation far, and the weather warm, the loss by melting and breaking reduces the original stock one half. In bringing ice from a distance by sea in schooners of three or four hundred tons burden, such as are employed in the transportation of ice from Maine to this city, the wastage on the voyage amounts to about one-third. It must be remembered also that ice is bulky and heavy as well as cheap, and freightage soon equals the original cost. And with a commodity so perishable, the shipper's margin of profit must be large to cover the risk.

Accordingly the small consumer of ice must expect to pay, under the most favorable circumstances, several times the first cost of it. And unfortunately the conditions of the trade are such that a few large companies, too often a single company, may have a practical monopoly of the trade of a city, and will take every opportunity to put the price up to the highest that individual consumers can be made to pay. Thus the Knickerbocker Ice Company was able, a few years ago, to charge large consumers twenty dollars a ton and families twice as much, or two dollars a hundredweight. The open winter just past is made the occasion of something like an ice famine in this city, and the price is pushed up to ten dollars a ton, though excellent ice is sold at the store houses of the Kennebec for one dollar a ton, and twice as much more will bring it to this city and deliver it with profit, allowing an ample margin for transportation, wastage, and risk.

At such times of high prices, whether due to a real failure of the ice crop or to the natural disposition of monopolists to make the most of their opportunities, the question of artificial production usually comes up. New York manufactures ice making machinery for use in other places; why is it not employed here, and the trade, or rather the public, relieved of the hazards of open winters?

The only reason that we can discover for this state of things is the sufficient one that, in its present state of development, ice-making machinery is not able to compete with Jack Frost in our climate. To be successful financially the manufacture of artificial ice, it would seem, must at present be carried on only where natural ice rarely or never forms, where water is abundant and cheap, and at points so distant from the sources of supply of natural ice, or so unfavorably situated with respect to transportation facilities, as to make natural ice practically unattainable, or at best, very dear.

From the best information that we have been able to obtain the cost of artificial ice has never, under the most favorable conditions in actual practice, been reduced below one dollar a ton, and two dollars is probably nearer the actual cost. It is even doubtful whether a process capable of yielding ice at the lower rate given could be successfully employed to compete with natural ice in this market. If, to save transportation and shrinkage, the work were attempted within the city limits, the price of the water necessary to be employed would go far by itself to cover the cost of natural ice in an ordinary season; since for every ton of ice made there would be required from fifteen to twenty tons of croton water simply to carry off the heat to be withdrawn from the water frozen.

And it must be remembered that the production of artificial ice as an industry must be able to compete with nature, not merely in exceptional seasons, but at all times.

By the adoption of artesian well-water for freezing, and the employment of the current of the East or the North River for cooling, as proposed by Mr. Rankin, this element of the cost of artificial ice might be materially reduced: yet even then there are grave reasons for doubting the ability of existing machinery to compete in cheapness with nature, especially when we take into account the liberal ground space required in the manufacture of ice on a large scale, and the high rental charged for such space and for wharf privileges in this city. The question is not merely whether ice could be made here so as to sell at a profit at the present market rate, but whether the same investment would not bring a larger quantity of natural ice from northern New York or from Maine, where the crop is always abundant and sure. And the same comparison must be borne in mind with regard to seasons less favorable to artificial ice, and they are the great majority, when the Hudson yields its usual supply and the market price is correspondingly low. The ice trade of the north, however, is an enormous one; and, though our ice-makers are unable as yet to wrest it from the harvesters of the natural crop, it is well worth working for. The production of ice-making machinery is still in its infancy; and so long as it is theoretically possible to make ice for less than a dollar a ton in or near our great cities, just so long inventors will have in this a promising field to work in.

The obvious advantage of an ice manufactory near the market place, in saving the expense and loss incident to winter storage, transportation, and repeated handling, makes it possible for artificial ice to compete successfully with winter ice, even when the first cost is several times that

of cutting and housing the natural product. The sanitary advantage of ice frozen from pure water, over ordinary river and pond ice, is another important item in its favor, and one which will reconcile intelligent consumers, if necessary, to a price measurably exceeding that of natural ice.

Whether the cheaper water and cheaper land obtainable at a distance from the market place would more than offset the expense and wastage involved in transportation and extra handling is a matter to be determined. It may be that the most economical place for ice manufacture for New York consumption, all things considered, would be up the Hudson where the water is sweet, perhaps above the State dam at Troy. Ground space opposite or above Lansingburg would be comparatively inexpensive. The water could be drawn from the river and would be uncontaminated by the sewage of Albany, Troy, and the adjacent towns, as would be the case if the works were located further down the river. The condensing or cooling coils could be submerged in the river, and one of the chief items of cost in the production of ice artificially would thus be avoided. The ice as fast as manufactured could be placed on river barges such as are now employed in the trade, and the daily product could be towed down the river cheaply and with comparatively slight wastage. If the claims advanced by the makers of ice-machinery are verifiable in practice on a large scale there ought to be a good margin for profit in an undertaking of this character. If existing machinery will not justify the experiment—and we do not see why capitalists are neglecting it if the opportunity is real—then our inventors should look to it. As already remarked, the field is wide and inviting.

THE MILLERS IN COUNCIL.

The Millers' International Exhibition at Cincinnati, for which preparations have been making for many months, was opened on the 31st ult. It presents undoubtedly the completest display of milling machinery in full operation, and all appliances connected with the trade, together with the largest collection of different varieties of grain and flour, that has ever been brought together in this or any other country. The Millers' National Association fixed the time of holding their annual convention for the first week of the Exhibition, as the latter is to last four weeks, and besides a full attendance of members of the trade from all parts of the United States, an imposing delegation of the leading millers of Great Britain, France, Germany, and Austria, are in attendance.

For many reasons this Exhibition and the assembling of representative millers from all parts of the world is of the utmost significance at the present time. Our exports of wheat for the nine months to the 1st of April last amounted to $149,012,749, and in wheat flour the exports for the same period were valued at $26,375,228. The quantities were smaller, although the proportions were about the same for the like period of the year preceding. The question immediately arises: Is it not possible for our millers to largely increase the quantity of flour, in proportion to wheat exported? To do this would be by so much to enlarge the field for the employment of American labor and capital. Perhaps the most important object of the Exhibition, however, and it is intimately connected with the above question, is the comparison of the methods of milling adopted in various countries. And here we find a very complicated state of affairs; indeed if this were not so it is hardly probable that so influential a delegation of foreign millers would have come across the ocean to see what our millers are doing. It is the habit of American manufacturers, mechanics, and artisans, to perfect their own processes partly by watching closely what every one else is doing in the same line, either at home or abroad; but it is generally the rule with foreigners to scout the idea that anything can be learned in regard to the older trades from our experience. Now, however, these foreign millers want to find out something about the making of our new process flour; they want to know something about the improvements we have been making in milling for the past ten years, whereby our millers have rendered it a task of constantly increasing difficulty for them to hold the business of making flour for their own markets. And the welcome extended to them, and the facilities they are afforded for examining the machinery and looking into the workings of all our large establishments, present a striking contrast to the exclusiveness which most foreign manufacturers maintain toward all would-be visitors.

Just what the new process is it would be impossible to define specifically, for what might be the new process with one establishment may have become substantially an old one with another. The business has been constantly changing within the past few years, the general direction of the movement having been toward the introduction of chilled iron rolls operating in connection with the burr stones, and reducing the wheat two, three, or more times, instead of once, as formerly. Hardly any two millers agree exactly as to what is the best method, but there is a general concurrence of opinion among the leading members of the trade that the plan of gradual reduction, with repeated purifications and regrindings, is the best, although, in thus making a smaller proportion of flour of the finest grades, they have a large proportion of other products, which it will take some time to generally classify. Of all these methods, however, foreign millers will have an excellent opportunity to judge, while our own millers will undoubtedly make the most of an examination of several full sets of English and German milling machinery shown at the Exhibition, as well as obtain much valuable information from a comparison of views with so many of the leading representatives of the trade abroad. Among the mechanical features which are likely to receive particular attention, the magnetic separator, for removing all iron particles from the wheat, is one of the newest. It is astonishing in what a variety of shapes iron finds its way into the wheat, not only from the wire used in binding, but in the way of nails, pins, pieces of reapers, etc., and even as ore dust from wheat lands of this character. The damage heretofore done to the stones and bolting cloths from this cause has been great, and many fires have been caused thereby. Our elevator system of handling grain will likewise be of particular interest to our foreign visitors, where our methods of handling and storing are almost unknown. But, while they will give no little attention to the various differences of classification, and while the conceded objects of both foreign and American millers at this meeting are to discover how best to make the purest and finest flours, we hope the opportunity will not be allowed to pass for these representatives of the trade to properly stigmatize the not unusual practices which have grown up of late in adulterating flour. The mixture of white corn or barley flour with wheat flour is now done by some millers to an extent which would perhaps quite counterbalance the improvement made by others in the quality of their product, while it is well known that alum is used to some extent. For the credit of the trade, as well as for the benefit of the community, we hope that such practices will receive their deserved rebuke, and if possible effectual exposure, at the hands of the millers assembled in Cincinnati.

THE HOWGATE POLAR EXPEDITION.

The steamer to convey the Howgate colony to the Arctic regions has been overhauled and specially strengthened for the service at Alexandria, Va., and has received her outfit at the Washington Navy Yard, preparatory to sailing June 10. The chosen vessel is the Gulnare, a Clyde built steamer of 230 tons.

She is 140 feet in length, and 21 feet 6 inches breadth. The engine is 200 horse power, and has two 30 inch cylinders, each 24 inches stroke. Additional strength has been given by filling in 2½ inch oaken plank between the iron frames and sheathing inside and outside with stout oaken planks, thus making the hull uniformly 15 inches thick. The inside of the hull has been braced with extra heavy white oak timbers placed horizontally. Three heavy white oak breast hooks have been placed inside of the prow, and on the outside of the bow is a sheathing, three-eighths of an inch of iron armor, extending 10 feet deep and 14 feet aft from the stern. In addition on the sides of the vessel extending above the water line there have been placed wedge-shaped oak timbers to be used in easing the vessel upward when pressed by heavy ice. A new main deck has been constructed, and a new smokestack and an extra propeller provided. A new bridge 21 feet long has been placed amidships. The forward part of the vessel will be used for the seamen. Aft of the engine and boiler is the cabin, with staterooms which will accommodate the officers and scientists. The Gulnare will carry in addition to her steam power mainmasts and foremasts and duplicate sets of new sails.

Accommodations are provided for forty persons, twenty-five of whom comprise the polar colony, consisting of Lieut. A. W. Greely, Fifth United States cavalry, commander, with, as assistants, Lieut. G. C. Doane, Second United States cavalry; Lieut. W. H. Low, Twentieth United States infantry; Henry Clay (grandson of Henry Clay); Astronomer—Orray Taft Sherman, who was connected with the Florence Expedition, and as assistants, George H. Rohie, W. S. Jewell, and O. Aldrich, of the Signal Corps United States Army; Surgeon and Naturalist, Dr. Octave Pavy; Photographer, J. W. Rice; and fourteen enlisted men as a working party. In addition to these two half-breeds have been engaged as dog drivers, and will join the vessel at a place called Rigolette, on the coast of Labrador.

The steamer carries two years' supply of provisions for the colony, and rations for the ship's crew for sixteen months, though it is expected that the voyage will be made in five months. A double-walled frame house, 21 x 65 feet inside, is carried for the colony, besides the usual outfit for traveling parties. The station will be provided with a steam yawl and two whaleboats for water exploration, and six sledges, with dogs, for land work. It is expected that fuel will be obtained from a coal vein at the site of the proposed station.

The outfit includes the following scientific apparatus, in addition to a proper supply of surgical and medical instruments and appliances.

Meteorological.—12 spirit thermometers, 12 mercurial thermometers, 12 maximum thermometers, spirit; 3 maximum thermometers, mercurial; 6 psychrometers, mercurial; 6 psychrometers, spirit; 12 minimum thermometers, spirit; 6 black bulb thermometers, in vacuo; 6 black bulb thermometers, free; 1 Regnault's hygrometer, dewpoint apparatus; 3 rain gauges, 6 standard barometers, 6 aneroid barometers, 6 anemometers, standard; 3 self-registers for anemometers, 3 wind vanes, 6 water thermometers, in cases, complete.

Astronomical.—3 sextants, 6 chronometers, 2 magnetometers, 2 fox circles, 6 telescopes, 6 binoculars, 2 spectroscopes, 4 heliographs, 4 sets drawing instruments, 6 sets signal equipments. In addition to a well selected collection scientific works, and an unusually fine collection of Arctic works, a large quantity of miscellaneous reading matter has been contributed by friends of the expedition.

On leaving Washington the Gulnare will proceed under sail (to save fuel) to St. Johns, N. F., where she will stop for additional coal and an ice pilot and any further supplies that may be needed.

From St. Johns the vessel will go to Rigolette and take on board the dog drivers and the sledge dogs, which are expected to be ready for the expedition. From Rigolette she will go to Disco, using steam only when absoluely necessary.

At Disco the coal bunkers will be refilled from the supply left by the Polaris, or, failing that, from the Danish stores, and then the vessel will be pushed forward as rapidly as possible to Lady Franklin Bay, where the colony and outfit will be landed. If weather and water prove favorable the vessel will return to the United States with as much speed as practicable. It is expected that she will reach Washington on her return by the middle of October.

OUR IRON AND STEEL IMPORTS.

The recent labor troubles in the iron industry of Western Pennsylvania give especial interest to the figures furnished by the United States Bureau of Statistics, relative to our increased imports of iron and its manufactures. Without touching at all upon the merits of the questions at issue, from the laborers' point of view, the practical one, which concerns consumers as well as producers—the price at which iron and its manufactures can be maintained and meet with the largest market for the product of the mills—meets here a significant answer. The imports of this class are all dutiable, and there seems to be now no probability that we shall have any change in the tariff thereon during the present session of Congress. Yet, notwithstanding these duties, our imports of iron and its principal manufactures have increased enormously within the past few months. The "boom" in the iron industry, which, so short a time ago, seemed to promise an extremely active business throughout all of 1880, at prices that were "out of sight" of those obtainable a year ago, has entirely subsided, and, with the flood of foreign goods which has been coming in, prices have so declined that it is evident, even with the enormous consumptive demand we are having, that fancy figures will not be obtainable hereafter. The iron manufacturers here will have to compete with those abroad, with the advantages of the tariff in our favor, it is true, but with heavy stocks, lower rates for wages, and more abundant and cheaper capital to the credit of the other side of the account.

In the three-quarters of a year preceding April 1, 1879, our imports of pig iron amounted to only $1,366,700; for a like period to April 1, 1880, they were $7,291,453, but the price of American pig in New York the first of this year was $35 per ton, against $17 per ton the 1st of January, 1879. The imports of old and scrap iron for the first mentioned period were but $66,967, but for the corresponding nine months a year later they were $6,705,190. In steel ingots, bars, sheets, and wire, we took from foreign manufacturers in the first period to the value of $837,631, against $2,463,127 in nine months a year later; in bar iron we bought $1,037,205 in the former, as against $3,159,606 in the latter period; and in miscellaneous manufactures of iron and steel the imports stand at $1,595,020 for the nine months to April 1, 1879, against $3,416,065 for a similar period to April 1, this year. A corresponding increase was also experienced in imports of boiler iron, band and hoop iron, railroad bars of iron and steel, sheet iron, hardware, anchors, cables and chains of all kinds, machinery, and cutlery, and there was even an increase in our imports of firearms, which amounted to $466,426 for the former as against $608,072 for the latter period. The only articles not reported as showing an increase are saws and tools and general castings, of which our importations were insignificant during both periods.

We have here given the figures relating to only one of our leading industries, although in many other branches of business like comparisons present themselves. In none, however, are the extremes more conspicuous, both as to prices and the increased imports, than in this department. This comes naturally enough, probably, from the great activity in railroad building, and from the wonderful growth experienced in nearly every branch of manufactures, but our iron-masters already see that extreme profits and speculative prices cannot be hereafter obtained. From a general point of view the situation is in every way encouraging, for our enormous exports of grain, provisions, and cotton still turn the balance of trade in our favor; money is abundant and cheap in all the leading centers, trade is the more healthy for the diminished tendency to speculation, and there is everywhere plenty to do for those who are willing and able to work; but, our money being good now all over the world, the standards of value here for manufactured goods must inevitably bear a fixed and definite relation to the prices obtained for like articles in the leading foreign markets.

The Millers' National Association.

At the meeting of the Millers' National Association, in Cincinnati, June 2, in connection with the Millers' International Exhibition, Mr. Alexander H. Smith, chairman of the committee on patents, advocated more liberal appropriations by Congress to the Patent Office, the abolition of the reissue of patents under new titles, the establishment of a patent court, and reforms with reference to rules for estimating damages in cases of infringement. At the same time Mr. Smith took occasion to denounce "the thieves who steal foreign processes and patent them in this country."